



IBSCON 2026

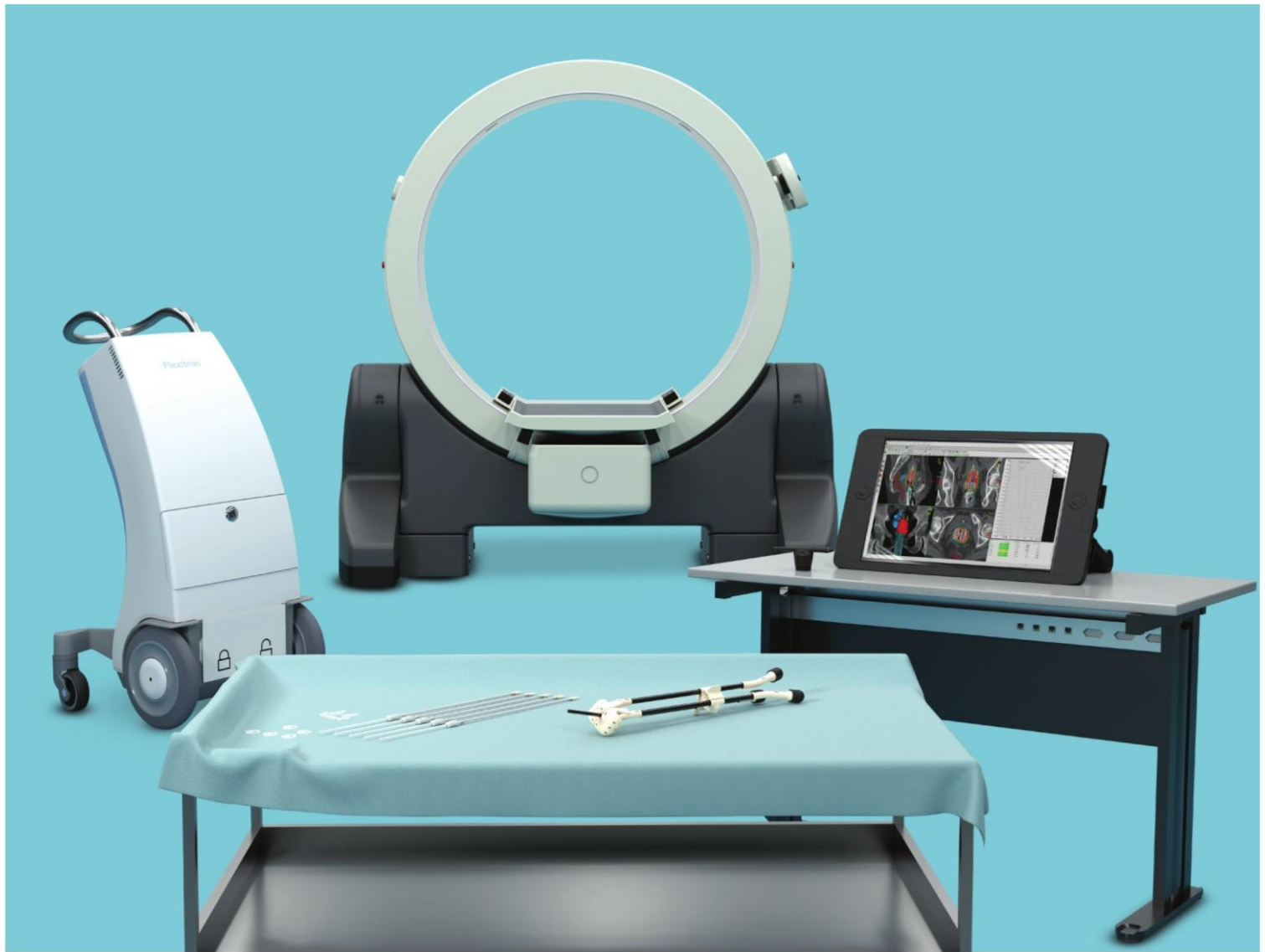
16th Annual Conference
Indian Brachytherapy Society
20-22th August, 2026

**Re-imagining Brachytherapy in
Comprehensive Cancer Care**

Precision : Personalisation : Compassion



Organized by :
Ida B Scudder Cancer centre,
Department of Radiation Oncology,
Christian Medical College, Vellore, Tamil Nadu, India



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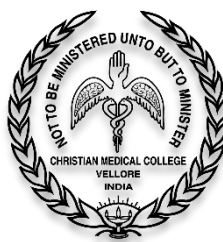
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Re-imagining Brachytherapy in Comprehensive Cancer Care
Precision: Personalization: Compassion



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Ida B Scudder Cancer Centre,
Department of Radiation Oncology,
Christian Medical College, Vellore,
Tamil Nadu, India

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Welcome note

From the desk of the Organizing committee

With great pleasure, we welcome you to be a part of the **16th Annual Conference of the Indian Brachytherapy Society – IBSCON 2026**, to be held at **Christian Medical College, Vellore**, from **August 20–22, 2026**. CMC Vellore, with its 125-year legacy of compassionate, patient-centred healthcare and clinical excellence, is honoured to host this national academic event. Our Department of Radiation Oncology—now in its 87th year—remains deeply committed to advancing high-quality cancer care that combines innovation, precision, and care.

The Theme for this Year’s Conference, ***“Re-imagining Brachytherapy in Comprehensive Cancer Care – Precision: Personalization: Compassion”*** captures our vision of integrating technological advancements with the enduring values of patient comfort and individualized treatment.

IBSCON 2026 aims to bring together experts in various fields of brachytherapy, physicists, researchers, and trainees from India and around the world. The scientific programme is being thoughtfully crafted to highlight emerging developments across brachytherapy, share pioneering research, and promote practical insights that can be applied directly to patient care. We hope that this platform will not only **enrich scientific understanding** but also **strengthen collaborations** and **inspire confidence in practising evidence-based brachytherapy**. We warmly invite you to join us in Vellore for three days of learning, meaningful exchange, and collegiality. We look forward to welcoming you to IBSCON 2026 and hope you will take back rich academic insights, renewed connections, and lasting memories.

Warm Regards,



Dr Thomas Samuel Ram

Organizing Chairperson



Dr. Patricia Sebastian

Organizing Secretary



Dr Simon Pavamani

Scientific Chair

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Office Bearers - Indian Brachytherapy Society

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Scientific Committee



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Mr Abraham Joel

Indian Brachytherapy Society: An Overview

Indian Brachytherapy Society (IBS) is a non-profit organization dedicated to academic and research activities in the field of brachytherapy and its allied sciences and was established on 5th February 2005 at Chennai. Over the past two decades, the Society has grown to include 675 life members — radiation oncologists, medical physicists, and other professionals with a keen interest in brachytherapy — making it one of the largest dedicated brachytherapy societies in the world.

Aims and Objectives

- To promote brachytherapy and its application in medicine and biology
- To identify and support clinical practice, teaching, research, and development work in brachytherapy and its related fields
- To provide a forum for persons engaged in or interested in brachytherapy, and to arrange regular scientific meetings and discussions
- To disseminate information in the field worldwide to all members of the association
- To promote academic activities in brachytherapy and allied sciences, and to study the socio-economic aspects of brachytherapy practice
- To assist government and non-government agencies in matters pertaining to brachytherapy
- To protect and preserve the interests of members, and to benefit patients by providing information directly to the consumer

A Journey of Growth

Over a period of 2 decades, IBS has steadily expanded its footprint through a continuous series of national workshops, symposia, and annual conferences hosted by institutions across the country — from Bangalore, Madurai, and Hyderabad in the early years, to Mumbai, Kolkata, Delhi, Mangalore and Varanasi in more recent times. The Society's Annual Conference, IBSCON, has become the flagship academic event for brachytherapy in India, bringing together clinicians, physicists, and researchers to share advances in technique, technology, and patient care. Since last 2 years IBS has also initiated webinars which have focused on common cancers where brachytherapy is an integral component.

Snapshot of IBS Activities

Date	Event	Organizing Secretary
February 5, 2005	Inauguration of IBS & International Seminar on Brachytherapy, Chennai	Dr. K. Thayalan
January 9–10, 2006	International Symposium cum Workshop on Prostate Brachytherapy, Apollo Specialty Hospital, Chennai	Dr. P. Mahadev
May 20–21, 2006	National Brachytherapy Update, Bangalore Institute of Oncology, Bangalore	Dr. R. Bilimaga
January 27–28, 2007	National Workshop on HDR Brachytherapy, Meenakshi Medical Mission Hospital & Research Institute, Madurai	Dr. G. Amarnath
May 3–4, 2008	National Workshop on HDR Brachytherapy, Indo-American Cancer Institute & Research Centre, Hyderabad	Dr. P. Prabhakar
September 5–6, 2008	National Workshop on Calibration of HDR Brachytherapy Source, Dr. Kamakshi Memorial Hospital, Chennai	Dr. K. Thayalan
April 25, 2009	National Workshop on Brachytherapy Update, Pravara Institute of Medical Sciences, Loni, Maharashtra	Dr. K. K. Singh
October 10, 2009	National Workshop on HDR Brachytherapy (with AROI, Guj- MP Chapter), CBCC Apollo Hospital, Ahmedabad	Dr. D Bhavsakar
December 14, 2009	Brachytherapy Workshop, CSM Medical University, Lucknow	Dr. M. S. Pant
February 13–14, 2010	1st Annual Conference, Mahavir Cancer Sansthan, Patna	Dr. J. K. Singh
July 31, 2010	Brachytherapy Symposium, Kolkata	Dr. S Saha
August 11–12, 2012	2nd Annual Conference, Bharat Hospital and Institute of Oncology, Mysore	Dr. Viswasvariah
May 4–5, 2013	3rd Annual Conference, Jupiter Hospital, Thane	Dr. R. L. Bhalavat
March 14–16, 2014	4th Annual Conference, Dr. B.R.A. Institute Rotary Cancer Hospital, AIIMS, New Delhi	Dr. D. N. Sharma
August 28–30, 2015	5th Annual Conference (with AROI, Kolkata Chapter), R. G. Kar Medical College, Kolkata	Dr. S Saha
August 26–28, 2016	6th Annual Conference, Dr. Kamakshi Memorial Hospital, Chennai	Dr. V. Srinivasan
December 10–11, 2017	7th Annual Conference (merged with International Cancer Congress, ICC), Bangalore	Dr. S Palled
May 6, 2018	National Symposium on Radiobiology of Clinical Radiotherapy, Dr. Kamakshi Memorial Hospital, Chennai	Dr. K. Thayalan
August 10–12, 2018	8th Annual Conference, Tata Memorial Hospital, Mumbai	Dr. U Mahantshetty
October 1, 2018	Brachytherapy Workshop, Jaipur	Dr. A Chougale

Date	Event	Organizing Secretary
August 30 – September 1, 2019	9th Annual Conference, Father Muller Medical College, Mangalore	Dr. M. S. Athiyaman
December 21–22, 2019	Brachytherapy Head & Neck Workshop, Indo-American Hospital, Hyderabad	Dr. K Raju
January 31 – February 1, 2020	Cadaveric Brachytherapy Hands-on Workshop on Head & Neck Brachytherapy, Ramaiah Medical College, Bangalore	Dr. M. G. Janaki
March 31, 2020	Brachytherapy Workshop, Oncology Society of Himachal Pradesh, Shimla	Dr. M Gupta
—	10th Annual Conference was not held due to the COVID-19 pandemic	—
November 13, 2021	11th Annual Conference, Virtual Meeting	Dr. U Mahantshetty
August 12–14, 2022	12th Annual Conference, Kidwai Memorial Institute of Oncology, Bangalore	Dr. C. R. T. Pasha
August 5–6, 2023	13th Annual Conference, Mahamana Pandit Madanmohan Malviya Cancer Centre & Homi Bhabha Cancer Hospital, Varanasi	Dr. A Mukherji / Dr. S. Pradhan
August 23–25, 2024	14th Annual Conference, Medanta – The Medicity, Gurugram	Dr. S Banerjee
October 5-6, 2025	Fundamentals in Brachytherapy- A practical Approach	Dr B Rai
March 20, 2025	1 st Webinar on HDR Brachytherapy for Prostate Cancers	Dr V Anand
April 5-6, 2025	Hands on workshop for Gynecological Cancers	Dr Karthiga S
August 29–31, 2025	15th Annual Conference, National Cancer Institute, AIIMS, New Delhi	Dr A Sharma
January 22, 2026	2 nd Webinar of Brachytherapy for Head Neck Cancers	Dr A Budrukhar
July 16-17, 2026	Workshop on Brachytherapy for Gynecological Cancers	Dr A Goel/ Dr S Bhatta

Research, Guidelines, and Collaboration

Journal of Contemporary Brachytherapy is the official journal of IBS, co-partnered with the Polish Brachytherapy Society. IBS members remain at the forefront of original research, case reports, and clinical publications in the field. The Society has been particularly active in developing and publishing consensus guidelines for brachytherapy across major disease sites — including cervical, head and neck, and breast cancers — often in collaboration with international bodies

such as the American Brachytherapy Society (ABS) and GEC-ESTRO. A notable example is the joint IBS/GEC-ESTRO/ABS recommendations for CT-based target contouring in image-guided adaptive brachytherapy for cervical cancer.

Looking Ahead

IBS continues to work towards strengthening brachytherapy practice across India through hands-on workshops, focused training programmes, and site-specific special interest groups, with a special emphasis on reaching centres where brachytherapy remains under-utilized. The Society is also committed to advancing quality assurance and sub-specialization among medical physicists, dosimetrists, radiation technologists, and nursing staff, and to encouraging research towards indigenous, cost-effective brachytherapy equipment and accessories — all without compromising on quality of care.

As IBS looks into the future, it remains guided by its founding vision: to promote brachytherapy as an indispensable, precise, and deeply patient-centred modality in the fight against cancer, and to nurture the next generation of practitioners who will carry this mission forward.

Dr. DN Sharma

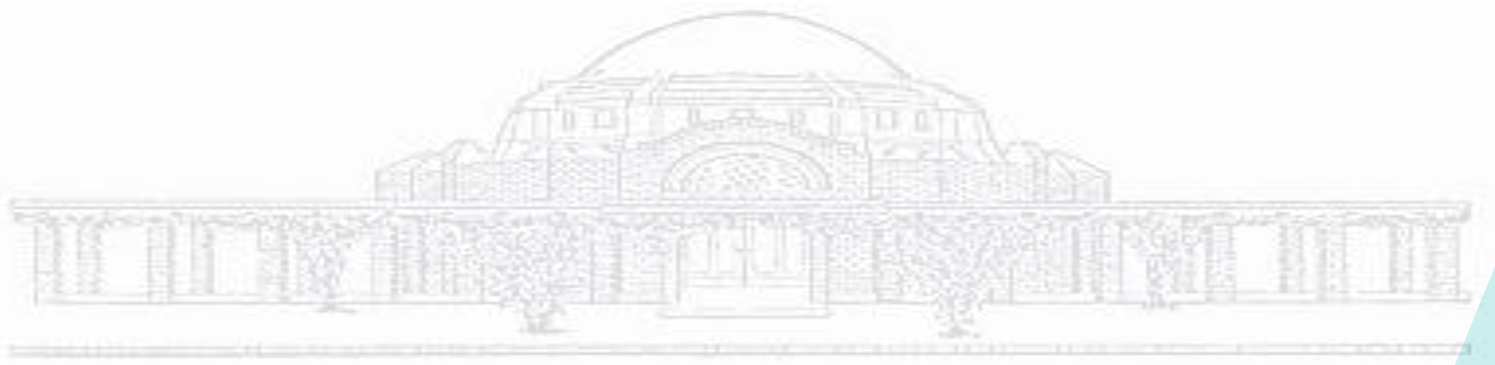
President,

Indian Brachytherapy Society

Dr. Ashwini Budrukhar

Secretary,

Indian Brachytherapy Society



16th Annual Conference **Indian Brachytherapy Society** **IBSCON 2026**

Felicitations



Organized by

Dr. Tida B. Scudder, Cancer Centre
Department of Radiotherapy/Oncology
Chauhan Medical College, Jaipur



MESSAGE FROM THE PRESIDENT

INDIAN BRACHYTHERAPY SOCIETY

Dear Colleagues and Friends,

It gives me immense pleasure to welcome you all to the **Annual Conference of the Indian Brachytherapy Society (IBS) 2026**, being held at the prestigious **Christian Medical College, Vellore**.

Brachytherapy has always been an integral and evolving component of modern radiation oncology. Over the years, India has witnessed remarkable advances in brachytherapy techniques, imaging, treatment planning, technology, and clinical applications. The Indian Brachytherapy Society has played an important role in promoting excellence in clinical practice, education, research, and training in this field.



The theme of our annual conference provides us with an opportunity to reflect on these advances while looking ahead to the future. The rapid integration of **image-guided brachytherapy, adaptive treatment planning, automation, artificial intelligence, and novel approaches to personalized treatment** is transforming the way we deliver brachytherapy. At the same time, it remains our responsibility to ensure that these advances translate into accessible, safe, evidence-based, and high-quality care for our patients.

This conference will bring together experts, young professionals, researchers, medical physicists, radiation therapists, and other colleagues from across the country and beyond. I am confident that the scientific programme will provide an enriching platform for sharing knowledge, discussing challenging cases, presenting innovative research, and fostering meaningful academic collaborations.

I am particularly delighted that **CMC Vellore**, an institution renowned for its commitment to excellence in healthcare, education, and research, is hosting this year's conference. I am sure that the academic environment and warm hospitality of CMC Vellore will make this meeting both intellectually stimulating and memorable.

I encourage our young colleagues to participate actively in the scientific deliberations, present their work, ask questions, and engage with the leaders in the field. The future of brachytherapy in India depends upon nurturing the next generation of professionals and encouraging innovation and collaborative research.

I extend my sincere appreciation to the organizing committee, faculty, delegates, sponsors, and all members of the Indian Brachytherapy Society whose efforts have made this meeting possible.

I look forward to welcoming you all to **Vellore** for an engaging, inspiring, and academically rewarding conference.

With warm regards and best wishes,

Dr. D. N. Sharma

President, Indian Brachytherapy Society



MESSAGE FROM THE SECRETARY

INDIAN BRACHYTHERAPY SOCIETY

It gives me immense pleasure to welcome you to the 16th Annual Conference of the Indian Brachytherapy Society – IBSCON 2026, being hosted by the Christian Medical College, Vellore, from 20th to 22nd August 2026.



Brachytherapy has always occupied a unique and indispensable position in radiation oncology. More than a century after its inception, it continues to evolve with remarkable advances in imaging, applicators, treatment planning, image guidance, automation and artificial intelligence. Yet, at its core, brachytherapy remains a discipline that brings together precision, clinical judgement, technical expertise and the human touch. It is this unique combination that continues to make brachytherapy relevant in an era of rapidly advancing external beam radiation techniques. The theme of this year's conference, "Re-imagining Brachytherapy in Comprehensive Cancer Care – Precision: Personalisation: Compassion," is particularly meaningful. It reminds us that technological progress should ultimately translate into better patient care.

The Indian Brachytherapy Society (IBS) has grown remarkably since its inception with a continued commitment to promoting education, research, training and the appropriate use of brachytherapy across the country. Our collective efforts have contributed to the development of guidelines, dissemination of knowledge, hands-on training and greater collaboration with national and international organizations. IBS has also remained committed to encouraging young radiation oncologists, medical physicists, radiation therapists and nursing professionals to acquire and advance their skills in this highly specialized field.

IBSCON provides an important opportunity to bring together this diverse community. This year's scientific programme promises an exciting blend of expert-led lectures, cadaveric hands-on training, case-based discussions, technological demonstrations, research presentations and resident-focused teaching. The inclusion of specialised hands-on workshops in Head & Neck and Sarcoma Brachytherapy further reflects our commitment to translating knowledge into clinical skills.

I would like to express my sincere appreciation to the CMC Vellore team, faculty members, invited speakers, industry partners and all those who have worked tirelessly to bring this meeting together. I also thank IBS office bearers and executive committee members for their continued support and commitment to the Society's activities.

As we gather in the historic and academically vibrant setting of CMC Vellore, let us celebrate what brachytherapy has achieved, critically examine where we stand today, and, more importantly, envision how we would like to take it further.

I warmly welcome each one of you to IBSCON 2026 and hope that these three days will be filled with learning, meaningful scientific dialogue, collaboration, friendship and inspiration.

With warm regards,

Dr. Ashwini Budrukhar
Secretary
Indian Brachytherapy Society



CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA

OFFICE OF THE DIRECTOR

It gives me immense pleasure to extend my warm greetings and best wishes to the organizers and participants of the National Conference of the Indian Brachytherapy Society (IBSCON 2026), being hosted by the Department of Radiation Oncology, Christian Medical College, Vellore, from 20-22 August 2026.

Brachytherapy continues to play a pivotal role in the multidisciplinary management of cancer, offering precise, effective, and patient-centered treatment. Conferences such as IBSCON provide an invaluable platform for clinicians, researchers, medical physicists, radiation technologists, and trainees to exchange knowledge, share innovations, and strengthen professional collaborations that ultimately enhance patient care.



I commend the organizing committee for their dedication and meticulous efforts in bringing together experts from across the country to foster scientific excellence and advance the field of brachytherapy.

I wish IBSCON 2026 every success and hope that the deliberations during the conference will inspire new ideas, meaningful collaborations, and continued progress in radiation oncology for the benefit of patients and society.

With my best wishes for a successful conference.



Dr. Biju George
Director



CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA

OFFICE OF THE PRINCIPAL

Dear Friends,

I congratulate the faculty of the Department of Radiation Oncology for their leadership and vision to organise the Indian Brachytherapy Society Conference 2026 themed **“Re-imagining Brachytherapy in Comprehensive Cancer Care – Precision: Personalization: Compassion”**. Providing quality precision care for patients with cancer is always challenging, requiring highly skilled and dedicated clinicians, nurses, allied health professionals and innovative technology. There are several aspects of cancer care that needs to be addressed. A conference like this provides the right platform to discuss and enhance appropriate use of brachytherapy in comprehensive cancer care.



Research in this area will definitely enhance patient care and I am happy to note that there will be several talks and posters, showcasing current and relevant research that is being carried out to address several unanswered questions related to translating excellence in the field of brachytherapy. The conference has several expert speakers to inspire and impart the latest evidence-based strategies and global guidelines for brachytherapy.

Christian Medical College, Vellore has always focussed on excellence in education, patient care and research. The Radiation Oncology department has grown from its small beginnings, to providing state of the art clinical services, excellent educational programs, and conducting relevant research, thus carrying forward the vision of the institution.

I am sure that this conference will serve as an excellent platform for networking, collaboration, sharing of best practices and experiences. May every patient receive the best possible care. We thank God for making this possible.

Regards and best wishes.

Dr. Solomon Sathishkumar
Principal,
Christian Medical College, Vellore.



CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA

OFFICE OF THE MEDICAL SUPERINTENDENT

Greetings from the Office of the Medical Superintendent!

I am happy to note that you are organizing the **Indian Brachytherapy Society Conference (IBSCON 2026)** from 20th to 22nd August 2026 at Christian Medical College, Vellore.



IBSCON 2026 will be an outstanding academic forum that brings together distinguished Clinicians, Researchers, Medical Physicists, Radiation Oncologists, and other Healthcare Professionals. The conference will provide a vibrant platform for exchanging knowledge, discussing emerging trends, presenting original research, and fostering interdisciplinary collaborations. Such interactions will not only enrich professional expertise but also inspire innovation, strengthen clinical practice, and ultimately enhance the quality of patient care.

I would like to wish God's choicest blessings on each one of you who are being professionally trained to be excellent care givers.

With warm regards,

Yours sincerely,

Dr. I. Rajesh

Medical Superintendent



CHRISTIAN MEDICAL COLLEGE, VELLORE, INDIA

OFFICE OF THE NURSING SUPERINTENDENT

It is a great privilege to extend my heartfelt greetings to the organizers, faculty, and delegates of the Indian Brachytherapy Society Conference (IBSCON 2026), hosted by the Department of Radiation Oncology, Christian Medical College, Vellore.

Cancer care is far more than the treatment of disease—it is the restoration of hope, dignity, and quality of life. Every advancement in brachytherapy represents not only scientific excellence but also an unwavering commitment to alleviating suffering and bringing healing to countless lives. Conferences such as IBSCON serve as powerful platforms for innovation, collaboration, and the exchange of knowledge that ultimately transforms patient care.



I warmly congratulate the Department of Radiation Oncology, Christian Medical College, Vellore, and the Indian Brachytherapy Society for organizing this prestigious conference. May this gathering stimulate meaningful discussions, inspire pioneering research, strengthen interdisciplinary collaboration, and renew our collective commitment to excellence in oncology care.

May IBSCON 2026 stand as a landmark in advancing precision medicine, enhancing patient outcomes, and shaping the future of cancer care. I wish every delegate an enriching academic experience, fruitful professional interactions, and every success for this remarkable conference.

"Together, let us transform knowledge into innovation, innovation into healing, and healing into hope."

With warm regards and best wishes,

Mrs Alice Sony

Nursing Superintendent

Christian Medical College Vellore



MESSAGE FROM THE ORGANIZING CHAIRMAN

On behalf of our institution and department, it is a great privilege to welcome you all to IBSCON 2026 at Christian Medical College, Vellore. IBSCON 2026 is a gathering of the brachytherapy learning community devoted to advancing its science, practice and art and, ultimately, improving the care we offer our patients.

This conference is particularly special for us as CMC Vellore celebrates 126 years of healing ministry, founded by Dr. Ida S Scudder on the values and ethos of integrity, compassion, and excellence. It is also an opportunity to remember our founder's niece Dr. Ida B. Scudder, and those who came before us. On 23rd December 1939, Dr. Ida B Scudder treated the first radiation therapy patient at CMC using radium surface application. That moment heralded the beginning of radiation therapy and brachytherapy at our institution and reminds us that innovation has always been part of our heritage.



The theme of this year's conference, "Re-imagining Brachytherapy in Comprehensive Cancer Care – Precision: Personalization: Compassion," reflects our shared vision of blending technological excellence with contextual relevance.

Over the past 25 years, brachytherapy has entered the modern era and transformed from LDR to HDR, from two-dimensional planning to image guidance, and from relatively simple applicators to increasingly sophisticated applicator designs for optimal geometry. Yet, the purpose has remained unchanged: to deliver the right treatment, to the right patient, with the right precision, and above all with compassion.

The next phase of brachytherapy will require us to go beyond dosimetry towards biological and personalised treatment. It must also champion advocacy for equitable access to brachytherapy, so that the best of our care and science reaches the unreached. I hope IBSCON 2026 will provide the opportunity to learn, question, share and, importantly, think together about where our specialty should go next.

I thank all our faculty, staff, students, delegates, colleagues, industry partners, volunteers and the Organizing team for making this conference possible. I hope you find IBSCON 2026 scientifically stimulating, professionally enriching and personally memorable.

I wish the conference a great success!

Warm regards,

Dr. Thomas Samuel Ram MD MBA FICRO

Organizing Chairman, IBSCON 2026



MESSAGE FROM THE ORGANIZING SECRETARY

It is with immense gratitude and privilege that we welcome you to **IBSCON 2026, the 16th Annual Conference of the Indian Brachytherapy Society**, hosted by the Department of Radiation Oncology, Christian Medical College (CMC), Vellore.

The story of CMC Vellore is one of vision, compassion, and service. In the 1890s, Dr. Ida Sophia Scudder responded to a pressing need she witnessed firsthand: women who suffered and died because they could not access medical care from women physicians. Inspired by this need and guided by Jesus her Lord, she established what would become Christian Medical College, Vellore. Continuing this legacy, her niece, **Dr. Ida Bella Scudder**, recognized the emerging need for radiological services and played a pivotal role in developing the fields of Radiology and Radiation Oncology at CMC.



Today, as we celebrate **86 years of dedicated service to the nation in Radiation Oncology**, we are honoured to host colleagues, teachers, mentors, researchers and trainees from across the country for IBSCON 2026.

Our institutional motto is drawn from the words of Jesus Christ: "**Not to be ministered unto, but to minister.**" These words remind us that we are called not to be served, but to serve. As healthcare professionals, this spirit of service guides our commitment to patients, colleagues, students, and the wider community. It is in this same spirit that we welcome each one of you to this conference.

Brachytherapy remains one of the most effective methods of delivering radiation therapy. It offers high precision, the ability to deliver high heterogeneous doses directly to the target, shorter treatment durations, and a cost-effective approach that can significantly benefit our patients making it the best suitable option for them when indicated. However, its successful practice requires dedication, training, and the acquisition of specialised skills.

As a community of radiation oncologists, we have a responsibility to encourage and equip the next generation with the knowledge, confidence, and expertise needed to practice brachytherapy effectively. The true success of this conference will not merely be measured by scientific sessions or discussions, but by how many participants leave inspired, empowered, and better prepared to incorporate brachytherapy into their clinical practice whenever indicated.

Through the academic programme, hands-on learning opportunities, and interactions with experts, we hope to foster greater confidence, enhance practical skills, and strengthen our collective commitment to advancing brachytherapy in India.

We are deeply honoured to host you at **IBSCON 2026** and sincerely hope that your time with us will be academically enriching, professionally rewarding, and personally memorable.

We look forward to welcoming you to CMC Vellore.

Warm regards,

Dr. Patricia Sebastian

Organizing Secretary, IBSCON 2026



MESSAGE FROM THE SCIENTIFIC CHAIR

Greetings from the Scientific Committee of IBSCON 2026!

Brachytherapy, or, to use its contemporary name ‘Interventional Radiotherapy’, initiated the use of radiation as a therapeutic treatment modality in the early years of the twentieth century. It preceded external beam radiotherapy by a few decades. Therefore, it is exhilarating to see that Brachytherapy Societies around the world, including the Indian Brachytherapy Society, are active and are promoting this treatment modality.



Brachytherapy is almost entirely dependent on the clinical skills and experience of the Radiation Oncologist and the supporting team. Developments in technology and Artificial Intelligence will certainly define new ways to improve treatment outcomes and toxicity profile of the patients we treat. Nevertheless, the Radiation Oncology team will continue to be the centre of any Brachytherapy programme.

At IBSCON 2026, we have curated a scientific programme which will cater to Radiation Oncology trainees as well as senior Brachytherapy experts. The proceedings commence with a Cadaveric Workshop for those who are in the initial stages of their Brachytherapy journey. This will be followed by a busy two days of Presentations, Discussions and Keynote Lectures. Experts in Brachytherapy from India and around the world have graciously accepted our invitation to share their knowledge and experience during IBSCON 2026. We are indebted to them for agreeing to share their expertise. Multidisciplinary panel discussions with colleagues from other specialties will attempt to highlight real-life situations and processes which help choose the treatment modality and sequence when necessary. We thank Reviewers and Committee members for ensuring a high quality and academic rigour of the scientific proceedings.

We are sure the deliberations at IBSCON 2026 will continue to forward discussions, collaborations and research that will push the boundaries of Brachytherapy as a radiation treatment modality.

With best wishes,

Dr. Simon P Pavamani,

Professor,

Department of Radiation Oncology, CMC Vellore.

Chair, Scientific Committee, IBSCON 2026



SCIENTIFIC PROGRAMME

Workshop

IBSCON 2026

Venue – Department of Anatomy, Skills lab, 2nd floor, Bagayam Vellore

Talk / Lecture

Panel discussion

Hands on / Video demo

Debate

Hands-on cadaveric brachytherapy workshop for Head and neck and Sarcoma

Time	Session type	Topic	Speaker/ Resource persons	
10:00		Registration and coffee time	Organizing Team	
11:00		Welcome	Dr Thomas Samuel Ram Dr Patricia Sebastian	
11:15	Talk	Indications and Patient Selection for Head & Neck Brachytherapy	Dr Sarthak Tandon	
11:30	Talk	Implant Principles, Anatomy, and Technique Overview for Head & Neck Brachytherapy	Dr Judith Aaron	
11:40	Panel Discussion	Indications and Patient Selection for Soft tissue sarcoma Brachytherapy; Implant Principles	Dr Tarun Jose Dr Patricia Sebastian	Dr Siddhartha S Laskar Dr Nehal Khanna Dr Hasib A G Dr Sudharshan Gupta Dr Paul Trinity Stephen D Dr Bharti Devnani
11:55	Video Demonstration	Implant Procedure	Dr Rajendra Benny K Dr Patricia Sebastian	Dr Ashwini Budrukkar Dr Jose Luis Guinot Rodriguez Dr Siddhartha S Laskar Dr Nehal Khanna



Hands-on cadaveric brachytherapy workshop for Head and neck and Sarcoma

13:30	Hands on	Hands on – Sarcoma Brachytherapy	STS Team: Dr Patricia Sebastian Dr Paul Trinity Stephen D Dr Tarun Jose Dr Praneet Raj Pathivada Dr Sudharshan Gupta Dr Bharti Devnani	
14:30	Hands on	Hands on – Head & Neck Brachytherapy	Head & Neck Team: Dr Rajendra Benny K Dr Jino Victor Wilson Dr Arun Paul Dr Vidutha Ravi Pavan Dr Glynis F. Francis Dr Gagana Shree Dr Madhuri Shaw	
15:30	Talk	Contouring in Head and Neck Brachytherapy	Dr Jino Victor Wilson	
15:40	Talk	Contouring in Soft tissue sarcoma Brachytherapy	Dr Praneet Raj Pathivada Dr Patricia Sebastian	
15:50	Talk	RT Planning Session • Reconstruction of Catheters • Plan Optimization • Dose Evaluation and DVH Review	Ms Sheeba G Mr Jaya Krishna Kumar K	Dr Thayalan Kuppusamy Dr Paul Ravindran
16:15		Wrap-up & Closing Remarks		



Day **1**
21.08.2026

IBSCON 2026

Venue – Scudder Auditorium, CMC College Campus, Bagayam, Vellore

Start	Session Type	Topic	Speaker	Chairperson
8:00		Oral Paper Presentations (6 x 10 min) and Poster Presentations		
Introductory Session				
9:30	Lecture	From Past to Present History, Evolution and Physics of Brachytherapy	Dr Paul Ravindran	Dr Thayalan Kuppasamy Dr V Srinivasan Dr Rabi Raja Singh Dr Satheesh Babu
9:50	Lecture	Why Brachytherapy Matters: Clinical Impact and Cost-Effectiveness in India and the Subcontinent	Dr Thomas Samuel Ram	
10:10	Lecture	Getting It Right Every Time: Quality Assurance and Safety in Brachytherapy	Dr Henry Finlay Godson	
10:30	Lecture	Radiotherapy Technician's perspective	Mr Abraham Joel	



11:00		Inaugural Ceremony		
12:00		Keynote session : The Place of Brachytherapy in an Evolving World	Dr Jose Luis Guinot Rodriguez	Dr Ashwini Budrukhar Dr DN Sharma
13:00		Precision Therapy for Eye Tumours: Ocular Brachytherapy	Dr Vijay Anand Reddy	Dr Deepthi Elizabeth Kurian Dr Subhashini John



Gynaecological brachytherapy				
14:30	Lecture	What's New in Vaginal Brachytherapy?	Dr Ram Madhavan	Dr V Srinivasan Dr Hasib AG Dr Hannah Mary Thomas
14:40	Lecture	MRI-Guided Adaptive Brachytherapy and the Emerging Role of AI: Current Standards and Real-World Challenges	Dr Alexandra Taylor	
15:20	Lecture	Hybrid Intracavitary-Interstitial Techniques in Gynaecological Cancers: 3D Printing and Complex Treatment Planning	Dr Umesh Mahantshetty	
15:40	Panel Discussion	Advanced Cervix Brachytherapy: Expert Panel Discussion	Dr Alexandra Taylor Dr Umesh Mahantshetty Dr Harjot Bajwa Dr Ajit Sebastian Dr Shobiga Natarajan Moderator: Dr Jebakarunya Rami Reddy	Dr Karthiga Sivaprakasam Dr C Vasanth Christopher Jayapaul
16:10	Lecture	Molecular Markers in Cervical Brachytherapy: Are We Ready for Personalized Care?	Dr. Ankita Gupta	

Special Sites				
16:30	Lecture	Managing Complexity: Challenges in Extremity Soft Tissue Sarcoma Brachytherapy	Dr Siddhartha S Laskar	Dr Simon Pradeep Pavamani Dr Vijayshree T N Dr Monali Swain
16:50	Lecture	Modern Approaches in Skin Brachytherapy	Dr Kanhu Charan Patro	
17:10	Lecture	Breast Brachytherapy: Is it a dying art in India?	Dr Tabassum Wadasadawala	
17:30	Lecture	Brachytherapy for Lung Cancer	Dr D N Sharma	
18:00	Meeting	IBS General Body meeting		



Day 2
22.08.2026

IBSCON 2026

Venue – Scudder Auditorium, CMC College Campus, Bagayam Vellore

Start	Session Type	Topic	Speaker	Chairperson	
7:30		Best Proffered Papers			
Head and Neck Brachytherapy					
8:45	Panel Discussion	Early Oral Cavity Cancer:To operate or to radiate?	Dr Monali Swain Dr Kirushna Kumar Dr Gunaseelan Dr Jose Luis Guinot Rodriguez Dr Ashwini Budrukkar Dr Konduru Vidya Dr Aparna I Moderators: Dr Jino Victor Wilson Dr Rajendra Benny K	Dr Ramesh Purohit Dr Nagarajan Murugaiyan Dr Rajesh I	
9:30	Lecture	Brachytherapy for Oropharynx	Dr Ashwini Budrukkar		
9:50	Lecture	Intraoperative Brachytherapy	Dr Tanvir Pasha C.R		
10:30		Trade Talk: Elekta Studio : Unleash the Full Potential of Adaptive Interventional Brachytherapy See. Adapt. Treat .	Mr A N Muralidharan, Director South .		
Soft Tissue Sarcoma brachytherapy					
10:50	Debate	Brachytherapy versus EBRT in Sarcoma Care- debate	Dr Bharti Devnani vs Dr Mayur Mayank Judge: Dr Rajesh Balakrishnan	Dr Vikram Maiya Dr Paul Trinity Stephen D	
11:20	Panel Discussion	Case vignettes and practical inputs	Dr Susovan Banerjee Panelists: Dr SadanandSharosh Gandhi Dr Saumyanranjan Mishra Dr Anil Mathew Dr Madhavi Kandagaddala Dr Anne Jennifer Priscilla V		
11:40		Trade Talk - Master the art of brachytherapy - Precision in Practice. Elegance in Execution	Heiko Müller Senior Product Manager Brachytherapy Applicators		
Paediatric brachytherapy					
12:00	Lecture	Pediatric pelvic brachytherapy- CMC Journey	Dr Patricia Sebastian Dr Arun Kumar Loganathan	Dr P B Anand Rao Dr Saikat Das	
12:20	Lecture	Saving Organs, Saving Futures: The Promise of Pediatric Brachytherapy	Dr Sophie Espenel (Online)		
12:40	Lecture	Challenges and Lessons learnt from pediatric head and neck brachytherapy practice	Dr Nehal Khanna		
 GE Luncheon Talk					
Rectal Brachytherapy					
14:00	Lecture	Survivor's perspective	Mr Mark Davies - Cousins		
14:10	Lecture	Rectal Brachytherapy Today: Patient Selection and Technical Considerations	Dr Reena Engineer		
14:30	Lecture	Contact Brachytherapy for Organ Preservation in Rectal Cancer	Dr Arthur Sun Myint		
14:50	Panel Discussion	Contact Brachytherapy versus Surgery versus Watch-and-Wait: Making the Right Choice	Dr Mayur Mayank Dr Arthur Sun Myint Dr Anuradha Chandramohan Dr Rajat Raghunath Dr Ajoy Oommen John Moderator: Dr Rohan Samuel Thomas	Dr Kirti Srivastava Dr Kirushna Kumar	
Genito Urinary Brachytherapy					
15:30	Lecture	HDR Monotherapy in Low-risk prostate cancer	Dr Vivek Anand	Dr Francis James	
15:50	Lecture	Treatment intensification for High-Risk Prostate Cancer	Dr Sushil Beriwal	Dr Balu Krishna S	
16:10	Lecture	Salvage Brachytherapy in Prostate Cancer	Dr Siddanna Rudrappa Palled	Dr Santosh Kumar	
17:00	Valedictory & Awards				



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- **Utmost & Unprecedented Flexibility**
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PROTEIN in 20 ml

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Can be used in a fluid restricted diet
Can be added to hot/cold food and drinks

DUTCH MEDICAL FOOD

Proti*Medic[®]

10g

PROTEIN in 20 ml

40 KCAL SUGAR FREE

Can be used in a fluid restricted diet
Can be added to hot/cold food and drinks

DUTCH MEDICAL FOOD

Proti*Medic[®]

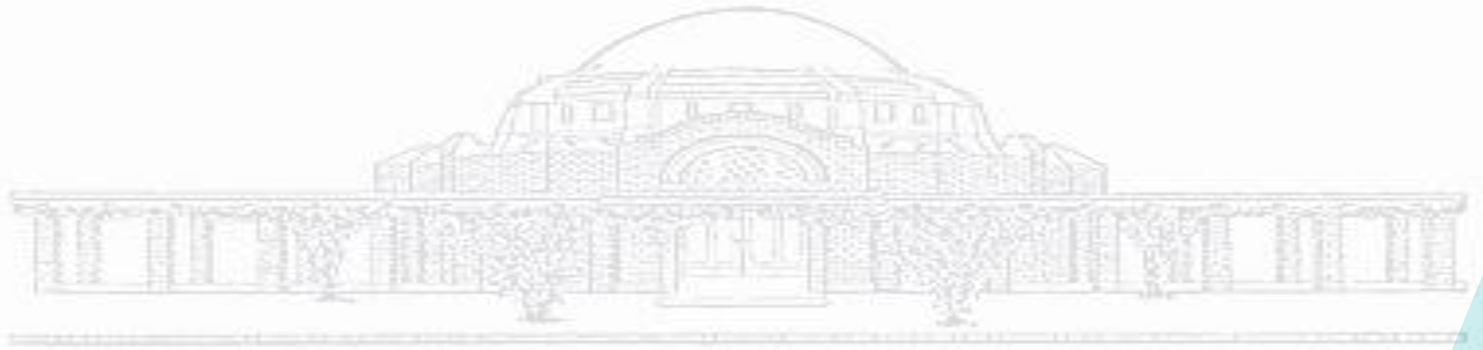
10g

PROTEIN in 20 ml

40 KCAL SUGAR FREE

Can be used in a fluid restricted diet
Can be added to hot/cold food and drinks

DUTCH MEDICAL FOOD



16th Annual Conference **Indian Brachytherapy Society** **IBSCON 2026**

***History and Legacy of
CMC Vellore***



Organized by:

Dr. J. B. Sridhar, Cancer Centre
Department of Radiation Oncology
Christian Medical College, Vellore

THE HISTORY AND LEGACY OF CMC

Christian Medical College (CMC), Vellore, was founded by an American missionary's daughter, Ida Sophia Scudder. Born in South India in 1870, Ida Scudder spent most of her childhood in the US and was educated there. Although her grandparents, Rev. John Scudder and his wife, Harriet Waterbury Scudder were the first of the Scudders to arrive in India as medical missionaries, and her parents and most other members of her extended family had served as missionaries in India, this was not the life she wanted.



One night, while visiting her parents at their home in India, her life was turned around. As she sat alone at her desk, in her room in her parents' bungalow, she heard steps coming up to the veranda, and, looking up she saw a very tall and fine-looking Brahmin gentleman. She asked him what she could do for him.

He said that his little wife, a mere child, was in labour and having a very difficult time and the untrained midwives said that they could do nothing for her. He asked if she could go and help her. She told him that she knew absolutely nothing about midwifery, but that her father was a doctor. When he returned from a call, he would gladly come and help. The man drew himself up and said, "Your father? Come into my home and take care of my wife? She had better die than have anything like that happen." Ida took the man to her father, and together, they pleaded with him to let Ida's father help the man's wife. Ida promised that she would also be there to assist. Still, the man refused, and left, displeased since Ida wasn't able to help.

This encounter shook Ida, and as she sat at her desk, thinking about everything that had just happened, she heard footsteps again, coming up to the house. Ida jumped up, hoping that the man had returned to finally accept their help, but instead of seeing the Brahmin gentleman, she saw a Muslim gentleman who had come to see her, and was horrified to hear the exact same plea from him. His wife too was dying. Would she come and help? Again, she told him that she knew nothing about midwifery and her father who was the doctor would help and she would assist him. A scornful answer made her heart sad. He utterly refused saying that no one outside his family had ever looked upon the face of his wife

'She had better die than have a man come into the house,' he said, and he left. She went back to her room with her heart so burdened that she hardly knew how to overcome it. After some time of thinking and trying to distract herself, she again heard footsteps, and running to the door, looked out to see if any of the men had returned, but again she was more than horrified to have the same plea coming from a third man, who refused just as the others had done, and vanished into the darkness.

"I could not sleep that night – it was too terrible. Within the touch of my hand were three girls dying because there was no woman to help them. I spent much of the night in anguish and prayer."

I did not want to spend my life in India. My friends were begging me to return to the joyous opportunities of a young girl in America, and I somehow felt that I could not give that up. I went to bed in the early morning after praying much for guidance. I think that was the first time I ever met God face to face, and all that time it seemed that He was calling me into this work.

Early in the morning I heard the 'tom-tom' beating in the village and it struck terror in my heart, for it was a death message. I sent our Servant, who had come up early, to the village to find out the fate of these three women, and he came back saying that all of them had died during the night. As a funeral passed our house during the morning, it made me very unhappy. I could not bear to think of these young girls as dead.

Again I shut myself in my room and thought very seriously about the condition of the Indian women and after much thought and prayer, I went to my father and mother and told them that I must go home and study Medicine, and come back to India to help such women. “

Having resolved to help the women and children of India, she returned to the US to study as a doctor, graduating from Cornell University Medical College in 1899, among the first batch of women. She started her medical work in Vellore in 1900, using one room in her parents' bungalow as a one-bedded clinic-cum-dispensary.

In view of her earlier experience, her focus was on women and children; at that time there were hardly any women doctors in India. Gradually her reputation grew, and with it, the demand for her services.

In 1902, she opened the 40-bedded Mary Taber Schell Memorial Hospital, built using funds donated in the USA. In 1924, a new 267-bedded hospital was opened in the centre of Vellore, which has continued to expand there ever since.

Right from the beginning, Ida knew that she needed to train women to help women. Initially it was compounders – modern day pharmacists – and nurses. Formal nurse training began in 1909. By the year 1918, she proudly opened the Missionary Medical School for Women, which offered the LMP (Licensed Medical Practitioner) course. In 1942 this was upgraded to a full MBBS degree course, and men were admitted from 1947 onwards. The Nursing School became the first College of Nursing in India in 1946 and is now a WHO collaborating centre for Nursing and Midwifery. Ida Scudder is famous as the founder of the Christian Medical College and its associated hospitals, but her legacy is far greater than the institution and its buildings.

She brought new hope and dignity to women in South India, giving them the benefits of modern medicine previously denied them by cultural barriers. She opened up the health care professions to women from all faiths and backgrounds, encouraging families to allow their daughters to train as nurses and doctors and showing by her own example and her students' achievements that women could equal men both in medical studies and clinical proficiency, and excel in leadership even in the toughest of times.



Ida inspired hundreds of young medical professionals to take the words of Jesus as their motto. He said that he had come, “not to be served but to serve.” Many of her graduates dedicated their lives to bringing healthcare and new hope to remote areas of India. Others continued to serve in Vellore, passing on the torch of knowledge, skill and compassionate caring to new generations.

At the same time, Ida never lost “the common touch”. Patients loved her because of her compassionate care for them and the way, even after retirement, she used to sit beside them in their pain and hold their hands. Her students loved her because she made them her family, spending her off-duty time with them for relaxation and fun, and not just studies. Her colleagues and staff members respected her trust in them and her integrity, tireless hard work and indefatigable spirit as she strove to build “not a medical college, but the Kingdom of God”.

Ida Scudder, who never had any postgraduate medical training, was a pioneer in many areas: medical training for women, roadside clinics, new initiatives in education and research.

She recognized the value of research and both published papers herself and encouraged others to do so. She worked hard to ensure CMC was at the forefront of introducing new treatments and acquiring the latest equipment. Her commitment to improving the quality and effectiveness of medical practice has resulted in CMC Vellore being one of the leading medical research institutes in India.

For her pioneering and immense contributions in the field of healthcare, Dr Ida Scudder was awarded the Kaisar-i-Hind Medal for Public Service in India, in 1920 - the highest civilian honour of the time. Dr Ida Scudder passed away in 1960 leaving behind a hospital which has now grown into multiple campuses with its service areas reaching out to the unreachable, providing quality health care to the marginalised and needy. In the next few decades, CMC made great strides in developing tertiary care, pioneering cardiothoracic surgery, neurosurgery, paediatric surgery and renal transplantation in India.



GROWTH OF CMC OVER THE YEARS

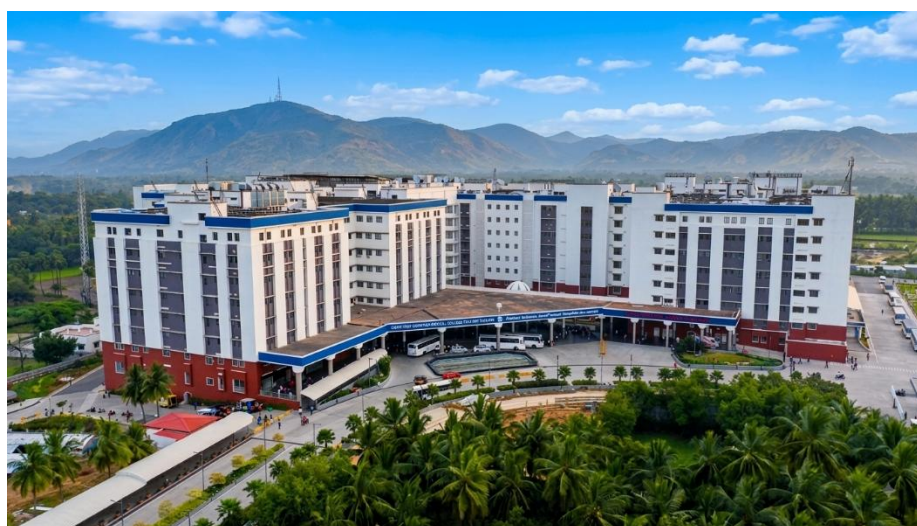
Today, CMC Vellore’s network of primary, secondary, tertiary and quaternary care teaching hospitals are spread across seven campuses in Vellore, Ranipet and Chittoor, Andhra Pradesh. Together, CMC Vellore is a 3005 bedded multi-speciality medical institution of international repute.

The CMC Vellore Hospital Campus or the Town Campus located at the centre of Vellore City is the parent node of CMC. It began as the Cole Dispensary in 1923. The CMC hospital offers a large range of medical specialities, with advanced diagnostic and therapeutic services, alongside primary and secondary level care for local communities, catering to 1,43,514 inpatients and 31,30,398 outpatients in 2022 - 2023.

Other Services: The Schell Eye Hospital is located in a separate campus around 2 Kilometres from the Main Campus and has active community services. The Rehabilitation Unit and the Mental Health Centre are located in Bagayam and provide specialized services rehabilitation and mental health. The Rural Unit for Health and Social Affairs (RUHSA) is CMC's comprehensive rural site, serving critical needs such as primary and secondary care for families, fieldwork and education for doctors, nurses and allied health professionals, clinical research and numerous family support programmes for local residents.

In 1944, a model-training centre for rural health care at Kavanur village was proposed. Later on, this was renamed as RUHSA. The expansion of its outpatient department has created new spaces for programmes that will benefit the residents of the K.V. Kuppam block. CMC's Community Health and Development programme (CHAD) was established in 1955, and is the epicentre of CMC's community health programme. It has its own training centre, outpatient clinic, secondary care hospital and provides training to medical, nursing, paramedical students, postgraduates and staff. It is a world-renowned centre for epidemiological and translational research. CHAD serves rural communities of the Kaniyambadi block and the tribal hamlets of Jawadhi hills. Apart from basic medical services, CHAD helps in occupational therapy, health education, nutritional education and overall community service.

The Low-Cost Effective Care Unit (LCECU) began in 1982. It caters to the needs of those living in the urban slums of Vellore. LCECU works holistically to bring not only healing to the body but also takes care of familial and community relationships. The CMC Vellore Chittoor Campus, in southern Andhra Pradesh has been offering medical services since 2011. The campus is now a rapidly growing broad specialty hospital and has four state-of-the-art operation theatres, a good diagnostic laboratory that can handle clinical pathology, biochemistry, microbiology and virology. It also runs outreach programmes for primary health centers and schools.

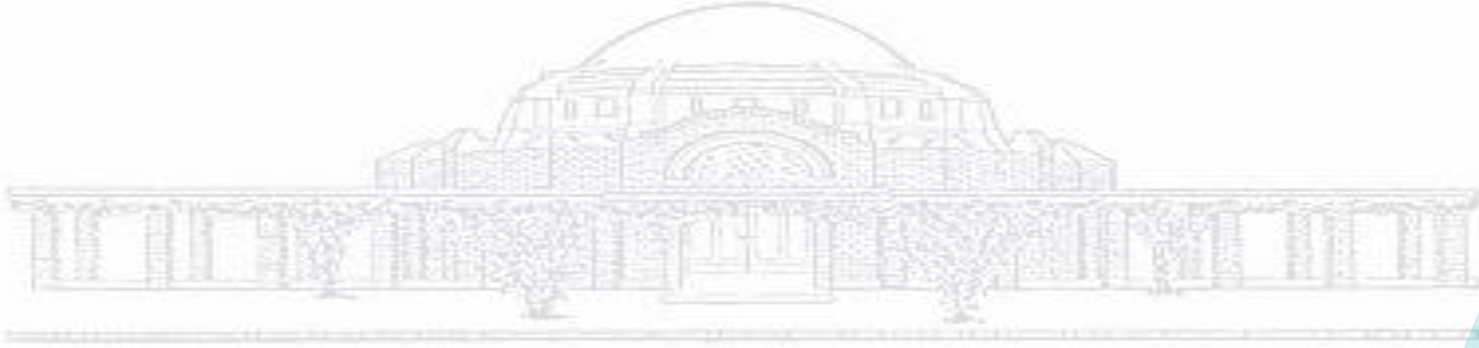


The CMC Vellore Ranipet Campus is the newest addition to the CMC family. This centre was inaugurated by Chief Minister M.K. Stalin on the 25th of June, 2022. The level 1 trauma care unit is aims to provide comprehensive healthcare solutions for victims of accidents. The facility includes 1,500 beds, with six surgical theatres for accident victims, quaternary care medical and surgical services with an additional 29 operating theatres, 250 intensive care unit beds, cancer

services, cardiac catheterization laboratories, 29 bone-marrow transplant unit beds, well-equipped blood storage and donor facility, 50 dialysis beds, high-end diagnostic and therapeutic radiology unit and state-of-the-art laboratories.

Modelled as a green campus, the new facility has a zero-waste water discharge system with sewage treatment and effluent treatment plants. For power supply, 30% of the demand load will be met through solar panels.

When the pandemic broke out, the newly built Ranipet Campus was transformed into a COVID facility. The sprawling new campus responded immediately to the need of the hour and recalibrated its wards as COVID wards. New ICUs were opened just in time when the second wave was engulfing the nation. Phase 2 of the facility is a 350-bed Paediatric Specialty Centre which is under construction with support from Fairfax Financial Holdings and Qess Corp. There is also a proposal to create a research and innovation block to enhance the institutional research capacity.



16th Annual Conference **Indian Brachytherapy Society** **IBSCON 2026**

***From Radium to Remote
Afterloading***

Evolution of Brachytherapy in CMC



Organized by:

**Dr. Jyoti B. Sorddar, Cancer Centre
Department of Radiation Oncology
Christian Medical Group, Coimbatore
www.ibsociety.org**

MILESTONES OF BRACHYTHERAPY AT CMC VELLORE

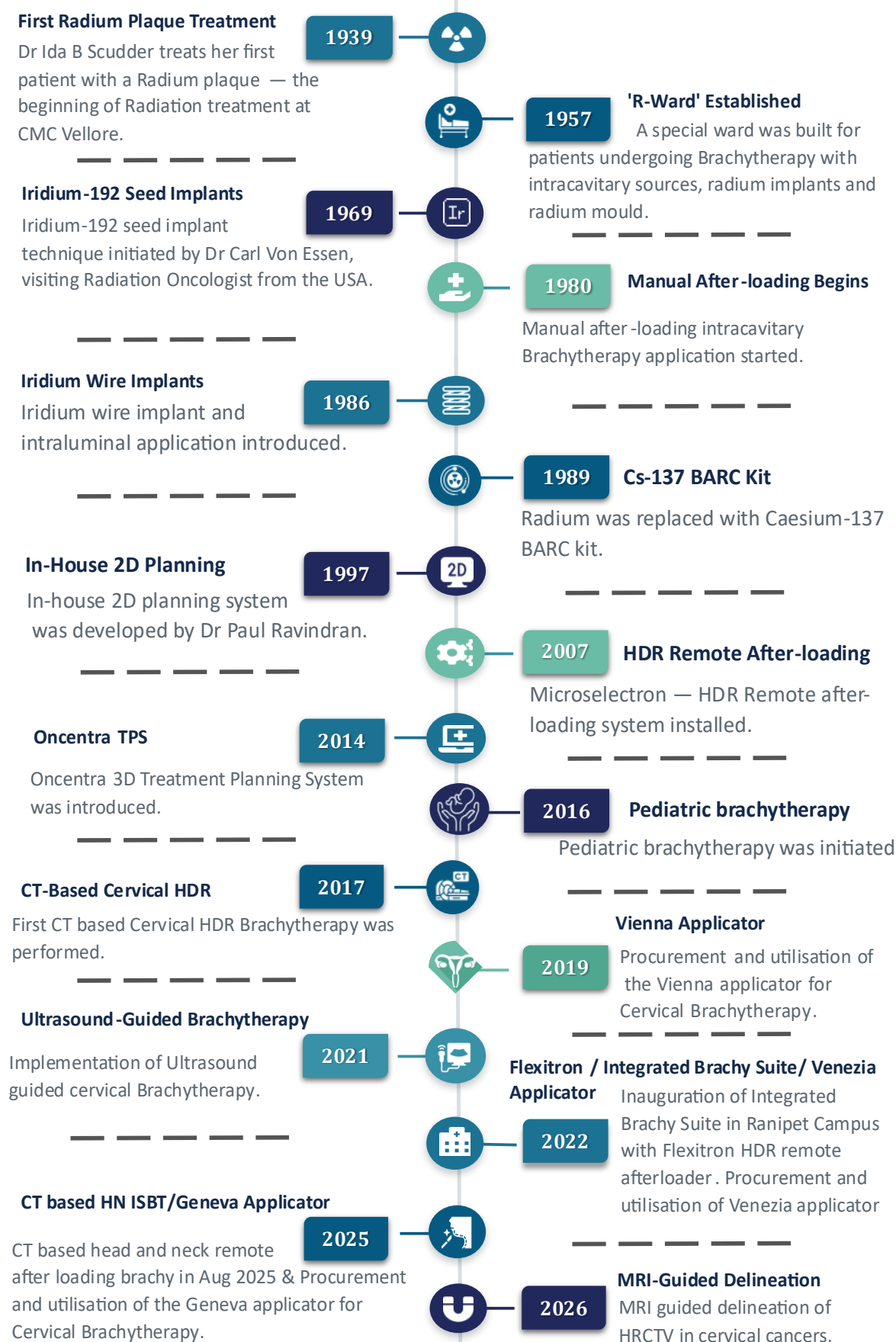
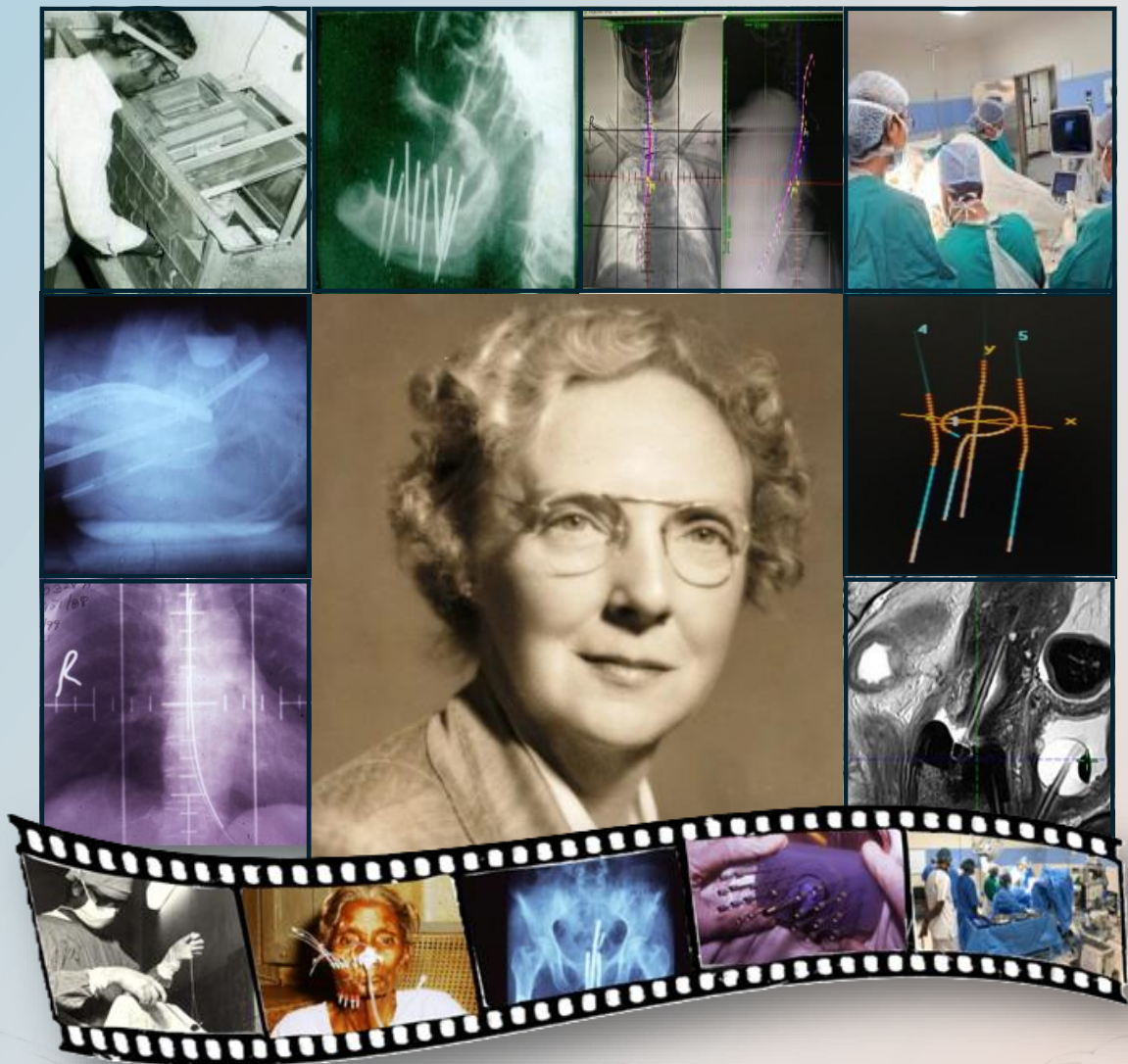


Photo Gallery

Brachytherapy: Through the ages



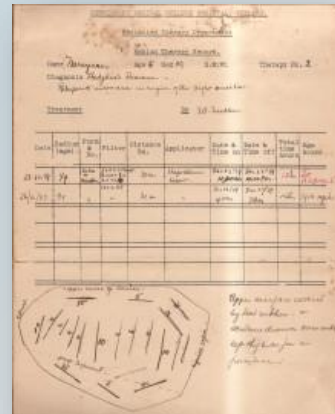
DR IDA BELLE SCUDDER
FOUNDER, DEPARTMENT OF RADIATION ONCOLOGY,
CMC VELLORE

Great is Thy faithfulness;
Lamentations 3:23

THE GENESIS OF BRACHYTHERAPY

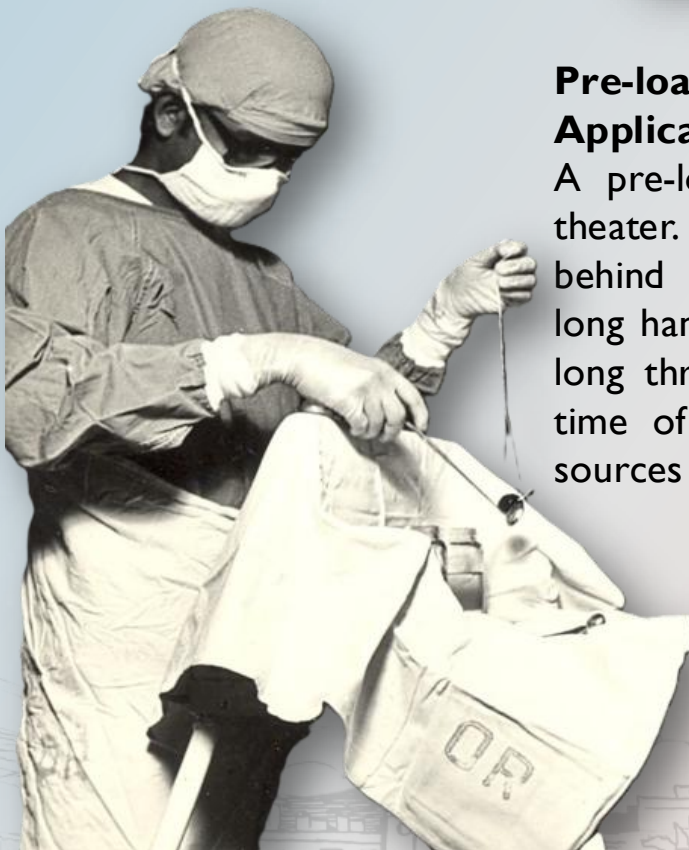
23 December 1939

Dr Ida B Scudder placed a radium surface applicator on a patient with a retro-peritoneal Para-iliac mass of Hodgkins disease. This was the first patient to be treated using radiation.

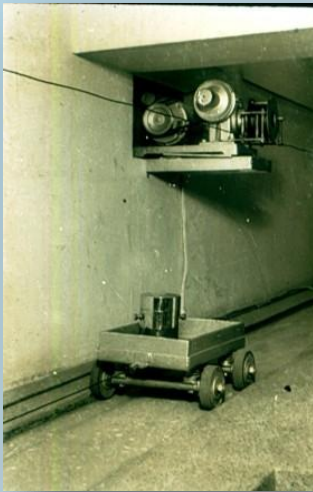


Pre-loaded Brachytherapy Applicators:

A pre-loaded “hot” ovoid in theater. The doctor worked behind a lead shield, using long handled forceps and the long thread to minimize the time of handling radioactive sources

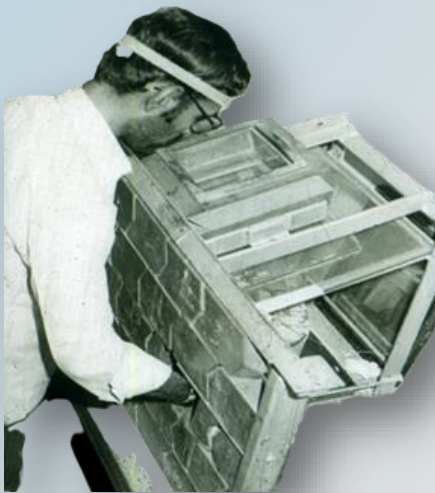


The Safe in OR basement for radioactive sources



Remote-controlled trolley: For transfer of sources to **OR I “Radium Theater”** developed by **Dr Cyril A Jayachandran**

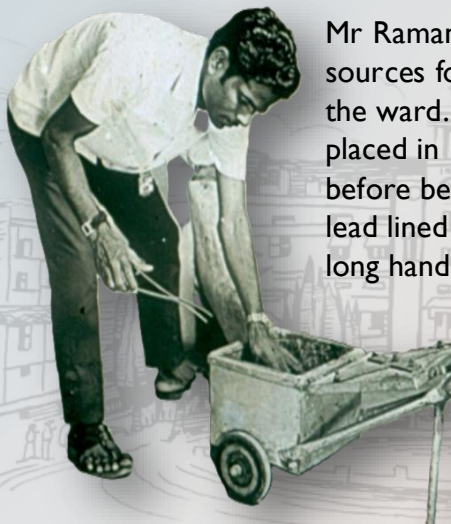
Lead Barrier used to reduce radiation dose to staff handling radioactive patients



Mr Gopal working behind a lead bench preparing sources for manual after - loading brachytherapy

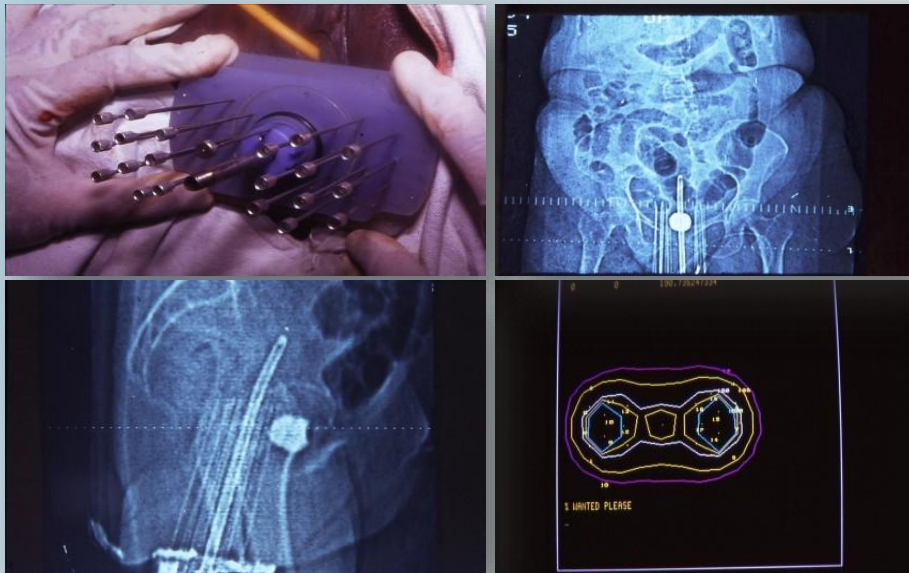


1987 - Preparation of Iridium-192 wires for manual after -loading



Mr Ramani Loading sources for transport to the ward. Sources were placed in lead jars before being placed in a lead lined trolley with a long handle

Use of Iridium -192 in Cervical cancer



Syed-Neblett interstitial Perineal template for cervical cancer, delivered higher dose to the parametria, when compared to intracavitary application,



Caesium 137 Applicator BRIT Kit



2D TPS software for Brachytherapy developed by
Dr Paul Ravindran

Intra-coronary endovascular brachytherapy to prevent neointimal proliferation

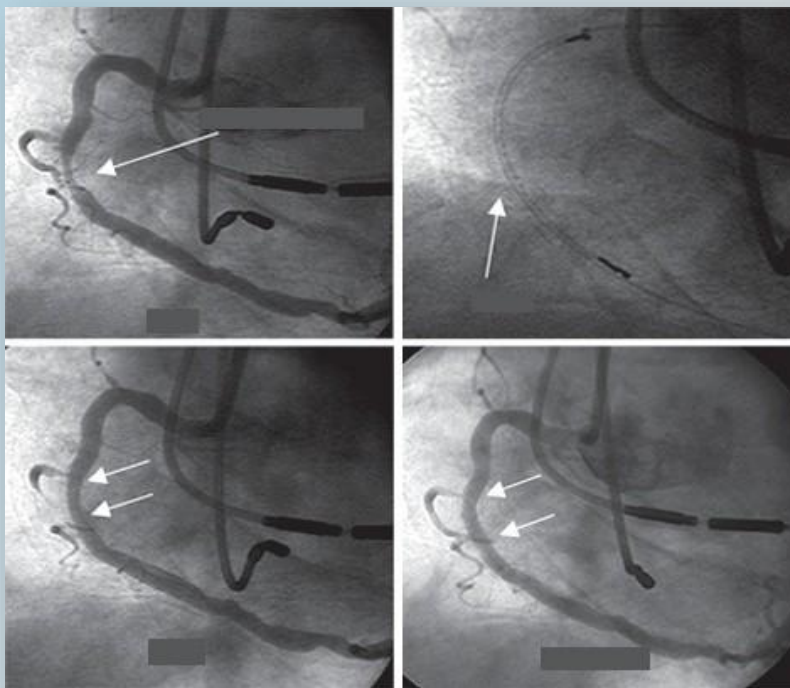
BETA-CATH:

Sr 90 isotope with a half life of 28.8 years.

Activity/ seed: 5 mCi x 24



Device with sr ⁹⁰ source (120 mCi)



Angiogram showing recurrent coronary artery narrowing in a patient previously stented. Arrows show catheter with radio-opaque markers in place

Intra-luminal Brachytherapy (1999)



Cholangio Carcinoma



Esophageal Cancer



Ra²²⁶ Needles in oral cancer

Dose calculations using the paterson & parker system



Total Length - 25mm
Treatment Length-15mm

1987. Iridium 192 Brachytherapy dose calculations were based on the Paris method. -Manual After Loading

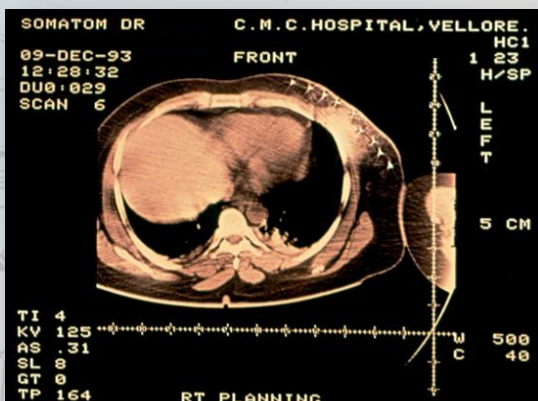


Ir¹⁹² wire storage container post preparation for required length

A shielded lead Ir¹⁹² coil container that uses a rotatable, narrow opening to safely extract and clip precise segments of radioactive wire while keeping the remaining bulk spool fully enclosed.



Head and Neck After loading Interstitial



1993-Ir¹⁹² Wire implant as boost to the tumour bed after lumpectomy in breast conservation

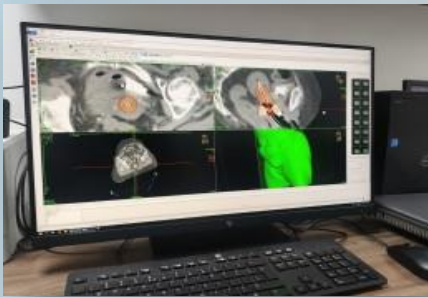
Beginning of Remote After Loading



Inauguration of Nucletron HDR



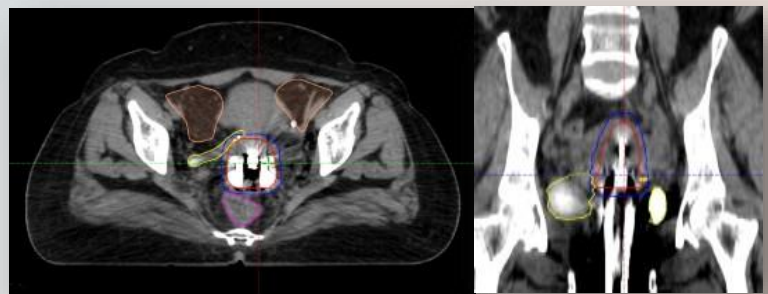
2007: Nucletron Microselectron
Remote Afterloading HDR



2014: Oncentra Brachy TPS

The Beginning of CT Based Brachytherapy

2017 – First CT based Cervical HDR Brachytherapy – We had moved to prescribing from point A to HRCTV



2019 - Vienna applicator for
Cervical Brachytherapy



2021- Implementation of Ultrasound
guided cervical Brachytherapy



Inauguration of Brachytherapy suite in Ranipet campus

Integrated Brachy Suite 2022



Dedicated Theatre For Brachytherapy



Recovery Room
Next to CT



CT Simulator
with Access Door to Recovery Room



HDR TPS & Console
opposite to Recovery room



HDR Bunker



2022 - Elekta Flexitron
Remote Afterloading HDR



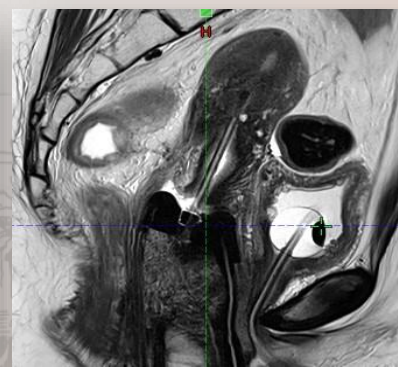
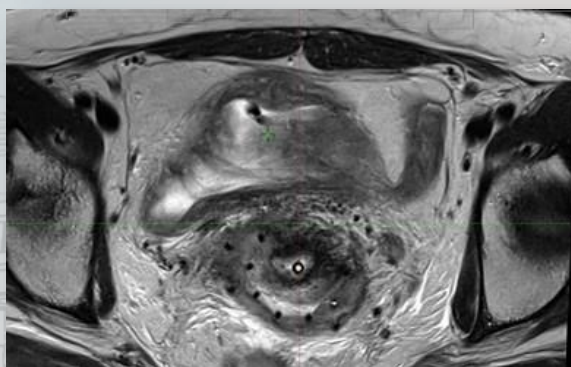
2022 Venezia Applicator (Ring and tandem) for Cervical Brachytherapy



2025 Geneva Applicator for Cervical Brachytherapy



Venezia with the vaginal cap Suitable for patients with upper vaginal disease



2026 -MRI guided delineation of HRCTV in cervical cancers

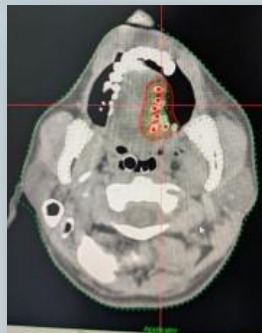
Head and Neck Brachy



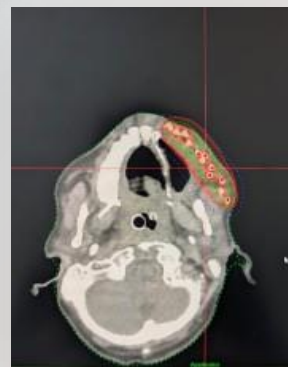
Hard Palate
Brachytherapy –
Intraoral Mould
Applicator



Customised Mould
Fabrication for Hard
Palate Brachytherapy

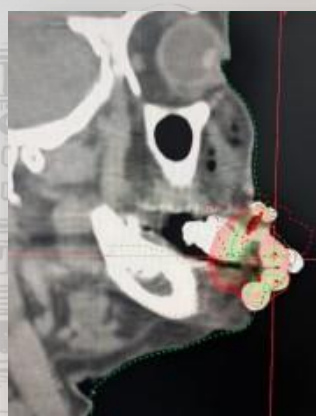


CT-Based Treatment
Planning,
Interstitial Brachytherapy for
Carcinoma Tongue



CT-Based Treatment
Planning, Interstitial
Brachytherapy for
Buccal mucosa

CT-Based Treatment
Planning – Interstitial
Brachytherapy for
Carcinoma Lip

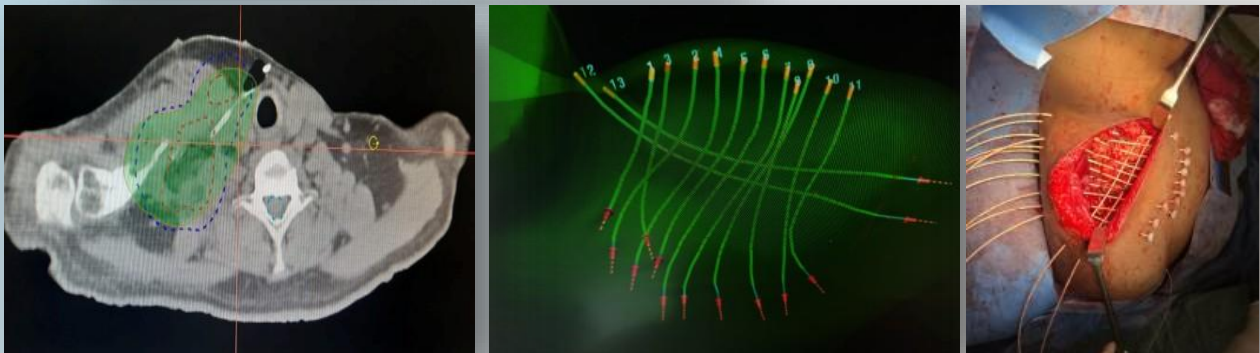


Brachytherapy for treatment of Sarcomas



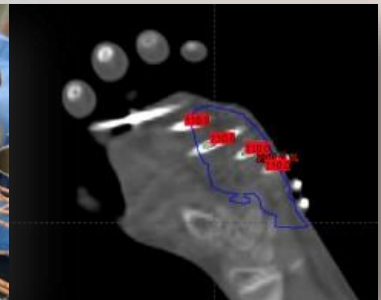
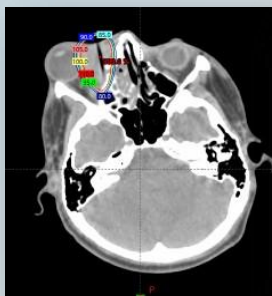
Interstitial brachytherapy brings precision to sarcomas of the upper arm, neck and shoulder—targeting the surgical bed while sparing surrounding normal tissues

Upper arm



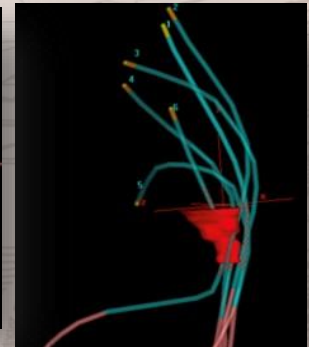
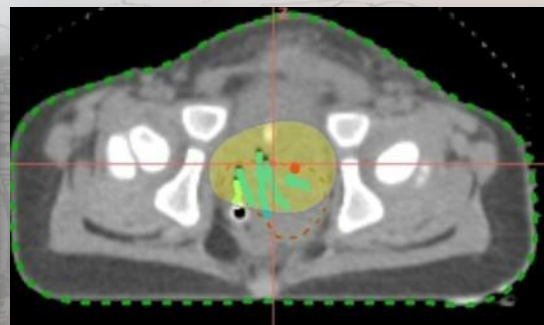
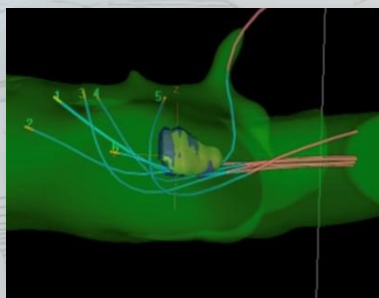
Neck and shoulder needing pectoralis flap reconstruction

Paediatric Brachytherapy

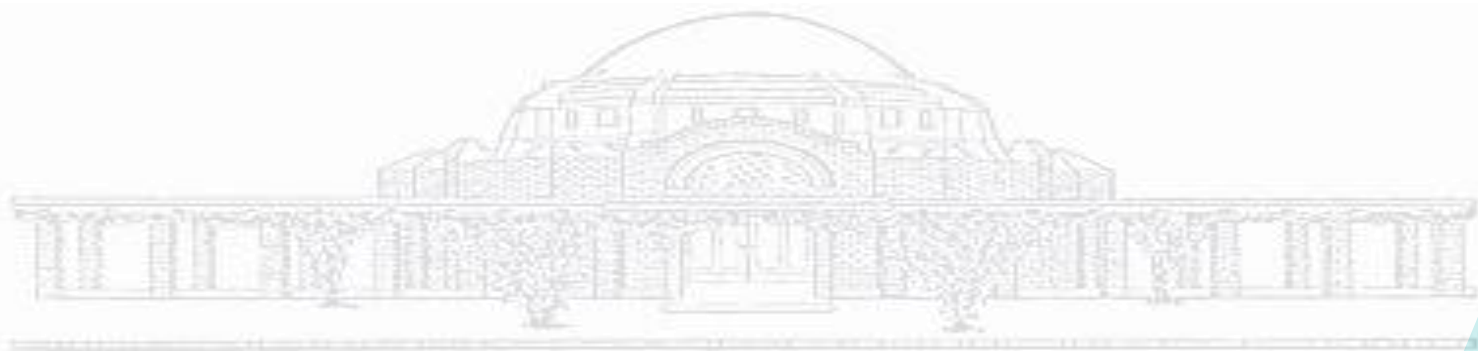


Orbital brachytherapy

Hand brachytherapy



Pelvic brachytherapy



16th Annual Conference **Indian Brachytherapy Society** **IBSCON 2026**

Memoirs:
Standing on the Shoulders of Giants



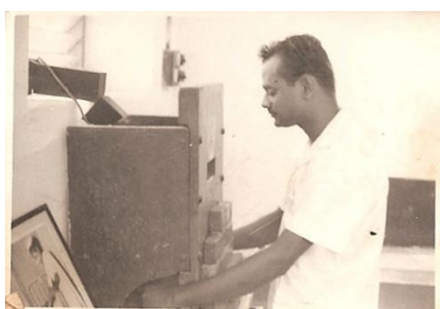
Organized by:

Dr. Jyoti B. Sordhe, Cancer Centre
Department of Radiation Oncology
Chhatrapati Shahu Maharaj Cancer Hospital
Pune, India

TRANSITION FROM LDR TO HDR BRACHYTHERAPY - MY EXPERIENCE

Dr Subhashini John, Former Professor, Radiation Oncology, CMC Vellore

For several years after I joined the Department of Radiation Oncology at Christian Medical College Vellore in 1985, brachytherapy was performed using manual low-dose-rate (LDR) techniques. In the early years, interstitial brachytherapy was carried out using radioactive radium needles and cesium-137 needles. These were subsequently replaced by iridium-192 wires. Preloaded cobalt-60 tubes later replaced by preloaded cesium-137 tubes were used for intracavitary treatment of gynecologically malignancies, while Ir-192 wires were used for intraluminal brachytherapy.



Manual LDR brachytherapy required the handling of radioactive sources by radiation oncologists and radiographers. Treatment often involved prolonged hospital stays, with patients having to remain in specially designed, lead-shielded rooms. The long treatment duration resulted in considerable discomfort to patient and also increased the possibility of applicator displacement, which could affect the accuracy of treatment, while caregivers and healthcare personnel - including nurses, radiographers, and oncologists were potentially exposed to radiation.

Radiation safety was a very important aspect and therefore considerable attention had to be paid to the safe storage and inventory of radioactive sources in the hot laboratory and to minimizing radiation exposure to staff. The fundamental principles of radiation protection - time, distance, and shielding needed to be constantly kept in mind. Staff had to work behind protective shields, maintain as much distance from the source as practically possible, use long forceps for handling radioactive sources, and complete the required procedure as quickly and safely as possible. This was technically challenging and demanded discipline, teamwork, technical skill, and constant awareness of radiation safety.



Treatment planning during the LDR era was based mainly on conventional two-dimensional (2D) orthogonal X-rays. Dose calculations were performed manually or with relatively basic software, and the resulting dose distributions were essentially two-dimensional. There was limited ability to visualize the target and surrounding normal tissues or to modify the dose distribution according to individual patient anatomy.

The Transition to HDR

The introduction of remote after loading high-dose-rate (HDR) brachytherapy brought about a major transformation in the way brachytherapy was delivered.



One of the most important advantages was the significant improvement in radiation safety reducing occupational radiation exposure to negligible levels. Treatment times were dramatically reduced from hours or days in some LDR procedures to minutes with HDR. This eliminated the need for prolonged hospitalization and isolation of patient and allowed treatment to be performed as an outpatient procedure. It also improved patient comfort and convenience.

Treatment planning underwent an equally significant evolution. The transition from conventional 2D planning to three-dimensional (3D), image-guided brachytherapy using ultrasound, CT, and MRI enabled much more accurate visualization of the target and surrounding normal tissues. This allowed better target coverage and conformity while providing greater protection to adjacent organs at risk (OARs).



Another major advantage of HDR was the ability to optimize the dose distribution by adjusting the radioactive source dwell positions and dwell times. With inverse planning and sophisticated optimization algorithms, the dose could be shaped more precisely around the target, achieving high target coverage with a rapid dose fall-off beyond the target and thereby reducing unnecessary irradiation of healthy tissues and critical organs.

Of course, the transition from LDR to HDR was not without its challenges. HDR required the use of multiple fractions to achieve a comparable radiobiological effect to LDR in terms of tumour control and normal-tissue toxicity. There were also understandable apprehensions when moving away from a technique that had been practiced successfully for many years.

For those of us accustomed to manual LDR, the transition from treatment that took hours or days to a procedure completed within minutes required a significant change in mindset. Concerns included the possibility of machine malfunction, the need for extremely accurate applicator placement because of the steep dose gradients associated with HDR, and the fear that even a small displacement could potentially result in inadequate tumour coverage or excessive dose to an OAR. The need for multiple treatment procedures also required adaptation by both patients and healthcare professionals.

Despite these initial concerns, the transition to HDR proved to be a major advancement in brachytherapy.

A Personal Reflection

For me, the journey from manual LDR to the HDR era at CMC Vellore has been an extremely enriching and rewarding experience, filled with continuous learning and adaptation.

I feel fortunate to have experienced the era of manual brachytherapy, when radioactive sources had to be handled directly and every procedure required meticulous attention to both treatment quality and radiation safety. Those years taught me the importance of precision, discipline, teamwork, and respect for radiation hazards. They also gave me a deep understanding of the practical challenges involved in delivering the best possible treatment while ensuring the safety of patients and healthcare professionals.

At the same time, witnessing the transition to HDR helped me appreciate the importance of embracing technological advances in medicine. HDR brought significant improvements in radiation safety, patient comfort, treatment efficiency, and, most importantly, the ability to deliver highly conformal treatment with better protection of organs at risk.

Looking back, I see the transition not simply as a change from one technique to another, but as an evolution in our approach to brachytherapy from manually handling radioactive sources and relying on 2D treatment planning to sophisticated, image-guided, three-dimensional and highly optimized treatment delivery.

The experience has reinforced an important lesson for me: we must respect the value of the techniques that shaped our past while remaining open to innovations that can make treatment safer, more precise, and more patient-centered.

My journey from LDR to HDR has therefore been much more than a technological transition. It has been a journey of learning, adaptation, and professional growth and one that I am grateful to have experienced.

FROM RADIUM TO HDR: REFLECTIONS ON FOUR DECADES OF BRACHYTHERAPY AT CMC VELLORE

Dr B. Paul Ravindran, Former Professor of Radiation Physics, CMC Vellore

I joined the Department of Radiation Oncology at Christian Medical College (CMC), Vellore, in January 1986. At that time, brachytherapy was predominantly performed using Cs-137 needles and tubes, supplied by Amersham, UK, building on the department's earlier experience with radium and cobalt sources. The LDR procedures were manual, and radiation safety was an important part of our daily practice. During the pre-loaded LDR era, a motorised transport container and lift arrangement were used to safely transport the sources from the hot laboratory in the basement to the operating theatre. The radium sources were eventually disposed of in 1989 in accordance with the requirements of the Department of Atomic Energy.



During the late 1980s, Ir-192 wires were introduced for interstitial brachytherapy. Dr R. K. Roul, then Head of the Department, took the initiative to introduce this technique. I personally carried the Ir-191 material brought by Dr Roul to Bhabha Atomic Research Centre (BARC), where it was irradiated in the reactor to produce radioactive Ir-192. The availability of flexible Ir-192 wires offered significant advantages over the older, low-activity Cs-137 needles and gradually replaced them for interstitial applications.

The older Amersham Cs-137 and cobalt tubes were also replaced by newly acquired BRIT-supplied Cs-137 sources for intrauterine and intravaginal treatments. Dr Roul further introduced combined intracavitary and interstitial brachytherapy using the Syed-Neblett template with Ir-192 wires, allowing better coverage of the parametrial regions when conventional intracavitary geometry was inadequate.

There were also several interesting applications of LDR brachytherapy beyond the standard techniques. Although intracavitary brachytherapy was performed manually, we were able to calculate differential loading of the central tandem and ovoid sources to obtain a more acceptable dose distribution. In practice, this also involved withdrawing the ovoid sources earlier, thereby modifying the relative contribution of the ovoids and tandem to the dose distribution.

Ir-192 wires were also used for some less conventional sites. An interesting application was nasopharyngeal brachytherapy, in which Ir-192 wires were positioned using a balloon applicator. Another relatively common application of Ir-192 was intraluminal brachytherapy of the esophagus, where the source was positioned within the lumen to deliver a localized dose to the treatment region.

The Challenge of LDR Dosimetry:

One of the major challenges of the LDR era was dose calculation. Initially, Point A and Point B doses for intracavitary treatments were determined by Mr J. V. R. Rose using two-dimensional dose-distribution templates superimposed on source reconstructions from orthogonal radiographs. Interstitial dosimetry involved reconstructing the implant geometry from AP and lateral radiographs and using mg-hour tables for the dose calculations.

These procedures required careful reconstruction of source positions and an understanding of how the individual source strengths and geometrical arrangement contributed to the overall dose distribution. At a time when modern three-dimensional treatment planning systems were not available, considerable effort was required to translate the source geometry seen on radiographs into a clinically useful dose distribution.

Recognizing the need for a more systematic and efficient approach, I subsequently developed brachytherapy dose-calculation software for Cs-137 and Ir-192 sources, covering both intracavitary and interstitial applications. The software enabled source geometry and dose calculations to be handled more efficiently and remained in clinical use for many years, until LDR brachytherapy was eventually discontinued.



Brachytherapy dose-calculation software developed in-house for brachytherapy applications.

The Transition to the HDR Era:

Interestingly, CMC Vellore never acquired a remote after-loading LDR unit. Manual LDR brachytherapy therefore continued for many years. In the early 2000s, we obtained a grant-in-aid of approximately ₹1 crore to purchase an HDR remote after-loading unit. Unfortunately, technical issues prevented us from accepting the grant at that time.

The turning point came in 2007, following the tremendous efforts of Dr Subhashini John, when we were able to obtain an HDR remote after-loading brachytherapy unit through an ASHA grant from the United States. The introduction of HDR represented a fundamental change in brachytherapy practice. This greatly improved radiation safety and provided much greater flexibility in shaping the dose distribution. LDR brachytherapy, however, did not disappear immediately. For several years, LDR and HDR techniques continued alongside each other, with BRIT-supplied Cs-137 sources being used for selected gynecological treatments. Eventually, as

HDR became established, the remaining LDR sources were withdrawn from clinical use and disposed of in accordance with the applicable regulatory requirements.

From Source Handling to CT/MR based Brachytherapy:

The subsequent introduction of CT- and MR-based three-dimensional image-guided brachytherapy brought another major change. The problem was no longer simply calculating the dose from a known source arrangement. The physicist now had to ensure that the planned three-dimensional dose distribution was actually delivered with the required source positions and dwell times. This created new challenges in treatment verification and quality assurance. Accurate verification of the source position became particularly important because even a relatively small discrepancy in the position of a high-activity HDR source could produce a clinically significant change in dose, especially near critical organs.



Dedication prayer for the HDR remote after-loading brachytherapy unit at CMC Vellore on 16th January 2007

This need for independent verification generated considerable interest within the department in developing practical QA methods. Dr Rabi Raja Singh developed a fluorescence-based QA kit for checking source position and dwell time, providing an additional means of verifying the mechanical and dosimetric accuracy of HDR source delivery.

Looking Back:

Looking back, I feel privileged to have witnessed a remarkable period in the evolution of brachytherapy at CMC Vellore—from manually handled radium, cobalt and Cs-137 sources, through flexible Ir-192 implants and computerized LDR dose calculation, to HDR remote after-loading and three-dimensional CT/MR based brachytherapy.

For me, it was a privilege to have been part of this transition and to contribute, in whatever small way, to the development of brachytherapy practice at CMC. The journey reflects not only the progress of technology but also the vision, and perseverance of the clinicians, physicists, and technologists who continually adapted the science of brachytherapy to provide better and safer patient care.

A Radiotherapy Technologist's Journey with Brachytherapy

Ms Tharani, Retd Senior Radiotherapy technologist, CMC Vellore

I am Ms. Tharani, a Radiotherapy Technologist from the batch of 1985 to 1987. After completing my studies, I joined as a staff member in 1988.

Brachytherapy has always been an interesting and challenging subject for me. So, I would like to share some of my experiences in intravaginal and intrauterine applications, particularly in IVIU source preparation.



During the earlier years of brachytherapy, Caesium-137 (Cs-137) sources were used for low-dose-rate intravaginal and intrauterine applications. Source preparation was a careful and demanding procedure that required thorough knowledge of radiation safety, precise handling, and good coordination among the radiotherapy team. Source preparation for IVIU was quite challenging because the principles of TDS — Time, Distance, and Shielding — which were very important whenever we were working in the radiation field.

Preparation of the Source



The Cs-137 source capsules were taken from the shielded storage safe in hot lab using long-handling forceps or tongs.

The sources were placed in a heavily shielded lead pot. The lead pot was then kept inside a heavily shielded trolley, and the trolley was positioned in front of the lead barrier.



An empty plastic tube was cut according to the size required for the vaginal and ovoid applicators. One end of the plastic tube was sealed carefully to ensure that the source could not come out.



The person preparing the source for IVIU had to wear personal radiation monitoring badges at the wrist and forehead.

The radiographer would stand behind the lead barrier and observe through the lead glass. Using long forceps, the source was taken from the lead pot and inserted into the plastic tube.



The central tandem carried two to three sources, with each source measuring approximately 2 centimetres in length.

Each ovoid carried one source, and it was kept in the lead pot. The pot was then placed inside the heavily shielded trolley and shifted to the hot lab in the ward for the application.

LDR – Low Dose Rate Brachytherapy

In LDR brachytherapy, the radiation source stays in the vaginal applicator for an extended period, frequently from 24 to 48 hours, or longer depending on the source decay and the prescribed dose to Point A.

Only restricted movements are allowed throughout the treatment. In this case, the patient may feel discomfort, and it requires a longer period of hospitalization.

The nursing staff may face a higher radiation exposure risk, and there is also a possibility of radiation exposure to relatives or caregivers if proper safety instructions are not followed.

Therefore, strict radiation safety precautions and continuous monitoring are essential.

Challenges in LDR

- Prolonged radiation delivery
- Longer patient hospitalization
- Isolation and limited movement during the treatment
- Usually, one application requires more manpower
- More time-consuming
- Higher occupational exposure for medical and nursing staff when compared with HDR
- Strict radiation safety precautions are required

HDR – High Dose Rate Brachytherapy

HDR is a remote afterloading system. The patient is isolated only for a few minutes during the treatment, usually around 10 to 20 minutes. The applicator is inserted and removed during each separate fraction, avoiding prolonged immobilization.

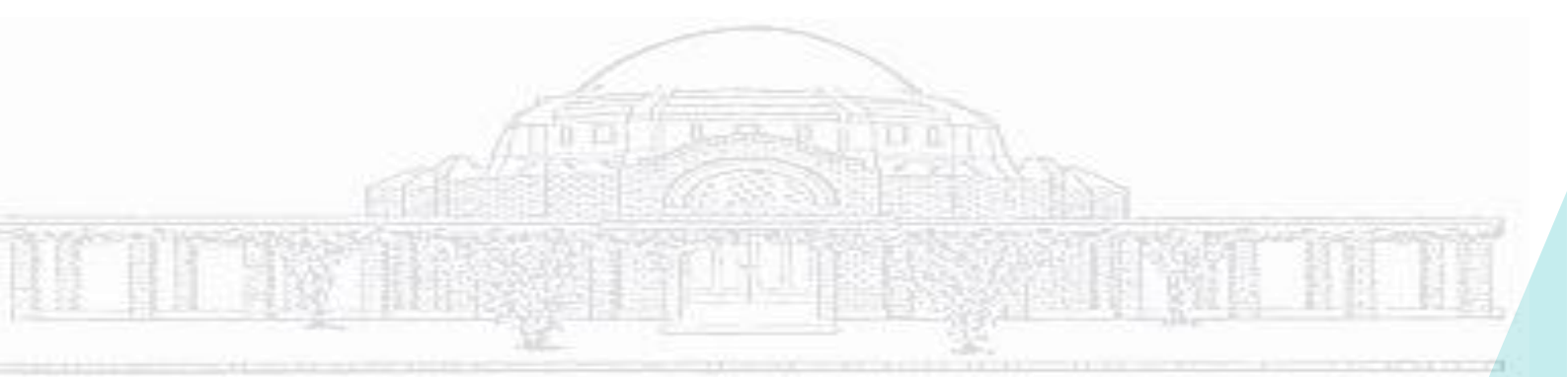
HDR provides an excellent radiation safety profile because the radioactive source is completely retracted into the remote afterloading machine when the treatment is completed. With HDR, the patient's hospital stay is less, although multiple sessions require repeated visits to the hospital for separate treatment fractions.

Sometimes, the patient may feel unhappy or uncomfortable because of the pain associated with the application and removal procedures during each session.

Lessons from my experience:

I feel privileged to have witnessed and been part of the evolution of brachytherapy from the earlier manual source-based techniques to modern remote afterloading systems, particularly with source preparation.

Brachytherapy was, and continues to be, an interesting and challenging field. The experience taught me the importance of careful source handling, radiation safety, teamwork, and responsibility while working in the radiation field.



16th Annual Conference **Indian Brachytherapy Society** **IBSCON 2026**

***Beyond the Dose:
Stories of Hope***



Organized by:

Dr. Ida B Scudder – Cancer Center
Department of Radiation Oncology
Cleveland Medical Group

CERVICAL BRACHYTHERAPY: A MOTHER'S JOURNEY TO RECOVERY

Mrs. Lalitha (Name changed), a 42-year-old woman from Gudiyatham, Vellore district presented to Dr. Ida. B. Scudder Cancer Centre for treatment of Cervical cancer. She lives with her son who is currently pursuing his college education. She also has an elder sister who is separated from her husband due to family issues. For the past few years, Lalitha and her sister were primarily supported by their father, who used to manage a few palm trees and earned a modest income to meet their daily needs. Lalitha had to really struggle even to attend the hospital visits for the diagnostic tests and evaluation. Lalitha was planned for Radical chemoradiotherapy.

During radiotherapy treatment, the family faced an unexpected and devastating loss. Her father passed away due to an electrocution accident. His death left Lalitha emotionally shattered without her primary source of financial and emotional support at a time when she was already undergoing treatment.

Her husband had gradually stopped providing financial support due to family issues. He was not supporting her even for her basic daily expenses or medical treatment. Her daughter who is married lives with her husband, while her son's education remains the only responsibility for which her husband provides some support.

With the sudden loss of her father, Lalitha, found herself helpless and deeply distressed. She was struggling emotionally and financially to continue her treatment. At such a difficult time, the support extended from Dr. Ida. B. Scudder Cancer centre towards her treatment became a great source of hope and strength.

With the assistance she received Lalitha was able to overcome the financial difficulties and successfully complete her treatment. She received External beam radiotherapy along with concurrent cisplatin followed by the state of art image guided Brachytherapy. She was very much nervous and anxious regarding the Brachytherapy procedure as she had heard various comments from different people. But repeated teaching, education and support provided by the amazing team comprised of various disciplines enabled her to go through and complete the procedure successfully.

Utmost quality treatment and support was provided at each and every step in her treatment journey. It was triumphing to see how she navigated throughout without a treatment break.

The support not only helped her continue her medical care but also gave her the courage to face one of the most difficult periods of her life.

With a heart full of gratitude, Lalitha, sincerely thanks everyone who supported her during her time of need. She feels that their kindness and timely assistance gave her the opportunity to complete her treatment and move forward with hope for a healthier future.

This heartfelt true story highlights the importance of timely and effective treatment, with brachytherapy playing a pivotal role as a cornerstone of care. Today, she is a vibrant cancer survivor who inspires countless women through her resilience and determination. More importantly, she continues to be a loving and devoted mother, cherishing every moment as she looks forward to seeing her son complete his education and grow into a successful and responsible citizen of the country.

A JOURNEY OF HOPE: VARSHA'S STORY

When Varsha (name changed), a 26-year-old young mother to a 6-year-old, from West Bengal, was diagnosed with Carcinoma of the right lateral border of the tongue, her life changed unexpectedly. She had never used tobacco in any form and was shocked to discover that she had oral cancer. After undergoing surgery in March 2026 for Stage II tongue cancer, Varsha was advised adjuvant radiotherapy. She received interstitial brachytherapy to the surgical tumour bed, with a dose of 45 Gy delivered in 10 fractions.

The initial days of treatment were difficult. She experienced significant pain during radiotherapy, and the first two weeks after treatment were particularly challenging. But she recalls the support of the sisters in the ward and the doctors who helped her through this difficult period.

Gradually, things began to improve. Within a month, she was able to start eating normally again, and three months after completing treatment, she feels much better. Today, she is disease-free and able to carry out all her daily activities and is happy with her recovery and appearance.

For Varsha, one of the advantages of brachytherapy was the shorter treatment time compared with conventional external beam radiotherapy, along with absence of skin changes which she had observed in other patients and was afraid of. She was particularly happy with the cosmetic outcome.

Looking back, she is deeply grateful to the doctors and sisters who supported her throughout her treatment. Her experience has given her confidence to encourage other patients facing a similar journey.

“I am very happy with my treatment and recovery. I would recommend it to other patients.”

For Varsha, brachytherapy was more than a treatment—it was a difficult journey that ended with recovery, confidence, and hope for the future.



*Consent taken

RECURRENT VAGINAL YOLK SAC TUMOUR IN A ONE-YEAR-OLD GIRL

A one-year-and-three-month-old girl, the only child of parents from a low socioeconomic background, was brought to the hospital in February 2015 with complaints of spontaneous expulsion of a fleshy mass through the vagina, followed by profuse vaginal bleeding. She was diagnosed with a yolk sac tumour arising from the lower third of the right lateral vaginal wall.

She received five cycles of chemotherapy, following which the vaginal tumour was surgically excised. There was no evidence of residual tumour in the surgical specimen or in the blood.

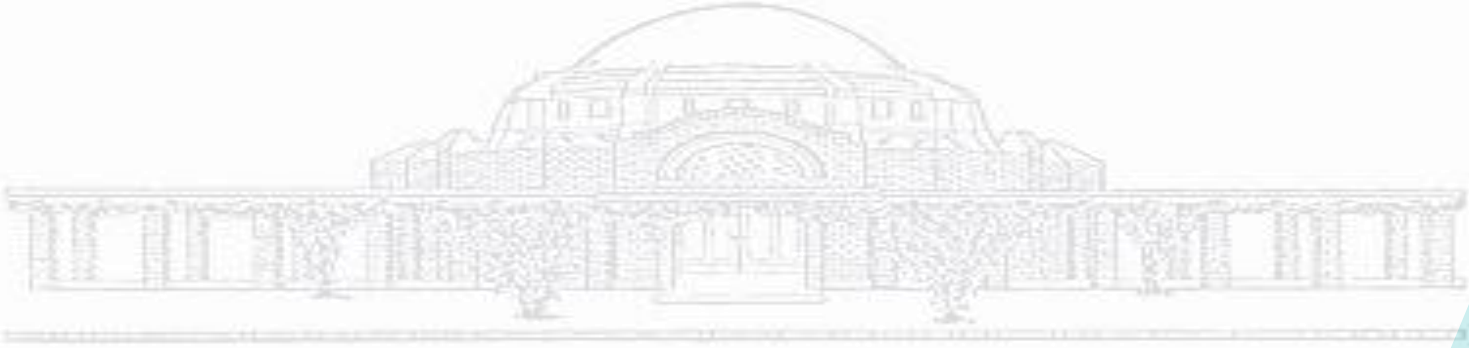
The parents believed that their child had been cured. However, within two months, her serum alpha-fetoprotein (AFP) levels began to rise, and vaginoscopy revealed recurrent tumour. She subsequently received six cycles of second-line chemotherapy; however, residual tumour persisted on vaginoscopy.

At this stage, both the parents and the treating physicians faced a difficult therapeutic decision. Further surgery would have resulted in significant morbidity, including the possibility of vaginectomy. After careful consideration, vaginal mould brachytherapy was chosen as an alternative treatment.

For brachytherapy, customized cylindrical vaginal moulds were fabricated using Perspex, with provision for placement of a brachytherapy catheter. A highly conformal high-dose-rate (HDR) brachytherapy plan was developed, with optimization of the dose distribution to adequately cover the tumour while minimizing radiation exposure to the surrounding organs at risk, including the uninvolved vagina, urinary bladder, rectum, and pelvic bones. She received brachytherapy in March 2016.

On follow-up in 2026, ten years after treatment, she was found to have mild radiation-induced fibrosis but was otherwise doing well, with no evidence of disease. Seeing her grow and develop normally over the years, and witnessing the joy on her parents' faces during the follow-up visit, was a deeply rewarding reminder of the difference that brachytherapy can make.

For this child and her family, brachytherapy was not merely a treatment—it was an opportunity for a future.



16th Annual Conference **Indian Brachytherapy Society** **IBSCON 2026**

Invited Talks



Organized by:

Dr. Jyoti B. Sordde Cancer Centre
Department of Radiation Oncology
Chhatrapati Shivaji Maharaj Vastu Sangrahalaya
Mumbai, India

“The Place of Brachytherapy in an Evolving World”

Dr José Luis Guinot Rodríguez, *Clinical Head of the Brachytherapy Unit, Radiation Oncology Service, Valencian Institute of Oncology Foundation (IVO). Valencia, Spain*

Brachytherapy (BT) has been around for over a century, evolving from low to high dose rates (HDR), while external beam radiotherapy (EBRT) has progressed from 2D to 3D to IMRT and SBRT, which has applied similar principles to BT to deliver very high doses to small volumes in a few sessions with great effectiveness. However, HDR-BT offers a rapid dose falloff and a superior biological effect within the target volume that cannot be replicated by EBRT or SBRT techniques.



Therefore, BT is essential for preserving function, as in tumours of the head and neck, lip, cheek, tongue, oral cavity and oropharynx, nasal vestibule, eyelid, and periorificial tumours. It can be used in the anal canal, rectum, or esophagus for organ preservation. In cases of relapse in previously irradiated breast cancer, multicatheter BT allows for avoiding salvage mastectomy. In breast cancer with a high risk of recurrence, it is the best option for increasing the local dose, and in low-risk breast cancer, the VAPBI regimen allows irradiation to be completed in one or two days.

Brachytherapy remains *irreplaceable for delivering very high doses* in cervical cancer and gynecological tumours, as it is in prostate cancer, to achieve better long-term control than with EBRT alone and with fewer side effects. It is also the preferred option when treating small volumes in the bronchus, nasopharynx, or in re-irradiation procedures. It is an invasive technique (known as interventional radiotherapy), but in addition to its dosimetric advantages, contact BT with masks or shielded applicators is ideal for treating skin tumours in a shorter overall time and more comfortably for elderly patients. Furthermore, BT reduces the number of EBRT sessions, freeing up space on linear accelerators and reducing the workload.

BT is also evolving, with new indications for interstitial implants, such as needles in the parametrium and vagina, based on MRI, which allow for improved dosimetry and control. New radioactive sources with Cobalt-60 require less maintenance, and more precise dosimetry methods (TG-186) to account for inhomogeneities in the calculation. Dosimetry using ultrasound imaging is being investigated, which will facilitate the use of BT in countries with fewer resources.

It is necessary to *organize training, communication among specialists, and access to centers of excellence* to learn techniques. The world is evolving toward a network in which we all learn and grow together. It will be necessary to establish levels of care: basic care with gynecological techniques and contact brachytherapy; standard centers that perform some interstitial techniques and image-guided dosimetry using CT and ultrasound; and centers of excellence as referral centers for complex cases where patients who will benefit from BT can be referred.

For years it has been said that BT may disappear, but only the indications and techniques change; it continues to evolve. Therefore, it is our responsibility to teach, promote, and make greater use of this technique, which contributes to curing many cancer patients and ensuring a good quality of life.

From Past to Present: History, Evolution and Physics of Brachytherapy

Dr Paul Ravindran B, Medical Physics and Radiation Safety Dept., Christian Institute of Health Sciences and Research, Chumukedima, Nagaland.

Brachytherapy, the oldest form of radiation therapy, has evolved over more than a century through advances in radiation physics, isotope development, dosimetry, imaging, and treatment delivery. Its origins date to the discovery of radioactivity by Henri Becquerel in 1896 and the isolation of radium by Marie and Pierre Curie in 1898. Early clinical applications demonstrated that radioactive sources placed directly within or adjacent to tumours could deliver high localized doses while sparing surrounding normal tissues. However, Radium-226 possessed a very long half-life (1,600 years), low specific activity, and generated radioactive radon gas, making source handling hazardous and limiting its widespread clinical use.



The discovery of artificial radioactivity in 1934 transformed brachytherapy by replacing natural radium with artificial isotopes possessing superior physical characteristics. Cesium-137 became the preferred source for intracavitary treatments, Gold-198 and Iodine-125 for permanent implants, and Iridium-192 emerged as the primary standard source for temporary brachytherapy because of its favourable 73.8-day half-life, high specific activity, and moderate photon energy. These developments improved treatment efficiency, dosimetric accuracy, and radiation safety.

Treatment delivery evolved in parallel from preloading, in which radioactive sources were inserted directly during applicator placement, to manual afterloading, where empty applicators were first positioned before the radioactive sources were inserted, thereby reducing occupational radiation exposure. The introduction of remote afterloading by Henschke in 1960 revolutionized brachytherapy by enabling radioactive sources to be transferred from a shielded safe into pre-positioned applicators using a computer-controlled system, greatly improving radiation protection and treatment precision.

These advances facilitated the transition from Low-Dose-Rate (LDR) and Medium-Dose-Rate (MDR) brachytherapy to modern High-Dose-Rate (HDR) treatments. HDR utilizes a single highly active stepping source—typically Iridium-192 or miniaturized Cobalt-60—that sequentially occupies multiple dwell positions within implanted applicators. Independent optimization of dwell positions and dwell times enables patient-specific inverse planning, producing highly

conformal dose distributions that maximize tumour coverage while minimizing dose to adjacent organs at risk. HDR also shortens treatment time and provides greater flexibility in dose sculpting than conventional LDR techniques.

The physics of brachytherapy is governed by the inverse square law and photon attenuation, producing a steep dose gradient that enables highly localized dose delivery. Parallel advances in dosimetry established standardized methods for source loading and dose prescription. Intracavitary brachytherapy was standardized through the Manchester (Paterson–Parker) system, introducing geometrical loading rules and prescription to Point A. Interstitial brachytherapy evolved through the Quimby, Memorial, Paterson–Parker, and Paris systems, culminating in computerized three-dimensional treatment planning and optimization. Contemporary planning employs the AAPM TG-43 dosimetric formalism together with inverse optimization algorithms to determine optimal dwell positions and dwell times, while CT/MRI-guided adaptive brachytherapy, model-based dose calculation algorithms, artificial intelligence-assisted planning, and patient-specific three-dimensional printed applicators continue to improve treatment precision.

The history of brachytherapy reflects a century of relentless innovation. By integrating fundamental radiation physics with advanced dosimetry, isotope engineering, remote afterloading, and modern image-guided adaptive planning, brachytherapy has evolved from crude radium insertions into one of the most precise, conformal, and effective modalities in contemporary radiation oncology.

Why Brachytherapy Matters: Clinical Impact and Cost-Effectiveness in India and the Subcontinent

Dr Thomas Samuel Ram, Professor, Dept of Radiation Oncology, Christian Medical College Vellore

Brachytherapy continues to be an integral modality of precision medicine in radiation oncology, yet its possibilities are not optimally leveraged across India and in the sub-continent. By placing radiation within or next to the tumour, brachytherapy delivers a concentrated dose with rapid fall-off, enabling effective tumour control while limiting normal tissue exposure. Modern image-guided adaptive brachytherapy techniques have enhanced this precision, with proven benefits in locally advanced cervical cancer and important roles in prostate, breast, head and neck, sarcoma and selected other malignancies.



The main challenge is no longer scientific validity but access. In India, brachytherapy resources are unevenly distributed: very few of the 800 medical colleges have facilities, with major deficits in several high-burden states and an estimated need for close to 300 additional units to meet gynaecological cancer demand. Workforce shortages, geography, and reimbursement further limit utilisation. This gap is structural and reversible.

Value must be defined not just by acquisition cost but by benefit per rupee: survival, toxicity, treatment duration, travel, productivity, financial toxicity, and downstream costs of treatment failure. With this perspective brachytherapy delivers decisive curative doses at a fraction of the cost of high-technology alternatives, thus making it an effective modality for equitable cancer care.

The way forward requires actions on access, equity, training, indigenous innovation, fair reimbursement, health technology assessment, advocacy and transparent outcomes measurement. India should not merely expand brachytherapy; it should lead in accessible precision oncology, bringing world-class science and care to the patient who needs it most, with precision, compassion and equity.

Pediatric Pelvic Brachytherapy: CMC Journey

Dr Patricia Sebastian, Professor, Radiation Oncology, CMC Vellore

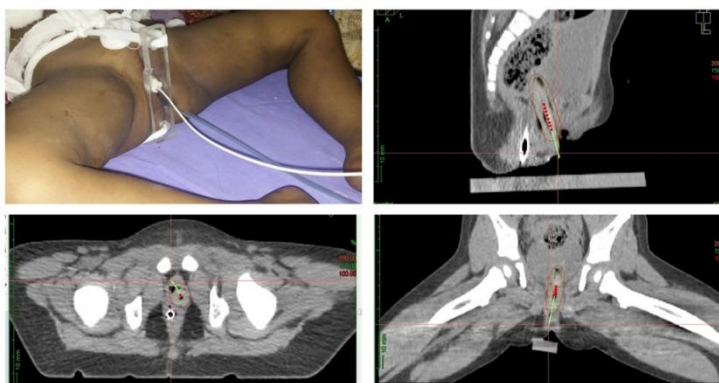
The landscape of pediatric oncology has witnessed remarkable progress, with nearly 75-80% of young cancer patients achieving long-term survival.

Among the various therapeutic modalities employed, radiation therapy holds a pivotal role in the comprehensive treatment of pediatric malignancies. Beyond the primary goal of curing the disease, considerations such as averting growth retardation, safeguarding organ structure and function, and minimizing the risk of secondary malignancies resulting from radiation exposure are of paramount importance in the pediatric oncology community.



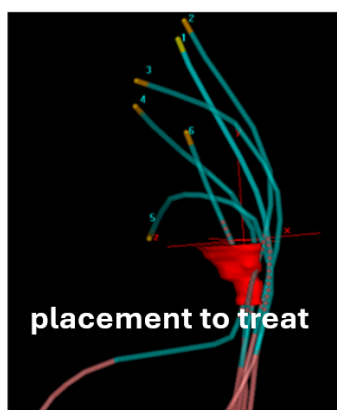
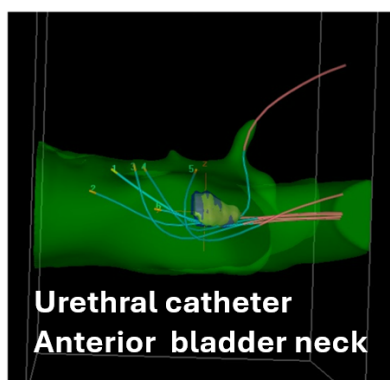
Pediatric pelvic malignancies represent a distinct and challenging subset of these cancers, often necessitating a multifaceted treatment approach. These tumours can manifest in various forms, including rhabdomyosarcomas of bladder/ prostate, yolk sac tumours, clear cell adenocarcinoma of vagina among others.

The intricacies of managing such malignancies require a delicate balance between achieving curative intent and preserving the child's quality of life. In this context, brachytherapy emerges as a fitting and precise tool for delivering radiation therapy in this sensitive patient population.



The first child we treated was a 2-year-old girl with recurrent vaginal yolk sac tumour where brachytherapy with customized mould offered cure and organ preservation.

For bladder/ prostate, we used transperineal approach similar to the group in France that uses flexible



catheters- technique described by Haie-Meder et al. from Gustave Roussy. We also followed similar approach but modified depending on the site of disease and the volume of disease. These catheters were inserted intraoperatively through the perineum, reaching the surface of the prostate and the posterior surface of the bladder. In addition, we have used urethral

catheter when treating the anterior bladder wall; extra catheters in the bladder exiting by the side of suprapubic cystostomy.

We saw that brachytherapy in these very young children offered not only cure but also normal growth and quality of life.

Getting It Right Every Time: Quality Assurance and Safety in Brachytherapy

Dr Henry Finlay Godson, Associate Professor of Radiological Physics, CMC Vellore

Brachytherapy is one of the most precise forms of radiation therapy, where the radioactive source is positioned close to or within the treatment target. In such a setting, every millimetre matters. Once a radioactive source has delivered its dose, there is no opportunity to “undo” an error. Therefore, the fundamental objective of brachytherapy safety is simple but critical: “Getting It Right Every Time.” Achieving this requires systematic quality assurance, well-defined safety procedures, effective teamwork, and continuous verification at every stage of treatment.



Quality Assurance refers to all planned and systematic actions necessary to provide adequate confidence that the treatment process will satisfy the required quality standards. QA is not merely a test of equipment performance; it is a structured approach to establishing processes that prevent predictable defects and minimize risk. A comprehensive QA programme includes quality control of radioactive sources, applicators, treatment planning, treatment units, and facility design. Source QA includes verification of source identity, inventory, uniformity, strength, and leakage or contamination. Applicator QA ensures mechanical integrity, correct dimensions, channel length, and accurate source positioning. Treatment planning QA provides an independent chain of verification from image acquisition to dose delivery. Applicator reconstruction, dwell positions, dwell times, dose optimization, and independent dose calculations require careful checking. Equipment QA further verifies critical safety systems such as door interlocks, emergency stops, radiation monitors, CCTV, warning lights, source positioning, and timer accuracy.

Radiation safety extends beyond routine QA to include area monitoring, personnel monitoring, protection surveys, source leak testing, security of radioactive sources, and emergency preparedness. Particular attention is required for source-stuck or non-retraction events, which can result in prolonged radiation exposure. Staff must be trained and drilled in immediate emergency actions, including source retraction, removal of the applicator where necessary, use of an emergency container, radiation surveys, and prompt notification of the RSO and regulatory authorities. Ultimately, safety is achieved through multiple layers of defense. Independent double-checks, preventive maintenance, and emergency preparedness help prevent errors. “Getting It Right Every Time” is therefore not about expecting perfection from individuals; it is about designing robust systems that prevent errors from reaching the patient.

Brachytherapy versus External Beam Radiotherapy in Soft Tissue Sarcoma Care: Why Brachytherapy Deserves a Dominant Role in Selected Patients

Dr Bharti Devnani

Soft tissue sarcomas (STS) are uncommon, heterogeneous malignancies in which durable local control depends on the optimal integration of surgery and radiotherapy. While external beam radiotherapy (EBRT) has become the most widely used radiation modality, brachytherapy remains an underutilized yet highly effective technique that, in appropriately selected patients, can serve as the dominant adjuvant radiation modality. This debate will argue that brachytherapy offers unique clinical, dosimetric, and logistical advantages that merit broader adoption in contemporary sarcoma care.



The presentation will review the radiobiological rationale and dosimetric advantages of brachytherapy, highlighting its ability to deliver highly conformal radiation directly to the tumour bed with rapid dose fall-off, thereby minimizing irradiation of surrounding normal tissues. These characteristics facilitate excellent functional preservation, reduce unnecessary normal tissue exposure, and allow completion of treatment within a few days, improving patient convenience and optimizing healthcare resource utilization.

The American Brachytherapy Society recommends brachytherapy as a boost in conjunction with EBRT when adequate dose coverage cannot be achieved because of anatomical constraints or in the presence of positive surgical margins. However, evidence from Memorial Sloan Kettering Cancer Center has demonstrated that, in patients with negative resection margins, adjuvant brachytherapy alone achieves local control comparable to EBRT alone or combined brachytherapy and EBRT. Furthermore, even among patients with positive margins, wound complication rates were not significantly different between brachytherapy alone and combined treatment, leading the investigators to favor brachytherapy alone whenever adequate target coverage could be achieved, including in selected high-grade sarcomas.

The debate will compare brachytherapy and EBRT with respect to oncological outcomes, toxicity, wound healing, functional preservation, treatment duration, and resource utilization. It will also highlight how advances in image-guided high-dose-rate (HDR) brachytherapy, three-dimensional treatment planning, and perioperative implantation techniques have further enhanced treatment precision and reproducibility.

Despite its proven efficacy, brachytherapy remains underutilized, largely because successful implementation requires specialized expertise, meticulous perioperative planning, and seamless collaboration between sarcoma surgeons and radiation oncologists. These are challenges of programme development rather than limitations of the technique itself. Centers with established multidisciplinary workflows have consistently demonstrated excellent outcomes, suggesting that wider dissemination of expertise could substantially expand patient access to this treatment.

The central argument of this debate is that brachytherapy should not simply be regarded as an adjunct to EBRT but should be recognized as a primary postoperative radiation strategy for appropriately selected patients with soft tissue sarcoma. Expanding expertise, strengthening multidisciplinary collaboration, and preserving brachytherapy skills are essential to ensuring that patients receive the most precise, individualized, and tissue-sparing radiation treatment available.

Precision in Practice: Video Demonstration and Cadaveric Hands-on Training in Head & Neck Brachytherapy

Dr Rajendra Benny K, Dr Jino Victor Wilson, Dr Arun Paul, Dr Vidutha Ravi Pavan, Dr Glynis F. Francis, Dr Gagana Shree, Dr Madhuri Shaw, Dr Simon P Pavamani

Head and neck interstitial brachytherapy is a highly conformal radiation technique that enables precise dose escalation while minimizing radiation exposure to surrounding normal tissues. Despite its proven clinical benefits in selected patients with oral cavity and oropharyngeal malignancies, its adoption remains limited due to the steep learning curve associated with implant techniques and the lack of structured practical training opportunities. This workshop has been designed to bridge this gap by combining a comprehensive video demonstration with an immersive cadaveric hands-on training session, allowing participants to develop both conceptual understanding and procedural competence.



The workshop begins with a 15-minute video demonstration showcasing a complete implant procedure performed on a cadaver specimen. The presentation will provide a systematic overview of patient selection, pre-procedural planning, operating room setup, instrumentation, and implant execution. Participants will be guided through key anatomical landmarks relevant to interstitial brachytherapy, appropriate needle entry and exit points, catheter insertion techniques, implant geometry, and methods to ensure adequate target coverage while protecting adjacent critical structures such as the mandible, tongue musculature, floor of mouth, facial vessels, and cranial nerves. The session will also discuss practical considerations including catheter fixation, reconstruction for treatment planning, common technical pitfalls, troubleshooting strategies, and quality assurance measures that contribute to successful clinical outcomes. The procedural video aims to provide a reproducible workflow that participants can adapt within their own institutions.

Following the video demonstration, participants will engage in a 120-minute cadaveric hands-on workshop under the supervision of experienced faculty. Working directly with cadaver specimens offers an invaluable opportunity to appreciate three-dimensional anatomy, understand tissue planes, and practice implant techniques in a realistic yet risk-free environment. Participants will perform catheter placement using established brachytherapy principles while receiving individualized guidance on needle orientation, spacing, implant geometry, and safe manipulation of instruments. Faculty members will provide real-time feedback to refine technique, optimize implant quality, and address procedural challenges encountered during the exercise.

The workshop places particular emphasis on standardizing implant methodology and promoting safe, reproducible practices that can be implemented across institutions. Participants will gain practical insights into integrating image guidance, maintaining geometric accuracy, avoiding complications, and coordinating multidisciplinary workflows involving radiation oncologists, surgeons, medical physicists, and radiation therapists. Discussion will also include indications for head and neck brachytherapy, patient selection criteria, postoperative and definitive treatment applications, and strategies for establishing or expanding brachytherapy services in resource-constrained settings.

By the conclusion of the workshop, participants will have acquired a comprehensive understanding of the technical principles underlying head and neck interstitial brachytherapy and developed hands-on experience in catheter implantation on cadaver specimens. The combination of visual demonstration and supervised practical training is expected to enhance procedural confidence, improve technical proficiency, and facilitate the wider adoption of high-quality head and neck brachytherapy.

Ultimately, the workshop aims to empower clinicians with the knowledge and skills necessary to safely implement this highly specialized treatment modality, thereby improving access to advanced, organ-preserving radiotherapy for patients with head and neck cancers

HDR Monotherapy in Prostate Cancer

Dr Vivek Anand, Vatsal Desai, Radiation Oncology, P D Hinduja Hospital & MRC, Mumbai

High-dose-rate (HDR) monotherapy has evolved over three decades from an experimental boost technique into a credible standalone curative option in low & favourable intermediate risk prostate cancer. Investigators, Yoshioka and Zambaglou in the 1990s began using temporary interstitial after loading catheters, first as a supplement to external beam radiotherapy (EBRT) and once radiobiological data suggested the prostate cancer alpha/beta ratio is unusually as low as 1.5 suggested monotherapy as radical treatment[1,2]. Low alpha/beta ratio implies preferential response to large fraction sizes, and underpins the entire rationale for hypo-fractionated HDR monotherapy: the therapeutic ratio widens as fraction size increases, favouring tumour control over late normal-tissue injury when dose is delivered with precision.



Technically, HDR monotherapy involves transrectal ultrasound-guided placement of after loading catheters/needles, followed by USG/CT or MRI-based inverse planning that shapes dose tightly around the gland while sparing intraprostatic urethra and rectum posteriorly. Because the entire fraction of the dose is delivered within minutes rather than over weeks required for iodine-125 seed decay, prostatic oedema has little bearing on dosimetry, and acute urinary symptoms resolve considerably faster than after low-dose-rate (LDR) implantation due to better sparing of urethra and bladder neck.

Current guidance from ASCO/CCO, American Brachytherapy Society and GEC-ESTRO supports HDR monotherapy for low- and favourable intermediate-risk disease, with selected unfavourable intermediate- and high-risk patients treated alongside androgen deprivation [3–5]. The longest track record belongs to the multi-fraction schedules of three to six implants, which have consistently delivered biochemical control above 90% across risk groups with late grade 3 toxicity of less than 2–3% [6–8]. Since these long schedules pose significant logistical demands, there has been a sustained attempt to reduce the number of fractions without compromising outcomes.

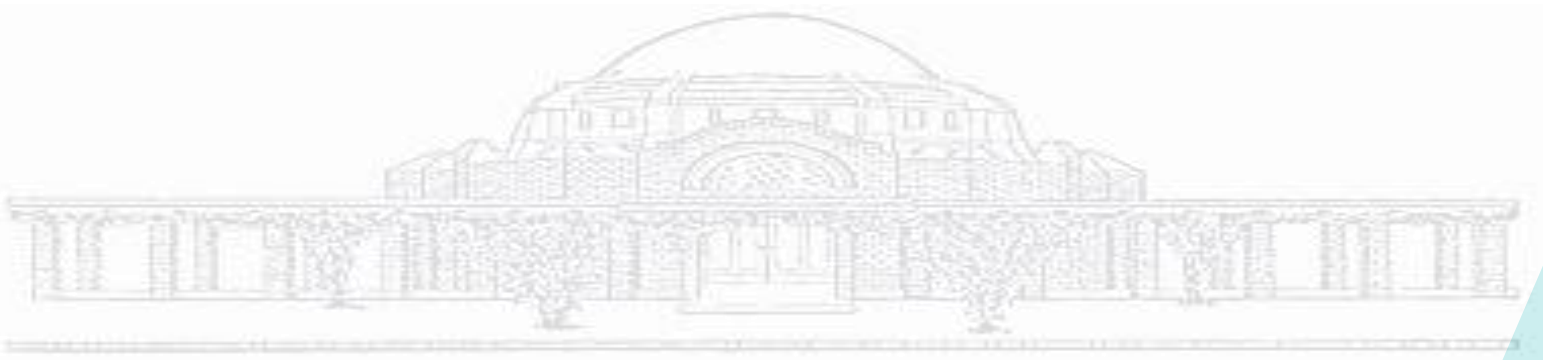
The two-fraction schedule $13.5 \text{ Gy} \times 2$, in two separate implants is endorsed by National comprehensive cancer network (NCCN) [9] and carries the most robust evidence in the field. In the Sunnybrook phase II trial, at a median follow-up of 107 months, biochemical disease-free survival at 8 years was 83.2% with 27 Gy in two fractions against 61.5% with a single 19 Gy

fraction ($p = 0.001$), and the cumulative incidence of local failure was 11.2% against 35.9% ($p < 0.001$) [10]. Biochemical control of 93.9% at 5 years and 83.2% at 8 years show that the two-fraction regimen delivers control that is sustained, and it is based on this evidence that the schedule of two fractions has been widely adopted.

The pendulum has therefore swung decisively against single-fraction 19 Gy. The UK national cohort of 441 patients found 3-year biochemical relapse-free survival of 100% in low-risk disease but only 86% and 75% in intermediate- and high-risk disease, with relapse occurring predominantly within the prostate [11]. MRI-guided focal boosting of the dominant intraprostatic lesion to 21 Gy failed to improve either biochemical or local control [12]. GEC-ESTRO now advises against single-fraction monotherapy outside a clinical trial [5].

In a randomised phase II trial [13], no grade 3 genitourinary (GU) events occurred in the two-fraction arm compared with 2% in the single-fraction arm; grade 2 GU prevalence was 21% and 29% respectively, and grade 2 gastrointestinal (GI) prevalence 1–2%. Bowel-related quality of life was essentially unchanged from baseline, whereas sexual function declined in both arms. Japanese propensity-weighted comparison of 352 HDR monotherapy and 486 LDR patients found equivalent 5-year biochemical control (92.9% versus 95.6%, $p = 0.25$) but markedly less acute grade 2 or worse GU toxicity with HDR (12% versus 43%), with 7-year cumulative late grade 2 or worse GU toxicity converging at 17.6% and 15.8% [14].

Two fractions of 13.5 Gy provides durable biochemical control with a low late grade 3 toxicity; a single fraction of 19 Gy, calculated to deliver an equivalent biological dose, with 19 Gy there is 100% bRFS at 3 years in low risk group. Results in intermediate and high risk groups are less encouraging falling to 86% and 75% at 3 years with relapse predominantly in the prostate [10,11]. Metanalysis has found both the number of fractions and the biologically effective dose per fraction to be significantly associated with better biochemical control [15], which confirms that the biological equivalence predicted for a single implant has not held clinical relevance. Thus, HDR monotherapy in two divided doses deserves a firm place in shared decision-making with appropriately selected patients.



16th Annual Conference **Indian Brachytherapy Society** **IBSCON 2026**

Abstracts



Organized by

Dr. Ida B. Scudder, Cancer Centre
Department of Radiation Oncology,
Chennai Medical College, Chennai

FROM THE DESK OF THE ABSTRACT SELECTION COMMITTEE

Dear Esteemed Participants,

It is with great pleasure that we welcome you to IBSCON 2026, marking another milestone for our chapter's academic journey. Your enthusiasm and dedication to advancing the field of radiation oncology and especially in brachytherapy have made this event truly exceptional.

Unprecedented Participation

We are thrilled to announce that we received an impressive 70 abstracts (64 written poster abstracts and 6 video abstracts) from 32 institutions across the country and internationally, showcasing the vibrant research landscape in our community. The depth and quality of your work have not only met but exceeded our expectations, setting a new standard for academic excellence.

Selection Process

To ensure fairness and maintain the highest standards, we assembled an esteemed panel of renowned faculty members, whose expertise and impartiality were crucial in evaluating the submissions across ten categories —

- Gynecology
- Gastrointestinal
- Genitourinary
- Head and Neck
- Hepatopancreatobiliary
- Skin
- Paediatric
- Innovative Brachytherapy Approaches
- Physics Synopsis
- Miscellaneous

Our selection criteria prioritized:

Prospective and retrospective studies with well-documented results

Clear and comprehensive abstracts

Innovative approaches and methodologies

All abstracts submitted on or before 31st July were considered for oral presentation; submissions received after this date were, by policy, allocated directly to the poster category. Every abstract was meticulously reviewed and blinded prior to scoring, reflecting the high regard we hold for the integrity of the process and for your work.

This year, a total of 5 abstracts were regrettably declined on this basis since the Scientific Committee remains committed to preserving the conference's core focus on brachytherapy-related research.

Presentation Formats

This year, IBSCON 2026 received 64 poster abstracts, further enriched by 2 video submissions reformatted as posters, bringing the total poster category to 66 presentations. Of 51 abstracts submitted by 31st July 2026, 9 abstracts were selected for oral presentation following blinded review — a mark of the exceptional quality across the board. The remaining 4 video abstracts will

be presented as video presentations in the main hall, giving delegates a rich and varied conference experience across formats.

Looking Ahead

To our budding oncologists presenting their research: your work today lays the foundation for tomorrow's breakthroughs. We eagerly anticipate your presentations and the discussions they will inspire.

As we embark on this journey of discovery together, let us remember that each abstract, each presentation, and each interaction contributes to our collective knowledge and the future of oncology.

Thank you for your exceptional contributions, and best wishes for a conference filled with learning, collaboration, and inspiration.

Together, we are shaping the future of cancer care.

Yours sincerely,
Scientific Committee



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* One additional credit hour will be awarded to the Speakers and Observer

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16th Annual Conference **Indian Brachytherapy Society** **IBSCON 2026**

Abstracts:
Oral Presentations



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Dr. Vidya B. Sridhar - Cancer Centre
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Understanding workflow and practice dynamics in brachytherapy: A Survey Study

N R Rekha, Post Graduate

HCG hospital, Bangalore, India

Dr. Mahalaxmi



Introduction: India bears a disproportionate share of the global cervical cancer burden - over 127,000 new cases and nearly 80,000 deaths annually, the highest in the WHO Southeast Asia region. Brachytherapy remains the irreplaceable cornerstone of curative-intent treatment for gynaecological malignancies. Yet while outcomes are meticulously documented, one question remains unanswered: what is brachytherapy costing the people who deliver it?

Methods: A descriptive cross-sectional online survey was conducted between May and June 2026 among 84 radiation oncologists across India, spanning the full hierarchy of practice-residents to heads of department-assessing workflow efficiency, financial sustainability and occupational burden

Results: Gynaecological malignancies constituted the predominant brachytherapy indication, accounting for 80-90% of procedures across participating centers. First fraction workflow duration ranged from 4-6 hours, with image-based contouring and treatment planning (21.4%) and anaesthesia or operative theatre coordination (16.7%) identified as the most resource-intensive steps. Schedule adherence was, with 72.6% of respondents reporting procedural overruns occurring sometimes or often, indicative of systemic rather than isolated workflow inefficiency. Occupational stress was prevalent, with 69.0% of respondents rating stress at $\geq 5/10$. Time constraints (26.2%) and concern regarding applicator placement accuracy (22.6%) were the leading contributory factors, reflecting the cognitive and technical demands inherent to image-guided adaptive brachytherapy under time-pressured clinical conditions. Financially, equipment procurement and maintenance represented the most frequently cited burden (52.4%). Although 54.8 % of respondents considered their programmes financially sustainable, 15.5% reported receiving no personal remuneration for procedure delivery-a finding that highlights a significant disparity between procedural complexity and practitioner compensation. Collectively, these results demonstrate a convergence of workflow inefficiency, occupational stress and financial inequity across Indian brachytherapy practice.

Conclusion: We treat thousands, document doses and report survival curves- but have largely ignored what sustains the practitioners behind these outcomes. This study adds critical, structured evidence on brachytherapy workflow dynamics, financial sustainability and occupational wellbeing in the Indian context-dimensions that remain poorly represented in existing literature. Structured training, dedicated workflow protocols and equitable compensation are not prerequisites for peripheral concern- they are prerequisites for preserving brachytherapy as a living, practiced specialty.

Feasibility of De-escalation of Vaginal Doses in Image Guided Adaptive Brachytherapy in Locally Advanced Cervical Carcinoma and its Clinical Implications.

Fathimathul Jameema Salih, Postgraduate student

Kidwai memorial institute of oncology, Bangalore, Bangalore, India

Dr. C R Tanvir Pasha, Dr. V Lokesh, Dr. Nikhila K R, Dr. B. Rekha Reddy



Introduction: Carcinoma cervix management by Image Guided Adaptive Brachytherapy (IGABT) has improved locoregional control. Guidelines exist for OARs like Bladder, Rectum, Sigmoid. However, vaginal mucosa often being exposed to high radiation doses, even if uninvolved, and toxicities associated with the same are often not reported/documented, leading to long-term toxicities like stenosis and shortening that compromise quality of life. This study evaluates the dosimetric feasibility and clinical impact of vaginal dose de-escalation during IGABT in patients without vaginal involvement at the time of brachytherapy.

Methods: In this prospective interventional study, patients with locally advanced cervical cancer (baseline FIGO IB2–IIIC, excluding IIIA) were enrolled after completion of EBRT. Patients with vaginal involvement at the time of BT were excluded. For every patient, a standard plan (STD) and a vaginal dose de-escalated (VDD) plan were generated. VDD was performed by manually optimizing the source loading patterns in ovoids/ring and tandem to limit visible vaginal mucosal dose to <150% of the High-Risk Clinical Target Volume (HRCTV) dose without compromising on the HRCTV dose. We compared dosimetric parameters HRCTV D90, D2cc (bladder, rectum, sigmoid), and vaginal dose points (PIBS 0, PIBS-2, PIBS+2, RV point, and clock positions) and vaginal length receiving %isodoses (L50, L100, L150, L200) using Mann Whitney U test. Clinical toxicity (CTCAE criteria) and locoregional control were assessed over a 1-year follow-up.

Results: 36 patients were recruited by consecutive convenience sampling. Median age was 52(45-62) years.

Patients with FIGO stage IIB (16%), IIIC1r (14%), IIA (2%), IIIB (2%). IIIC (1%), IIIC2r (1%).

Mean HRCTV volume was 22.21 cc; volume more than 30 cc with medial parametrial involvement treated with IC-ISBT (11.1%), less than 30 cc with disease confined to the cervix treated with ICBT (88.9%). The VDD group demonstrated a statistically significant reduction in doses to the bladder, rectum also across vaginal dose points (PIBS, and clock positions) and irradiated vaginal lengths, with no statistically significant difference in HRCTV D90.

Median follow-up period was 1 year. No Grade 3 or 4 toxicities were reported during the 1-year follow-up, and 91.7% (33/36) of patients had local control at 1 year. 1/36 (2.3%) died due to non-disease related events, 2/36(5.6%) patients lost for follow up. No patients with local recurrence/metastasis.

Conclusion: Vaginal dose de-escalation in IGABT is a safe, robust, and clinically feasible methodology to reduce vaginal doses as well as other OARs without sacrificing HRCTV dose or locoregional control.

Five-Year Clinical Outcomes of Single-Application Three-Fraction HDR Intracavitary Brachytherapy Versus Conventional Multi-Application Fractionation in Cervical Cancer

Lokesh Viswanath, Professor

Kidwai Memorial Institute of Oncology, Bangalore, India

Dr Lokesh Viswanath, Dr Premkant Bhaskar, Dr Sunil, Dr. Mandal, Siddanna Pallade, Dr Jameema, Dr Bindhu Joseph, Dr T Naveen, Dr Premkant Bhaskar



Purpose/Objective(s): High-dose-rate (HDR) intracavitary brachytherapy is an integral component of definitive chemoradiation for cervical cancer. Conventional schedules require repeated applicator insertions under anesthesia, prolonging overall treatment time (OTT) and increasing patient burden. Delivering multiple HDR fractions through a single applicator insertion within 48 hours has been described in interstitial brachytherapy but remains infrequently used for intracavitary treatment because of concerns regarding rectal and bladder toxicity and adequacy of dose delivery. This study compared long-term clinical outcomes, survival, and toxicity between accelerated single-application and conventional multi-application intracavitary HDR brachytherapy.

Materials/Methods: A retrospective comparative study included 86 patients with carcinoma cervix treated with definitive chemoradiation followed by CT-based image-guided Ir-192 HDR brachytherapy. Forty-two patients received conventional HDR brachytherapy with repeated applications (approximately two fractions/week over two weeks), while 44 underwent a single applicator insertion with three fractions delivered within 48 hours (minimum 6-hour interval). All patients received EBRT (3DCRT/IMRT) followed by CT-based brachytherapy planning with organ-at-risk dose optimization. Individual cumulative HDR dose, total physical dose, BED, disease status, overall survival (Kaplan-Meier; log-rank), and rectal/bladder toxicity (Fisher's exact test) were analyzed after approximately 5 years of follow-up.

Results: Baseline stage distribution and EBRT delivery were comparable. Mean EBRT dose was 48.14 Gy versus 48.78 Gy, while cumulative HDR dose was 21.7 Gy versus 21.0 Gy ($p=0.14$), resulting in similar total radiation doses (70.01 vs 69.78 Gy), tumour BED₁₀ (93.96 vs 93.87 Gy₁₀), and late tissue BED₃ (150.27 vs 150.07 Gy₃). Mean OTT was significantly reduced with the accelerated schedule (44.5 ± 5.1 vs 55.8 ± 4.0 days; $p<0.001$). At 5 years, no evidence of disease was observed in 81.0% versus 88.6% of patients ($p=0.38$). Overall survival did not differ significantly (log-rank $p=0.58$). Early-stage disease demonstrated excellent 5-year survival ($>88\%$) in both groups, while advanced-stage patients showed numerically higher disease control and survival with accelerated treatment without statistical significance. Grade ≥ 3 rectal toxicity remained low (4.8% vs 2.3%; $p=0.61$), and no clinically significant bladder toxicity was observed.

Conclusion:

Accelerated single-application intracavitary HDR brachytherapy significantly shortened OTT by approximately 11 days while maintaining equivalent physical and biological dose delivery, comparable long-term disease control, overall survival, and low late toxicity. This approach minimizes repeated anesthesia, improves patient convenience, and optimizes brachytherapy resource utilization, representing a practical alternative to conventional multi-application HDR schedules in cervical cancer.

Beyond Half-Life: Propensity Score-Matched Comparison of Iridium-192 and Cobalt-60 HDR Brachytherapy Delivery Quality, Dosimetry, Workflow, User Experience and Early Clinical Outcomes in Cervical Cancer

Priya J, Post graduate

Government Aringar Anna Memorial Cancer Hospital and Research Institute, Kanchipuram, India.



Background: High-dose-rate (HDR) brachytherapy is an integral component of definitive treatment for locally advanced cervical cancer.

Although Iridium-192 (Ir-192) and Cobalt-60 (Co-60) have demonstrated comparable dosimetric characteristics and clinical outcomes, limited real-world evidence compares overall treatment delivery quality by integrating objective treatment parameters with end-user experience. This study compared brachytherapy delivery quality, dosimetric performance and early clinical outcomes between the two HDR sources.

Methods: A propensity score-matched comparative cohort study was conducted at a tertiary cancer centre. Patients with histologically proven cervical carcinoma treated with definitive chemoradiotherapy followed by CT-based HDR brachytherapy were included. Following 1:1 propensity score matching, 100 patients (50 Ir-192 and 50 Co-60) were analysed. Brachytherapy Delivery Quality (BDQ) was assessed using objective treatment parameters and the HDR Brachytherapy End-User Experience Questionnaire (HDR-BEUQ) completed by radiation oncologists and medical physicists. Secondary endpoints included HR-CTV D90, bladder, rectum and sigmoid D2cc, treatment completion, early clinical response and acute grade ≥ 2 gastrointestinal and genitourinary toxicities.

Results: After matching, baseline characteristics were well balanced. Median cumulative HR-CTV D90 EQD2 was comparable between Ir-192 and Co-60 (85.6 vs 86.1 Gy; $p=0.54$), with similar bladder, rectum and sigmoid D2cc doses (all $p>0.05$). Dosimetric objectives were achieved in 88% and 90% of patients, respectively ($p=0.75$). Irradiation time was significantly longer with Ir-192 than Co-60 (11.9 vs 9.6 minutes; $p<0.001$), while treatment completion without interruption was comparable (96% vs 94%; $p=1.00$). Complete clinical response was observed in 92% and 94% of patients ($p=1.00$). Acute grade ≥ 2 gastrointestinal toxicity occurred in 14% versus 12%, and genitourinary toxicity in 8% versus 6% (all $p>0.05$). Overall HDR-BEUQ scores were comparable, although medical physicists reported significantly better workflow with Co-60 ($p=0.04$).

Conclusion: Co-60 HDR brachytherapy demonstrated dosimetric performance, treatment completion, early clinical response and toxicity profiles comparable to Ir-192. Despite differences in irradiation time, both sources achieved similar overall treatment quality, supporting Co-60 as a clinically effective alternative for CT-based cervical HDR brachytherapy with potential workflow advantages in routine practice.

Outcomes And Dosimetry of USG Guided Post Operative Interstitial Brachytherapy (ISBT) In Early Breast Cancer Accelerated Partial Breast Irradiation

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INTRODUCTION: Multichannel interstitial brachytherapy (MIBT) is the oldest validated modality of Accelerated Partial Breast Irradiation (APBI) to treat early-stage breast cancer in suitable patients. Here in this study, we present the outcome, dosimetry and technique of Ultrasound (USG) guided post operative Interstitial Brachytherapy (ISBT) of breast cancer, which is a novel approach for the same.

METHODS: Brachy Procedure: Patients with age > 45 year, who underwent upfront BCS, had tumour size ≤ 3 cm, and node negative status, irrespective of hormone status were taken up for APBI. Prior to procedure, patients' seroma was delineated using USG and marked over the skin to guide needle placement during the procedure. If needed the location was reconfirmed with a CT scan to confirm the seroma cavity delineation. After due consent, under USG guidance interstitial needles were placed at every 10-12mm through the seroma cavity in parallel planes, which were 10mm apart to adequately cover the seroma cavity with margin as per GEC- ESTRO recommendation. After CT Simulation, contouring of targets and OARs and catheter reconstruction, a suitable treatment plan was generated on Elekta Oncentra V 4.6.

Study Methods: A retrospective study of 23 consecutively treated patients with aforementioned technique who were treated between August 2021 And July 2026 was done in terms of disease characteristics, dosimetric factors and treatment outcomes. Data were analysed with SPSS V21.0.

RESULTS: Median age is 57 years (47 – 72 years). The mean tumour size 2.2 cm (1-3cm) with 95.7% having histology of Invasive Ductal Carcinoma. 21 patients were hormone positive, 1 was only her +ve and 1 patient was TNBC. 65.2 % patients were treated with 34Gy/10# and other with 32Gy/8# (30.4%) and 30.1Gy/7# (4.3%). Mean volume of the target was 51.8 cc. The Mean DNR, DHI was 0.5 each and COIN was 0.5. The OAR doses are mentioned in the table attached. The Median Follow up is 23.9 months. All the patients treated with APBI have been disease free with good cosmesis.

CONCLUSION: The study shows that the post op ISBT in breast cancer APBI is feasible with good outcomes. USG guidance adds an additional confidence during the procedure for correct placement of catheters during the procedure. However, how it compares dosimetrically and outcome wise to the traditional intra-op ISBT for APBI remains to be seen.

Comparing needles to vertices: A dosimetric comparison of interstitial brachytherapy and lattice radiotherapy to guide optimal technique selection

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Background: Interstitial brachytherapy (ISBT) and Lattice Radiotherapy (LRT) are advanced techniques designed to deliver ablative doses while minimizing exposure to surrounding normal tissues. ISBT achieves steep dose gradients through direct placement of radioactive sources within the tumour, whereas LRT employs spatially fractionated high-dose vertices within bulky tumours using external beam radiotherapy. Despite their shared objective of maximizing tumour control with acceptable toxicity, direct dosimetric comparisons between these modalities remain limited.

Aim: To compare the dosimetric characteristics of interstitial brachytherapy and lattice radiotherapy for bulky solid tumours and identify clinical scenarios in which one technique offers superior target coverage, dose conformity, organ-at-risk sparing, and dose heterogeneity.

Methods: This planning study included patients with bulky tumours suitable for either ISBT or LRT. For each patient, treatment plans were generated using both techniques on the same imaging dataset. Dosimetric parameters including target coverage (D90, V100, V150, V200), conformity index, homogeneity index, gradient index, organ-at-risk doses, and integral dose was evaluated. For LRT, vertex dose distribution, peak-to-valley dose ratio, and lattice geometry metrics is analysed. Statistical comparisons performed using paired analyses with significance set at $p < 0.05$.

Results: ISBT demonstrated superior dose conformity, steeper dose fall-off, and lower doses to adjacent critical organs, particularly for anatomically accessible tumours. LRT provided a practical non-invasive alternative for large, deeply seated, or technically unresectable lesions while maintaining acceptable organ-at-risk constraints through spatial dose modulation. This study identified tumour- and site-specific scenarios where ISBT provided the greatest dosimetric advantage.

Conclusion: This dosimetric comparison provided a framework for selecting interstitial brachytherapy and lattice radiotherapy based on target characteristics and normal tissue constraints. The above study refined patient selection and support evidence-based integration of the advanced techniques into the management of bulky malignancies.

High-dose-rate brachytherapy boost for high & very high-risk prostate cancer: A Single Institute experience.

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Purpose: HDR brachytherapy boost combined with external beam radiation therapy

(EBRT) is an established approach in high-risk prostate cancer and is recommended by GEC ESTRO ACROP guidelines as well, but data from Indian and other resource-limited centres remain scarce. We report our early institutional experience with EBRT plus HDR-BT boost.

Methods and Materials: We retrospectively reviewed 7 patients with high- and very high-risk prostate cancers treated with EBRT followed by HDR-BT boost at our center. Two additional patients (one salvage/recurrent case, one with incomplete records) were excluded from analysis. Gleason scores ranged from 7 to 9. EBRT was delivered to a median dose of 50 Gy (range, 45–60), with one patient additionally receiving a nodal boost of 10 Gy/5#. HDRBT boost was delivered in 2 fractions in all patients, with per-fraction doses of 7–10 Gy (total boost dose 16–20 Gy). PSA was assessed at baseline (pre-treatment) and following completion of combined EBRT and HDR-BT boost. Toxicity (CTCAE-based, genitourinary [GU] and gastrointestinal [GI]) was assessed at last available follow-up.

Results: Median baseline PSA was 70 ng/mL (range, 54.75–114). Following completion of EBRT and HDR-BT boost, median PSA was 2.60 ng/mL (range, 0.04–6.98), reflecting a favourable biochemical response to combined treatment. Locally advanced disease (T3–T4) was present in 4 of 7 patients (57%), and node-positive disease in 3 of 7 (43%); 5 of 7 (71%) were classified as very-high-risk. At last follow-up (Mean: 36 months), all 7 patients (100%) had a normal or declining PSA with no evidence of biochemical progression and no recurrence. No acute or late grade ≥ 2 GU toxicity was reported in any patient, and no GI toxicity was observed. Dosimetry advantage in terms of higher dose's to GTV and lower doses to OAR's was observed.

Conclusions: In this small institutional cohort, EBRT combined with HDR-BT boost for high- and very-high-risk prostate cancer was well tolerated, with no significant GU or GI toxicity and favourable early biochemical response in all patients.

Brachytherapy for Periauricular Non-Melanoma Cutaneous Malignancies: A Single-Institution Case Series

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Introduction: Non-melanoma skin cancers (NMSC) of the periauricular region present a unique therapeutic challenge owing to the complex three-dimensional anatomy of the auricle. Brachytherapy (BT), exploiting conformal dose delivery with rapid fall-off represents a compelling organ-preserving alternative to surgery. We report our institutional experience with various brachytherapy techniques in a curated cohort of periauricular NMSC patients.

Methods Patients with histologically confirmed periauricular NMSC treated with high-dose-rate (HDR) brachytherapy (surface mould, or Leipzig applicator techniques) at our institution were considered suitable for the study. Data was extracted from the prospectively maintained data base and electronic medical records. For superficial lesions (depth ≤ 5 mm), customised acrylic moulds were individually fabricated to closely conform to the contoured surface of the auricle and periauricular skin. Plastic tubes (catheters) were embedded within the mould encompassing the target volume. The Leipzig applicator with shielded circular dose distribution was employed for small, well-defined superficial lesions located on relatively flat periauricular skin. All patients underwent CT-based planning which included reconstruction of catheters, plan normalisation to catheter points and dose optimization. Treatment was delivered with ¹⁹²Ir HDR brachytherapy with 3-4Gy/# using BID regimen to a total dose of 48-52 Gy. Acute and late toxicity, cosmetic outcomes and 3-year local control (LC), locoregional control (LRC) and Overall Survival (OS) were evaluated.

Results During January 2010 to December 2025, 11 patients were treated with HDR brachytherapy for carcinoma of peri-auricular region. Median age of the cohort was 60 years (Range-39-69). There were 7(63%) women and 4(34%) men. Histologies included basal cell carcinoma in 8(73%) and squamous cell carcinoma in 3(27%) patients. Brachytherapy was delivered as definitive in 10(91%) patients and as salvage in 1(9%) patient. Nine were treated with surface mould brachytherapy while 2 were treated with Leipzig applicator. Median total dose of brachytherapy was 50.5Gy (48-52 Gy) in 12-14 fractions. Grade 1–2 acute dermatitis occurred in 7(63%) of patients. Late toxicity included Grade 3 Chondritis/ Soft tissue necrosis in 2(18%) patients which was managed conservatively. Excellent/good cosmesis was achieved in 7(70%). At a median follow up of 36 months (IQR- 13-59 months), LC, LRC and OS rates at 3 years were 86%, 86% and 100%, respectively.

Conclusion HDR brachytherapy for peri-auricular skin cancers using various techniques results in excellent LC and acceptable toxicity with excellent/ good cosmetic outcomes in well-selected patients.

Do Dosimetric Plan-Quality Indices Predict Clinical Outcomes in Interstitial Brachytherapy for Oral Cavity Cancers? An Institutional Experience

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Background: Interstitial Brachytherapy (ISBT) is the most conformal technique of radiation delivery, which strategically avoids exposure of critical structures, while enabling shorter overall-times with superior functional and cosmetic preservation, in suitable Oral Cavity Cancers (OCCa). This study was conceived based on existing literature correlating plan-quality indices with local control (LC) and toxicity, and was initiated in 2023 prior to the subsequent publication of the GEC-ESTRO-2024 framework, under which such indices are routinely reported in ISBT planning. Whether these indices meaningfully correlate with clinical outcomes remains poorly established. This study evaluates LC and toxicity outcomes in OCCa patients treated with ISBT and examines their correlation with dosimetric plan-quality indices.

Materials and Methods: Prospective-Observational study of OCCa patients treated by ISBT as radical/boost radiotherapy in definitive or postoperative settings between 2023-25. Inclusion criteria: Primaries-Tongue, buccal-mucosa, lip; T stage: T1-T3, N stage: N0-N2c Exclusion criteria: Buccal-mucosa/Lip lesions involving the gingivobuccal sulcus. Dose used was 3.5Gy x 12-14Fr was used for adjuvant brachytherapy alone, 3.5-4Gy x 5-6Fr was used as a boost after 50Gy/25Fr EBRT. Toxicity was graded using RTOG toxicity-grading criteria. Dosimetric parameters (CTV-D90, V100, V150, V200, DNR, DHI, CI) were recorded.

Results: 28 patients were recruited using consecutive convenience sampling. Median age was 51 years (IQR 40.5-62.5). Treatment distribution -Table 1a.DVH parameters and plan quality indices -Table 1b.22/28(78.6%) had LC. HR-CTV D90 was higher in patients who achieved LC than in those with local failure [median 99.3% (IQR 96.2–102.2) vs. 95.7% (IQR 92.8–97.2)]; however, the difference was not statistically significant (Mann–Whitney U=86.5, p=0.179). Acute toxicity: Grade-III mucositis = 78% (22/28); Grade-IV=10.7% (3/28 -1 bleeding, 2 ulcers). One patient had a chronic Grade IV ulcer-3.5%. Late skin toxicity: 13/13 patients with lip primary had persistent hypopigmentation post BT. No patients had osteoradionecrosis.

Spearman's rank correlation analysis demonstrated no statistically significant correlation between toxicity grade and any of the evaluated dosimetric parameters. The correlation coefficients were weak for V150% ($\rho=0.096$, $p=0.629$), V200% ($\rho=-0.167$, $p=0.395$), DNR ($\rho=0.091$, $p=0.646$), DHI ($\rho=-0.100$, $p=0.611$), and CI ($\rho=-0.062$, $p=0.753$), indicating that none of these indices were associated with the severity of toxicity in this cohort.

Conclusion: Our institutional ISBT experience demonstrates acceptable local control, but no significant correlation was observed between standard dosimetric plan-quality indices and toxicity grade. This likely reflects the limited sample size and diversity of treatment distribution rather than a true absence of association, thus necessitating further exploration with larger cohorts.



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Comparison of Treatment Outcomes with Varying Activity of Iridium-192 in Cervical Cancer Brachytherapy

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Introduction: Concurrent chemoradiation (CCRT) followed by brachytherapy is the standard treatment for locally advanced Cervical Cancer. HDR brachytherapy using Iridium-192 (Ir-192) plays a crucial role in improving target coverage while sparing organs at risk. As Ir-192 has a half-life of 73 days, gradual source decay and delays in source replacement may prolong overall treatment time (OTT), potentially affecting outcomes, especially in resource-limited settings. The aim of the study was to evaluate local control (LC), progression-free survival (PFS), and overall survival (OS) in cervical cancer patients treated with definitive CCRT followed by HDR brachytherapy using varying Ir-192 source activities

Method: A retrospective analysis of 159 cervical cancer patients treated with curative intent CCRT followed by HDR brachytherapy was performed. Patients received pelvic radiotherapy to 45–50.4 Gy with or without nodal boost, along with concurrent weekly cisplatin (40 mg/m²). HDR intracavitary brachytherapy of 6–9 Gy in 2–4 fractions were delivered following EBRT. Patients were categorised based on source activity into four groups: Group A (>9 Ci), Group B (7–9 Ci), Group C (3–7 Ci), and Group D (<3 Ci). Treatment outcomes including LC, PFS, and OS were analysed.

Results: The mean age was 57 years. Squamous cell carcinoma constituted 86.7% cases, with FIGO stage II being the most common stage (48%). Most patients received concurrent chemotherapy and intracavitary brachytherapy, commonly 7 Gy in 3 fractions. EQD2 >80 Gy to point A was achieved in 99.4% patients. OTT was <56 days in 98.6% patients. At a median follow-up of 120 months, 89% patients were alive and 82% remained disease-free. Distant metastasis was the most common pattern of failure. No statistically significant differences in LC, PFS, or OS were observed among different source activity groups.

Conclusion: Variation in HDR Ir-192 source activity did not significantly affect tumour control or survival outcomes. Low-activity HDR brachytherapy sources remain clinically safe and effective, particularly in resource-constrained settings

Development and Validation of a Contrast-Enhanced Computed Tomography (CECT)-Based Nomogram to Predict HR-CTV D90 Dosimetric Adequacy in Image-Guided Brachytherapy for Locally Advanced Cervical Cancer: A Retrospective Cohort Study

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Background: High-risk clinical target volume (HR-CTV) D90 is the strongest dosimetric predictor of local control in image-guided brachytherapy (IGBT) for locally advanced cervical cancer (LACC). Magnetic resonance imaging (MRI) is the gold-standard imaging modality for target delineation, but contrast-enhanced computed tomography (CECT) remains the predominant planning modality in most high-volume, resource-constrained centres, including government tertiary cancer centres in India. No validated clinical tool currently allows CECT-based prediction of achievable HR-CTV D90 at the time of applicator insertion, before dosimetric planning is finalised.

Purpose: To develop and internally validate a nomogram, derived from CECT-based intracavitary/hybrid brachytherapy planning data, that predicts the probability of achieving a pre-specified adequate HR-CTV D90 (EQD2 $\geq$ 60 Gy, with a secondary threshold of $\geq$ 75 Gy) using pre-implant clinical, radiological and applicator-related variables available at the time of the first brachytherapy fraction.

Methods: This is a single-institution, retrospective cohort study of consecutive patients with FIGO 2018 stage IB2–IVA cervical cancer treated with definitive concurrent chemoradiotherapy followed by CECT-based intracavitary or hybrid (intracavitary + interstitial) high-dose-rate brachytherapy between August 2021 and September 2024 at Kidwai Memorial Institute of Oncology. Candidate predictors will include pre-treatment tumour size, post-EBRT residual tumour dimensions on CECT, HR-CTV volume and width at first brachytherapy fraction, parametrial involvement, applicator type (intracavitary vs. hybrid), overall treatment time, and point A EQD2. Multivariable logistic regression, with candidate variables screened by least absolute shrinkage and selection operator (LASSO) regression, will be used to construct a nomogram predicting dosimetric adequacy. Internal validation will use bootstrap resampling (1,000 iterations) for optimism-corrected discrimination (Harrell's C-index) and calibration (calibration plot, Hosmer-Lemeshow test). Decision curve analysis will assess clinical utility. The study and reporting will follow STROBE and TRIPOD guidelines.

Results: Median HR-CTV D90 was 68.5 Gy (EQD2) (IQR 61.7–74.6); 174/220 (79.1%) achieved the primary threshold (D90 $\geq$ 60 Gy) and 51/220 (23.2%) achieved the secondary threshold (D90 $\geq$ 75 Gy). On multivariable logistic regression, independent predictors of D90 adequacy ($\geq$ 60 Gy) were smaller HR-CTV volume at first fraction (OR 0.90 per cm³, 95% CI 0.87–0.93, $p < 0.001$), absence of parametrial involvement (OR 0.21 for presence, 95% CI 0.08–0.52, $p = 0.001$), hybrid intracavitary-interstitial technique (OR 5.96, 95% CI 1.99–17.87, $p = 0.001$), and shorter overall treatment time (OR 0.94 per day, 95% CI 0.89–0.99, $p = 0.032$). The resulting nomogram showed good apparent discrimination (AUC 0.88) with bootstrap-corrected discrimination of 0.86 and a calibration slope of 0.88; the Hosmer-Lemeshow test showed no evidence of miscalibration ($p = 0.54$). Decision curve analysis showed positive net benefit over a threshold-probability range of approximately 0.10–0.75 relative to treat-all/treat-none strategies.

Conclusion: a CECT-derived nomogram integrating HR-CTV volume, parametrial involvement, applicator technique, overall treatment time, tumour size and age showed good discrimination and calibration for predicting HR-CTV D90 adequacy.

Role of Postoperative HDR Brachytherapy in Preventing Keloid Recurrence: A Single-Institution Observational Study

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Introduction: Keloids are benign fibroproliferative disorders resulting from abnormal wound healing, characterized by excessive collagen deposition extending beyond the original wound margins. Surgical excision alone is associated with recurrence rates exceeding 50%, making long-term management challenging. Adjuvant radiotherapy has been shown to reduce recurrence, with high-dose-rate (HDR) brachytherapy offering the advantage of delivering a highly conformal dose while minimizing exposure to surrounding normal tissues. This study evaluated the efficacy and safety of postoperative HDR brachytherapy following surgical excision of keloids

Methods: A single-institution observational study was conducted involving 12 patients with clinically diagnosed keloids treated between 2022 and 2024. All patients underwent complete surgical excision followed by postoperative HDR brachytherapy using an Iridium-192 source. Treatment consisted of 1.2 Gy per fraction, delivered twice daily, to a total dose of 14.4 Gy in six fractions. Patients were followed clinically for local recurrence and treatment-related toxicity.

Results: At a median follow-up of 15 months, 8 of 12 patients (66.7%) achieved sustained local control without recurrence. Four patients (33.3%) developed recurrence, all involving pre sternal keloids, with recurrence occurring at the lesion margins. Treatment was well tolerated, with hyperpigmentation being the only documented adverse effect. No Grade 3 or higher toxicities, wound complications, or treatment interruptions were observed.

Conclusion: Postoperative HDR brachytherapy following surgical excision demonstrated encouraging local control with minimal toxicity in patients with keloids. The observed recurrences were confined to pre sternal lesions, suggesting that anatomical site may influence treatment outcomes. HDR brachytherapy appears to be an effective adjuvant modality for reducing keloid recurrence while maintaining an acceptable safety profile. However, the small sample size, single-institution setting, and observational design limit the generalizability of these findings. Larger prospective studies with longer follow-up are required to establish optimal patient selection and treatment protocols.

Brachytherapy for the Palms and Soles: Optimizing Local Control and Functional Outcomes

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Introduction: Soft tissue sarcomas involving the palms and soles are uncommon and present a therapeutic challenge because of the need to achieve local control while preserving function in anatomically constrained regions. Brachytherapy enables highly conformal dose delivery with rapid dose fall-off, reducing radiation exposure to adjacent critical structures. We present our institutional experience with interstitial high-dose-rate (HDR) brachytherapy in three patients with hand and foot soft tissue sarcomas.

Methods: Three patients with localized soft tissue sarcomas underwent limb-sparing surgery followed by interstitial HDR brachytherapy using an Iridium-192 source. The first patient was a child with localized Ewing sarcoma involving the left hypothenar muscles who received adjuvant HDR interstitial brachytherapy to 36 Gy in 12 fractions delivered twice daily over 7 days. The second patient was a 2-year-old child with alveolar rhabdomyosarcoma involving the right thenar eminence and first web space, including the lumbrical and volar interossei muscles, who also received adjuvant HDR interstitial brachytherapy to 36 Gy in 12 fractions delivered twice daily. The third patient had an intermediate-grade synovial sarcoma of the left foot and received HDR interstitial brachytherapy to 18 Gy in 6 fractions delivered twice daily, followed by external beam radiotherapy using volumetric modulated arc therapy (VMAT) to 50 Gy in 25 fractions. Treatment delivery, acute toxicity, and clinical outcomes were evaluated.

Results: All three patients completed the planned brachytherapy without interruption. The patient with synovial sarcoma subsequently completed adjuvant VMAT without treatment breaks. No acute radiation-related complications were observed following brachytherapy. During external beam radiotherapy, the patient with synovial sarcoma developed mild sole pain. At a median follow-up of 14 months (range, 8–28 months), all three patients remained free of local recurrence and disease progression. Functional outcomes were favourable, with preservation of hand function in both paediatric patients and preservation of foot function in the patient with synovial sarcoma. The only persistent late complaint was mild foot pain in the patient with synovial sarcoma, while both paediatric patients remained clinically asymptomatic without significant late toxicity.

Conclusion: Interstitial HDR brachytherapy is a feasible and well-tolerated treatment modality for selected soft tissue sarcomas of the palms and soles. It facilitates organ and function preservation while delivering highly conformal radiation in anatomically complex regions. Our experience suggests that brachytherapy can be effectively integrated into multidisciplinary management for tumours of the palms and soles, although larger studies with longer follow-up are needed to further define its role.

Postoperative Radiotherapy Following Keloid Excision: A Single-Institution Experience with Electron Beam Radiotherapy and HDR Brachytherapy

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Introduction: Keloids are benign fibroproliferative scars that extend beyond the original wound margins, driven by excessive fibroblast proliferation and abnormal collagen deposition, causing pain, pruritus, and disfigurement. Surgical excision alone is inadequate as monotherapy, with recurrence rates ranging from 45% to 100%, necessitating adjuvant treatment. Available adjuvant options include intralesional corticosteroids, pressure therapy, cryotherapy, laser therapy, and radiotherapy, but non-radiotherapeutic modalities alone show inconsistent efficacy. Despite the established role of postoperative radiotherapy in reducing keloid recurrence, the optimal radiotherapy technique remains uncertain. Comparative data evaluating clinical outcomes and postoperative morbidity between electron beam radiotherapy and HDR brachytherapy are limited. We report our single-institution experience with both modalities.

Methodology: A single-institution retrospective observational study included patients with presternal, auricular, neck, shoulder, and abdominal keloids treated with surgical excision followed by postoperative radiotherapy between August 2023 and May 2025. Adjuvant radiotherapy was initiated within 24 hours of surgery using HDR Interstitial brachytherapy with Ir192 or electron beam radiotherapy, following institutional dose-fractionation protocols comprising predominantly 20 Gy in 4 fractions, with selected auricular keloids treated using an 18 Gy in 3 fractions regimen. Clinical outcomes included local control and treatment-related complications, including wound dehiscence, flap necrosis, and pigmentation changes.

Results: Twenty-six keloid lesions underwent surgical excision followed by postoperative radiotherapy, including 17 treated with HDR brachytherapy and 9 with electron beam radiotherapy. At a median follow-up of 30 months (range, 12–45 months), overall local control was achieved in 18/26 lesions (69.2%), including 12/17 (70.6%) treated with HDR brachytherapy and 6/9 (66.7%) treated with electron beam radiotherapy. Flap necrosis was observed in 3/17 (17.6%) lesions treated with HDR brachytherapy. Wound dehiscence occurred in 4/17 (23.5%) lesions following HDR brachytherapy and 1/9 (11.1%) following electron beam radiotherapy. Pigmentation changes were observed in 9/17 (52.9%) lesions following HDR brachytherapy and 4/9 (44.4%) following electron beam radiotherapy.

Conclusion: Both HDR brachytherapy and electron beam radiotherapy achieved comparable local control following keloid excision. The lower postoperative wound morbidity observed with electron beam radiotherapy highlights that treatment selection should consider wound healing in addition to local control. Larger prospective studies are warranted to define the optimal radiotherapy technique according to lesion characteristics and reconstructive requirements.

Development of an Indigenous Skull Brachytherapy Applicator with Initial Clinical Outcomes and Dosimetric Comparison with a 3D-Printed Applicator

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Introduction: Delivering high-dose-rate (HDR) brachytherapy to superficial scalp lesions is technically challenging because of the irregular convex anatomy of the skull. Conventional surface applicators often fail to achieve optimal conformity, resulting in dose inhomogeneity and reduced treatment reproducibility. Commercially available imported skull brachytherapy applicators are expensive and not readily accessible in many radiotherapy centres. To overcome these limitations, an indigenous customized skull HDR brachytherapy applicator was developed using a polymer silicone-based sheet. This study describes its fabrication, phantom dosimetric evaluation, comparison with a 3D-printed applicator, and initial clinical outcomes.

Methods: A customized skull applicator was fabricated using 5 mm and 10 mm thick polymer silicone sheets, selected for their flexibility, durability, and tissue-equivalent properties. The applicator was moulded to the patient's scalp contour, and parallel channels were created at 1 cm intervals to accommodate 6–10 flexible HDR catheters, ensuring uniform catheter spacing and stable geometry. CT simulation was performed with the applicator in place, followed by target delineation, catheter reconstruction, and treatment planning using Varian Eclipse Version 17. HDR treatment was delivered using a 20-channel GammaMedplus iX remote afterloader with an Iridium-192 source. Dosimetric evaluation was performed using a human tissue-equivalent phantom, and treatment plans were compared with those generated using a 3D-printed skull applicator. The indigenous applicator was subsequently evaluated clinically in patients receiving HDR brachytherapy.

Results: Phantom evaluation demonstrated excellent conformity of the indigenous polymer silicone applicator to the curved skull surface, minimizing air gaps and maintaining stable catheter positioning. Dosimetric comparison with the 3D-printed applicator showed comparable target coverage, dose homogeneity, conformity index, and organ-at-risk sparing, with no clinically significant differences in plan quality. The indigenous applicator was simple to fabricate, reusable, and considerably more economical than commercially imported applicators. Clinically, all patients completed treatment without interruption. CT-based planning confirmed reproducible applicator positioning and accurate dose delivery. Early clinical outcomes demonstrated satisfactory local control, acceptable acute toxicity, favorable cosmetic results, and excellent patient tolerance.

Conclusion: The indigenous polymer silicone-based skull HDR brachytherapy applicator demonstrated dosimetric performance comparable to that of a 3D-printed applicator, indicating that both can serve as effective alternatives to expensive imported skull brachytherapy applicators. The indigenous applicator offers additional advantages of low cost, simple fabrication, reusability, and easy availability, making it particularly suitable for resource-limited radiotherapy centres. Further clinical validation in a larger patient cohort is warranted.

When Millimeters Matter: Rectal D2cc as a Predictor of Severe Late Radiation Proctitis After HDR Brachytherapy for Carcinoma Cervix – An Institutional Experience

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Background: Rectal D2cc is the most widely accepted surrogate dosimetric parameter for predicting late rectal toxicity in HDR brachytherapy. However, institutional data correlating dose–volume parameters with severe late radiation proctitis remain limited.

Methods: We retrospectively analyzed 30 patients with carcinoma cervix treated with definitive radiotherapy and CT-guided HDR intracavitary brachytherapy at our institute. HR-CTV and organ-at-risk dosimetry were evaluated for each fraction. Cumulative rectal D2cc (EQD2, $\alpha/\beta = 3$ Gy) was analyzed with late rectal toxicity. Rectal D2cc remained below the institutional mean rectal dose (Dmean) across all plans.

Results: Two patients (6.7%) developed Grade 3 late radiation proctitis. Despite acceptable target coverage, higher cumulative rectal D2cc demonstrated a trend toward severe toxicity, supporting the serial-organ architecture and steep dose–volume response of the rectum.

Conclusion: Millimetric variations in rectal D2cc may significantly influence severe late rectal toxicity. Institutional optimization strategies emphasizing D2cc minimization beyond conventional dose constraints may further improve the therapeutic ratio.

Are Active dwell positions always necessary in ring or ovoid channel of cervical applicator in intracavitary brachytherapy of cervical cancer?

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Introduction (Aim): To compare the dosimetric parameters of brachytherapy treatment plans made with or without active source positions of ring or ovoid applicator in locally advanced cervical cancer patients.

Material & Methods: Thirty five patients with cervical cancer without vaginal involvement after external beam radiation with chemotherapy were selected for the study who received the intracavitary brachytherapy. For each patient two plans were made with and without active dwell positions in ring or ovoid channel using the same dose volume constraints. EQD2 total doses from external beam radiotherapy and brachytherapy of target volume and organs at risk (OARs) between the competing plans were compared

Results: There was no significant difference in High Risk clinical target volume (HR-CTV) receiving the prescribed dose (p- value 0.065) and bladder dose (OAR) (p-value 0.102) between the plans with active and inactive ring or ovoid activator. Dose to OARs rectum, sigmoid colon and vagina were significantly lower in plans without ring or ovoid activation (p-value <0.001, 0.017 and <0.001 respectively).

Conclusion: Inactivation of ring or ovoid channel of cervical applicator results in similar dose coverage of target volume (HR-CTV) with lower doses to OARs except bladder, as activation of ring or ovoid in cervix cancer patients when HR-CTV does not extend to R/O applicator.

Breaking the Cycle of Recurrence: Surgical Excision Followed by Immediate Post-Operative HDR Brachytherapy for Refractory Bilateral Ear Lobule Keloids – First Experience from NH Shimoga

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Case Presentation: A 20-year-old woman presented with symptomatic bilateral ear lobule keloids of four years' duration. The lesions had progressively enlarged despite multiple previous treatment modalities, including repeated intralesional Kenacort injections, silicone therapy, and various local interventions. The persistent hard, nodular keloids caused cosmetic disfigurement and significant psychosocial distress, affecting her confidence and participation in social activities.

Following multidisciplinary tumour board discussion, the patient was planned for definitive management with surgical intralesional keloid excision under general anesthesia. Considering the high risk of recurrence, adjuvant high-dose-rate (HDR) brachytherapy was initiated within 24 hours of surgery. A total dose of 12 Gy was delivered in three fractions (4 Gy $\times$ 3).

Results: The post-operative course was uneventful. At two months of follow-up, the patient demonstrated excellent cosmetic outcomes with satisfactory healing, marked improvement in ear contour, and no clinical evidence of recurrence. The patient reported significant improvement in quality of life and expressed high satisfaction with the treatment outcome.

Conclusion: The combination of surgical excision followed by immediate post-operative HDR brachytherapy appears to be a safe and effective treatment option for refractory ear lobule keloids, offering excellent cosmetic results and minimizing the risk of recurrence.

Rectal Brachytherapy: A Non- Surgical Alternative for Rectal Cancer Management

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Background and Purpose: Organ preservation has transformed cancer management, as seen with breast-conserving therapy in breast cancer. In rectal cancer, brachytherapy offers a means of achieving local tumour control while preserving anorectal function and quality of life in low lying tumours. The OPERA trial demonstrated improved organ preservation rates with brachytherapy boost after chemoradiotherapy, supporting its role in non-operative management strategies. This has established rectal brachytherapy as an important organ-preserving treatment option for selected patients with rectal cancer. Here, we present the outcomes of patients treated with Rectal high-dose-rate (HDR) brachytherapy at our institution and evaluate its feasibility, efficacy, and toxicity in an organ-preservation approach.

Materials and Method: A total of three patients were treated, comprising either patients unfit for radical surgery or those fit for radical surgery but refused the surgery. An organ-preserving multimodality treatment approach was employed. The treatment strategy aimed to enhance local tumour control while minimizing treatment-related morbidity and preserving anorectal function.

Results: A total of three patients with rectal adenocarcinoma were treated with neoadjuvant chemotherapy, long-course external beam radiotherapy and an HDR brachytherapy boost. Two patients achieved a complete clinical response and have remained disease-free on clinical and radiological follow-up for 2 years under a non-operative management strategy. The third patient is disease-free at 6 months of follow-up. No local regrowth has been observed to date. Organ preservation was successfully achieved in all patients. Treatment was well tolerated, with only one patient experiencing grade 1–2 toxicity. No grade ≥ 3 toxicities or treatment-related mortality were observed.

Conclusion: HDR Rectal brachytherapy boost is feasible and well tolerated as part of an organ-preserving multimodality treatment approach in patients with rectal and anorectal malignancies. Favorable local control was achieved while preserving anorectal function, suggesting that HDR brachytherapy may serve as a promising organ-preserving treatment option in selected patients. Further studies with larger patient cohorts and longer follow-up are warranted to validate these findings.

Cross-Vendor CBCT for Cervical ICRT: A Three-Platform Comparison for Contingency Planning

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BACKGROUND AND PURPOSE: Image-guided intracavitary radiotherapy (ICRT) remains the cornerstone of curative treatment for locally advanced cervical cancer, requiring dedicated CT or MRI for applicator reconstruction and target delineation. This dependence on simulator access creates a real workflow vulnerability in busy departments and resource-limited settings alike. On-board cone-beam CT is available on virtually every modern linear accelerator, yet its practical utility for ICRT planning has not been evaluated under real clinical conditions. We report a three-platform CBCT comparison conducted during a single patient's HDR brachytherapy course in the absence of CT simulator access, to answer a question with direct operational relevance: when CT is unavailable, which on-board imaging system can carry the planning burden?

MATERIALS AND METHODS: A patient with squamous cell carcinoma of the cervix, FIGO Stage IIIC1, underwent definitive chemoradiation followed by three fractions of HDR intracavitary brachytherapy using a Fletcher tandem-and-ovoid applicator. With CT simulator access unavailable during the brachytherapy course, each fraction was imaged on a different on-board platform. Fraction 1 was acquired on a Varian TrueBeam (kV-CBCT, 140 kV, CTDIvol 36.6 mGy, Pelvis Large protocol), Fraction 2 on a TomoTherapy Radixact (MV fan-beam CT, 3.5 MV), and Fraction 3 on an Elekta Versa HD (kV-CBCT, 120 kV, CTDIvol 15.5 mGy, adapted prostate protocol). All datasets were imported into Oncentra Brachy for applicator reconstruction, contouring, and dose calculation. Platforms were evaluated on applicator visibility, soft-tissue contrast, metal artifact profile, and overall feasibility for clinical planning. Inter-fraction anatomical variation is acknowledged as an inherent limitation of this sequential single-patient design.

RESULTS: Applicator reconstruction was achievable on all three platforms. Both kV-CBCT systems allowed identification of the bladder wall, rectal wall, and HR-CTV boundary with acceptable clinical confidence. Elekta delivered comparable soft-tissue contrast to Varian at 58% lower imaging dose (15.5 vs. 36.6 mGy CTDIvol), an ALARA advantage of clinical relevance in a treatment modality already delivering high local dose per fraction. TomoTherapy MV-CT offered superior metal-artifact suppression and reliable applicator geometry, but soft-tissue contrast was inadequate for standalone target delineation. Planning was completed on all three platforms, though the anatomical confidence underpinning that planning varied considerably across systems.

CONCLUSION: kV-CBCT from Varian or Elekta linacs is feasible for contingency ICRT planning within Oncentra Brachy when dedicated CT is unavailable. Elekta's lower imaging dose makes it the preferable option where cumulative dose is a concern. TomoTherapy MV-CT serves well for applicator geometry verification but cannot replace soft-tissue-based planning. This case establishes proof-of-concept for multi-vendor on-board CT as a contingency imaging strategy in cervical ICRT.

Dosimetric Comparison of Single-CT and Adaptive Multi-CT Planning in HDR Postoperative Gynecological Intracavitary Brachytherapy: A Feasibility Study for Selective Imaging Workflow

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Introduction: Three-dimensional CT-guided adaptive planning before every HDR brachytherapy fraction is the current standard for gynecological malignancies because it accounts for interfraction anatomical variations and optimizes organ-at-risk (OAR) sparing. However in postoperative gynecological malignancies, repeated CT imaging increases treatment time, workload, patient inconvenience, and resource utilization. This study compared cumulative biologically effective dose (BED) to the rectum, bladder, and sigmoid between a single-CT workflow and adaptive multi-CT planning, and evaluated the feasibility of a selective single-CT approach.

Methods: A retrospective dosimetric analysis was performed on 100 postoperative gynecological cancer patients treated with CT-guided HDR intracavitary brachytherapy. All patients received 8 Gy in two fractions. Adaptive multi-CT planning, where each fraction was individually optimized using a separate CT scan, served as the reference standard. A single-CT workflow was simulated by applying the first-fraction treatment plan to the second fraction. Cumulative BED ($\alpha/\beta = 3$) for the rectum, bladder, and sigmoid colon was calculated for both workflows. OAR dose constraints, target coverage, and dosimetric differences were assessed using paired t-tests, with $P < 0.05$ considered statistically significant.

Results: Among 100 patients, cumulative rectal BED was comparable between adaptive multi-CT and single-CT planning (117.1 ± 8.9 Gy vs. 118.2 ± 9.4 Gy; $P = 0.463$). Bladder BED was also similar (119.0 ± 13.5 Gy vs. 118.4 ± 13.2 Gy; $P = 0.620$). Although the single-CT workflow showed a modest but statistically significant increase in cumulative sigmoid BED (98.5 ± 12.1 Gy vs. 96.4 ± 11.8 Gy; $P = 0.017$), the difference remained clinically acceptable in most patients. OAR dose constraints and target coverage were maintained with both planning strategies. The single-CT workflow also offered the potential to reduce repeat CT simulations, planning time, and departmental workload, as all values are within acceptable range.

Conclusion: Single-CT planning achieved dosimetric outcomes comparable to adaptive multi-CT planning for the rectum and bladder while maintaining satisfactory target coverage. Although sigmoid BED increased slightly, the overall dosimetric impact was clinically acceptable. A selective single-CT workflow may improve efficiency and optimize resource utilization without compromising treatment quality in appropriately selected postoperative gynecological patients as all values are within acceptable range.

Single-Institute Experience for Interstitial and Hybrid Intracavitary-Interstitial Brachytherapy in Cervical malignancies

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Introduction: Interstitial and hybrid intracavitary-interstitial (IC-IS) brachytherapy techniques are novel methods that can be considered for gynecological cancers with unfavorable anatomy. We performed an analysis on patient selection, dosimetric parameters, early clinical outcomes and the initial experience with interstitial brachytherapy (ISBT) at our institute.

Materials and Methods: We studied the first 10 patients who required a documented interstitial component (pure ISBT or hybrid IC-IS) and form the basis of this analysis. Indications for interstitial brachytherapy included large residual disease post EBRT (≥ 2 cm, n=7), parametrial extension (n=8), extensive vaginal involvement (n=5), and vault recurrence (n=2). External beam radiotherapy (EBRT) doses ranged from 45–50.4 Gy in 25–28 fractions. Pre implant MRI was planned at 5th week of EBRT and was done in 80% of patients. HDR Brachytherapy was planned for a dose of 7 Gy per fraction for 3-4 fractions according to EBRT dose, with about 5-7 days gap between each fraction. Both applicator implantation and treatment delivery was done in a dedicated brachytherapy suite. Venezia hybrid applicator placement was done under short general anesthesia and interstitial needles placed with USG guidance. 3D Imaging modalities for planning included CT alone (n=17 fractions, 80%) or combined CT and MRI (n=4 fractions, 19%). Dedicated staff were allocated for the procedure. Image reconstruction with 3D planning and volume optimization was done. EQD2 sheets used. Treatment delivery after verification was done and the patient was discharged in the same day.

Results: A total of 21 fractions of HDR brachytherapy were analyzed. The cohort comprised cervical cancer (n=8, 80%) and vault recurrences (n=2, 20%). Stage distribution was Stage Ib3 (10%), Stage II (20%), Stage III (40%), Stage IV (10%), and recurrent disease (20%). Techniques included intracavitary-interstitial (IC-IS) in 60% and pure ISBT in 40%. 1 out of 10 patients defaulted planned 3rd fraction of brachytherapy. The number of implanted needles per session was ≤ 4 in 14.2%, 5–10 in 80.9%, and 11–15 in 4% of fractions. Cumulative mean D₉₀ for high-risk clinical target volume (HR-CTV) was 79.01 Gy (median: 78.5 Gy). Cumulative mean D_{2cc} organs-at-risk (OAR) doses for bladder, rectum, and sigmoid were 74.87 Gy, 62.3 Gy, and 59.1 Gy, respectively. All patients tolerated treatment well with no grade 3,4 acute reactions. Mean follow up period was 11.6 months at their last follow-up, 70%(n=7) of patients were disease-free, 10%(n=1) had residual disease, and 20% developed recurrence(n=2) (1 local, 1 distant).

Conclusion: Our initial experience demonstrates that a interstitial brachytherapy and hybrid intracavitary-interstitial brachytherapy enables safe and effective treatments yielding acceptable rates of early disease control with good OAR sparing. The challenges faced were the need of dedicated staff, complex planning and time consumption.

Clinical outcomes and toxicity of definitive chemoradiation with HDR intracavitary brachytherapy in carcinoma cervix: a single-institution retrospective study

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Introduction: Definitive concurrent chemoradiation followed by high-dose-rate (HDR) intracavitary brachytherapy (ICBT) is the standard of care for locally advanced carcinoma cervix, yet brachytherapy fractionation varies widely across centres. We analysed real-world clinical outcomes and toxicity in a large single-institution cohort, focusing on a pragmatic $8\text{ Gy} \times 3$ (24 Gy/3 fractions) HDR schedule that is not routinely practiced.

Methods: We retrospectively analysed 110 women with carcinoma cervix treated with definitive chemoradiation and image-based HDR ICBT between 2023 and 2026. External beam radiotherapy was followed by ICBT with volumetric D2cc-based organ-at-risk (OAR) evaluation. The predominant brachytherapy schedule was 24 Gy in 3 fractions (8 Gy per fraction; $n=66$, 60%), yielding a combined target EQD2 of approximately 82-90Gy. Primary endpoints were complete response (CR) at 3 months, assessed clinically and radiologically, and acute toxicity graded by CTCAE. Recurrence and survival were analysed descriptively.

Results: Median age was 58 years (range 27–81). Ninety percent had locally advanced disease ($\geq$ FIGO IIB) and 37% were node-positive (stage IIIC). External beam radiotherapy was delivered to a median dose of 46 Gy (range 45–55 Gy) in 23–28 fractions, with concurrent chemotherapy in 92% of patients (≥ 4 cycles in 85%). Median cumulative D2cc (EQD2) doses were: rectum 58 Gy, bladder 72 Gy, sigmoid 56 Gy, and bowel 51 Gy, all within accepted constraints. Complete response was achieved in 91% of evaluable patients (85/93), including 88% (30/34) of node-positive patients. In the $8\text{ Gy} \times 3$ subgroup, CR was 92% (54/59), with a Grade 1 late proctitis. Across the whole cohort, acute toxicity was predominantly Grade 1. At a median follow-up of approximately 20 months, recurrence occurred in 9%, predominantly distant, and 6% had died.

Conclusion: Definitive chemoradiation with image-based HDR intracavitary brachytherapy achieved high complete-response rates, including in node-positive disease, with a very low acute toxicity burden. The hypofractionated $8\text{ Gy} \times 3$ schedule delivered excellent local response with an acceptable safety profile, supporting its role as an effective and resource-efficient alternative in high-volume settings. Longer follow-up is required to mature late-toxicity and survival outcomes.

Dosimetric Comparison of Hybrid Point A-based and Image-Guided HR-CTV-based Planning Using Fletcher-Suit Applicators in Carcinoma Cervix

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Introduction: Image-guided adaptive Brachytherapy (IGABT) has transformed cervical cancer Brachytherapy by shifting from conventional Point A prescription to HR-CTV-based optimization, enabling individualized dose delivery while minimizing exposure to organs at risk (OARs). This study compared the dosimetric characteristics of hybrid Point A-based planning with HR-CTV-based planning using Fletcher-Suit applicators.

Methods: A retrospective dosimetric study was performed on 10 patients with carcinoma cervix treated with Intracavitary Brachytherapy. For each patient, two independent treatment plans were generated: a Hybrid Point A-based plan and an HR-CTV-based optimized plan. Bladder D2cc, Rectum D2cc, HR-CTV D90, and Point A dose were converted to EQD2 (Gy) and compared using paired t-tests.

Results: A total of 30 matched Brachytherapy plans from 10 patients treated with Fletcher-Suit applicators were analyzed. HR-CTV-based planning significantly reduced organ-at-risk doses compared with Point A-based planning. Mean bladder EQD2 decreased from 76.88 ± 3.12 Gy in Point A plans to 74.48 ± 1.85 Gy in HR-CTV plans (mean paired difference 2.40 Gy; $p = 0.12$). Mean rectum D2cc also decreased significantly from 70.09 ± 3.71 Gy to 68.61 ± 2.7 cGy (mean paired difference 1.47 Gy; $p = 0.187$).

For target dosimetry, mean HR-CTV D90 was 87.6 ± 2.95 cGy in HR-CTV based plans and 90.01 ± 3.62 Gy in Point A based plans (mean paired difference 2.41Gy; $p = 0.120$). The Point A dose was 79.52 ± 4.04 Gy in HR-CTV based plans and 81.12 ± 2.21 Gy in Point A based plans (mean paired difference 1.6 Gy; $p = 0.148$). Overall, HR-CTV-based planning improved bladder and rectal sparing, while Point A-based plans achieved a higher mean HR-CTV D90 at the cost of increased organ-at-risk dose.

Conclusion: HR-CTV-based planning using Fletcher-Suit applicators demonstrated a favorable dosimetric trend by reducing bladder and rectal doses with only a modest reduction in target dose compared with conventional Point A-based planning. The observed dosimetric pattern supports the rationale for image-guided HR-CTV-based optimization to improve the therapeutic ratio in cervical cancer Brachytherapy.

Clinical outcomes of radiotherapy with or without brachytherapy in gynaecological melanomas

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Introduction: Gynecological mucosal melanomas are rare and associated with poor survival. Owing to its rarity, evidence to guide optimal local management is limited, and surgery remains the conventional treatment. However, radical surgery is often associated with substantial morbidity and loss of organ function. Definitive radiotherapy with dose escalation using brachytherapy may offer an effective organ-preserving alternative, although published data remain scarce. We evaluated the clinical outcomes, treatment-related adverse events, and patterns of failure in patients treated with radical radiotherapy with or without brachytherapy.

Methods: A retrospective review was conducted of consecutive patients with histologically confirmed gynaecological mucosal melanoma who were treated with radical-intent radiotherapy with or without systemic therapy or immunotherapy between January 2019 and June 2025 were included. Patient demographics, tumour characteristics, treatment details, patterns of failure, treatment-related adverse events, and survival outcomes were analysed. Impact of brachytherapy on clinical outcomes were also assessed.

Results: Thirteen patients were included. Primary tumour sites included the vagina (n=8), cervix (n=4), and vulva (n=1). One-year local control (LC) progression-free survival (PFS), and overall survival (OS), for the entire cohort were 92.0%, 61.5% and 69.2%. Seven patients (53.8%) received brachytherapy boost, achieving a median cumulative EQD2 of 70–74 Gy. Five patients (38.5%) received adjuvant immunotherapy, while four (30.7%) received chemotherapy. At a median follow up of 16 months, seven patients (53.8%) developed distant metastases. The lung was the most common site of relapse (n=4), followed by the omentum (n=2), with one patient developing both brain and liver metastases. Patients treated with external beam radiotherapy (EBRT) alone with sequential external beam boost had an estimated 1-year OS and PFS of 50.0% and 33.3%, respectively, whereas those receiving brachytherapy boost achieved corresponding rates of OS 85.7% and PFS 61.5%. Given the small sample size, these subgroups findings should be considered exploratory. Grade 3 radiation proctitis occurred in two patients (15.4%). One patient developed radiation-induced soft tissue necrosis of the vaginal introitus.

Conclusion: Radical radiotherapy incorporating HDR brachytherapy achieved excellent local control with acceptable toxicity in this rare malignancy. Patients receiving brachytherapy demonstrated improved overall survival and progression-free survival, supporting its role as an organ-preserving dose-escalation strategy in selected patients with gynaecological mucosal melanoma. Larger multi-institutional studies are warranted to validate these findings.

Pilot Study on The Association Between Interfraction Residual Gross Tumour Volume and Organ-at-Risk Dosimetry During MRI-Guided Adaptive Brachytherapy for Cervical Cancer

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Background: MRI-guided adaptive brachytherapy (IGABT) enables personalized treatment planning in cervical cancer through serial assessment of residual gross tumour volume (GTVres) and organs-at-risk (OARs). Although tumour regression occurs during treatment, its impact on OAR dosimetry remains unclear. This pilot study evaluated the association between inter-fraction GTVres volume (cc) changes and OAR dose variations during MRI-guided adaptive brachytherapy.

Methods: This retrospective study included 25 patients (83 brachytherapy fractions) with MRI-visible residual GTV following concurrent chemoradiotherapy (CCRT) who underwent MRI-guided adaptive brachytherapy between 2023 and 2025. Patients achieving complete response after CCRT were excluded. Patients received either 8 Gy in three fractions or 7 Gy in four fractions according to institutional practice. The mean age was 53.6 years (range, 36–86), and the mean baseline GTVres was 7.87 cc (range, 1.16–28.98). Disease stages included IB3 (n=3), IIB (n=1), IIIC1 (n=16), IIIC2 (n=4), and IVB (n=1). GTVres and OAR dose-volume parameters (D0.1cc and D2cc) for the bladder, rectum, sigmoid, small bowel, and urethra were recorded at each fraction. Changes were analysed between TP1–TP2, TP2–TP3, and TP1–TP3. The Friedman test assessed GTVres changes across fractions, while Spearman rank correlation evaluated associations between GTVres reduction and OAR dose changes.

Results: Residual GTV decreased significantly during adaptive brachytherapy (Friedman test, $\chi^2 = 10.64$, $p = 0.0049$). The median GTVres reduction was 0.7 cc (IQR 0.0–2.2) between TP1–TP2, 0.2 cc (IQR 0.0–1.8) between TP2–TP3, and 1.0 cc (IQR 0.0–3.2) overall. No significant correlations were observed between changes in GTVres and corresponding changes in bladder, rectum, sigmoid, small bowel, or urethral D0.1cc or D2cc at any evaluated time point (all $p > 0.05$). Spearman correlation coefficients ranged from –0.17 to 0.39, indicating weak or negligible associations.

Conclusion: In this small cohort of patients, despite significant tumour regression during MRI-guided adaptive brachytherapy, changes in GTVres were not associated with OAR dose variations. These findings suggest that there are other factors at play as it concerns OAR dosimetry such as applicator geometry, organ filling, inter-fraction anatomical variation, and adaptive optimization rather than tumour regression alone. Larger prospective studies are warranted to validate these findings further.

Surface Mould Ir-192 HDR Brachytherapy for Chest Wall Re-Irradiation in Recurrent Invasive Lobular Carcinoma of the Breast: A Case Report

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Introduction: Chest wall re-irradiation after prior comprehensive external beam radiotherapy (EBRT) is challenging because cumulative doses to the skin, ribs, lung, heart, and brachial plexus may approach tolerance. Electron therapy may provide inadequate conformity over an irregular reconstructed chest wall and can expose deeper tissues through penumbra and bremsstrahlung contamination. Surface mould high-dose-rate (HDR) brachytherapy offers a steep dose gradient with relative sparing of deeper organs. We report its use in a patient with recurrent invasive lobular carcinoma (ILC), with sustained local control.

Methods: A 42-year-old woman with grade III, hormone receptor-positive, HER2-negative right breast ILC underwent breast-conserving surgery, chemotherapy, and locoregional EBRT in 2015 (40 Gy in 15 fractions plus a 12.5 Gy in 5-fraction tumour-bed boost using 3D conformal radiotherapy). An ipsilateral recurrence in 2018 required completion mastectomy. A second, isolated chest wall recurrence occurred in 2021 and was confirmed clinically, on PET-CT, and histopathologically as grade III ILC. Following six cycles of neoadjuvant ribociclib and fulvestrant, she underwent chest wall flap excision with latissimus dorsi reconstruction. Repeat EBRT and electron therapy were considered dosimetrically unsuitable because of the prior cumulative dose and thin reconstructed flap. A customized 19-catheter Ir-192 surface mould was fabricated by positioning nylon brachytherapy tubes over eight superimposed layers of DuoDERM dressing, providing adequate thickness while maintaining pliability and conformity to the chest wall. The clinical target encompassed the surgical scar with a 3-cm circumferential margin. HDR brachytherapy was delivered to 32 Gy in eight fractions of 4 Gy, twice daily at least 6 hours apart, over 4 days.

Results: Treatment was completed without interruption. Acute toxicity was limited to CTCAE grade 1 erythema, with no wound-healing complications or clinically evident cumulative-dose-related toxicity. All 12 planned cycles of systemic therapy were completed. At one month, the patient was asymptomatic with no residual disease. Local control has been maintained for 4 years without late sequelae.

Conclusion: Customized surface mould HDR brachytherapy is a feasible, well-tolerated, and tissue-sparing option for selected chest wall recurrences in previously irradiated patients when further EBRT or electron therapy is unsuitable. Larger prospective series with dosimetric comparisons are required.

Quality of Life (QOL) Assessment in Patients of Carcinoma Tongue Treated with External Beam Radiation Therapy and Brachytherapy

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Introduction: Interstitial brachytherapy (BT) delivers conformal dose to the target, allowing higher dose delivery than any other available radiation technique.

Aim To retrospectively compare the QOL in postoperative carcinoma oral tongue patients treated with External Beam Radiation Therapy (EBRT) to the primary tumour bed & neck and BT to primary tumour bed & EBRT to the neck

Materials & Methods: 109 postoperative carcinoma oral tongue patients treated from July 2014 to April 2025. 56 patients in Arm A (EBRT to the tumour bed and neck) and 53 patients in Arm B (EBRT to the neck and BT to the tumour bed). pT1, pT2, pT3, pT4a were 8, 34, 9, 5 and pN0, N1, N2 & N3 were 12, 16, 18, 8 respectively in Arm A. pT1, pT2, pT3, pT4a were 7, 24, 17, 5 and pN0, N1, N2 & N3 were 28, 7, 9, 9 respectively in Arm B. Arm A received 60–66 Gy/ 30–33 fractions; Arm B received EBRT to the neck 46–60 Gy/23–25 fractions and BT to the primary tumour bed 37–39 Gy/12–13 fractions after a median gap of 19 days. Patients with extranodal extension received concurrent chemotherapy during EBRT in both arms. Median Follow-up was 4 years in Arm A and 3 years in Arm B. Primary endpoint was to assess QOL in both the arms using EORTC QLQ-H&N 35 questionnaire. Significance of each parameter in questionnaire was tested using chi-square test. Secondary endpoints were Overall Survival (OS) and Disease Free Survival (DFS) and Kaplan-Meier curves were used to assess.

Results: Arm A showed greater impairment of swallowing (5.00 ± 1.17 vs. 4.60 ± 1.48 ; $p < 0.001$), xerostomia symptoms, dry mouth (1.69 ± 0.77 vs. 1.17 ± 0.61 ; $p < 0.001$) and sticky saliva (1.69 ± 0.77 vs. 1.17 ± 0.61 ; $p < 0.001$). Weight gain was better in Arm A (1.97 ± 0.16 vs. 1.75 ± 0.44 ; $p < 0.0119$). The 3 & 5 year OS were 73.9% and 51.3% (Arm A) vs 70.2% & 52.9% (Arm B) ($p=0.39$); DFS was 75.3% & 56.3% (Arm A) and 72.0% & 54.3% (Arm B) ($p=0.26$).

Conclusion: Arm A was associated with significant impairment in swallowing leading to moderate xerostomia (dry mouth, sticky saliva) at 5 years when compared to Arm B, while OS and DFS at 3 and 5 years did not differ significantly between both arms. Given similar survival outcomes, Arm B offers a favourable toxicity profile.

Brachytherapy in Soft-tissue Sarcoma (STS): Shaping the Future of Modern Oncology with Multi-omics based approach for Precision – A four patient Institutional Case series

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Introduction: Soft tissue and bone sarcomas are rare malignant tumours arising from mesenchymal tissues, accounting for 1% of adult and 20% of pediatric solid malignancies. A study done at our institution from December 2010 to April 2022 demonstrated the 5-year local recurrence-free survival, disease-free survival and overall survival 92%, 79% and 71% respectively in 58 patients who underwent per-operative brachytherapy (POBT) for STS. Modern HDR protocols match historical LDR efficacy while offering superior radiation safety, shortened treatment timelines, and manageable toxicity profiles when strict perioperative guidelines are enforced.

Methods: A retrospective analysis was conducted on four adult patients presenting with completely resected soft tissue sarcomas of the extremity. Patients were selected based on high-grade histopathological features. Adjuvant radiotherapy was delivered using high-dose-rate (HDR) interstitial brachytherapy by placement of flexible catheters in post-operative bed during surgery. Treatment delivery schedules and catheter loading protocols were optimized to minimize wound-healing morbidity by delaying source activation until postoperative day five. Treatment was delivered after CANOPy - Catheter reconstruction, Activation of dwell positions, Normalization, Optimization of plan and Prescription of required dose (Gy) using Iridium-192 source.

Results: The overall treatment time was 10-12 days. Treatment planning was done using Oncentra Brachytherapy 4.5.3 (Elekta) software. (Fig.5-8,13-15). Brachytherapy was delivered to a dose of 35 Gy in 10 fractions, 2 fractions per day over 5 days and 18 Gy in 6 fractions, 3 Gy per fraction over 3 days (Fig.18). All patients were reviewed at 1-month, 3-months, 6 months and 1 year follow-up with no acute or chronic radiation toxicities and improved limb movements. All patients are free of disease post treatment till now.

Conclusions: In alignment with the pillars of Precision, Personalization, and Compassion, recent genomic modeling by Yang et al. (Translational Oncology, 2021) demonstrates that STSs exhibit significant heterogeneity in intrinsic radiosensitivity (3). Their framework reveals that radioresistant sarcoma subsets demand an escalated biological effective dose (BED-97Gy) to optimize locoregional control. However, delivering such high doses through external irradiation in extremities carries an unacceptable risk of severe fibrosis, joint contractures, and functional loss, often necessitating salvage amputation. Adjuvant HDR-POBT provides highly conformal irradiation allowing necessary escalation of dose with a steep dose fall-off to reduce toxicities alongside limb preservation.

Adaptive radical brachytherapy as monotherapy in early squamous cell carcinoma of mucosal lip: A case series.

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Background: The role of adaptive radiotherapy is well documented in External Beam radiotherapy. Role of adaptive brachytherapy in non-gynaecological malignancies is sparsely studied. Hereby we are reporting 2 case report where adaptive radiotherapy was used in interstitial brachytherapy to treat early squamous cell carcinoma of mucosal lip.

Case summary:

Case 1: Sixty-six year old gentleman, smokeless tobacco user with compromised cardiac function presented with complaint of sore over lower mucosal lip for 2 months. After a detailed clinical, histopathological and radiological evaluation, diagnosis of carcinoma of lower mucosal lip cT2N0M0 MDSCC was made. Patient was treated with Interstitial radiotherapy with five catheter in three planes. Considering the changes in the local anatomy and tumour regression pattern, patient was imaged and re-planned thrice during the course of treatment. No classical tumour volume was contoured though it was predefined. Dose delivered was 40 Gray in 10 fractions twice a day, six hours apart over 6 days and additional dose of 3 Gray as last fraction to single channel. Patient tolerated treatment well. At 9 months follow-up, the disease was clinically and radiologically locoregionally controlled.

Case 2: Fifty-seven year old gentleman, smokeless tobacco and alcohol user presented with complaint of horny lesion over lower mucosal lip for 8 months. After a detailed clinical, histopathological and radiological evaluation, diagnosis of carcinoma of lower mucosal lip cT1N0M0 WDSCC was made. Patient was treated with Interstitial radiotherapy with four catheter in three planes. Considering the changes in the local anatomy and tumour regression pattern, patient was imaged and re-planned twice during the course of treatment. No classical tumour volume was contoured though it was predefined. Dose delivered was 44 Gray in 11 fractions twice a day, six hours apart over 6 days and additional dose of 3 Gray as last fraction to single channel. Patient tolerated treatment well. At 9 months follow-up, the disease was clinically and radiologically locoregionally controlled.

Conclusion: Adaptive personalised brachytherapy showed promising outcome.

Parametrial Dose Achieved with Intracavitary Brachytherapy Following External Beam Radiotherapy in Carcinoma Cervix with Upfront Parametrial Involvement: A Retrospective Observational Study

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Background: Parametrial involvement is a feature of locally advanced carcinoma cervix and has traditionally been considered a challenge for adequate dose delivery using intracavitary brachytherapy (ICBT) alone. While interstitial brachytherapy (ISBT) is recommended for patients with residual parametrial disease, many patients with good response to external beam radiotherapy (EBRT) can still be treated using ICBT. However, limited data exist regarding the adequacy of parametrial dose achieved with ICBT following EBRT and its impact on early clinical outcomes.

Objectives: To evaluate the adequacy of dose delivered to the involved parametrium during intracavitary brachytherapy following EBRT in patients with carcinoma cervix with upfront parametrial involvement and assessment of local control at six months after completion of treatment.

Methods: This retrospective observational study included 25 patients with biopsy-proven locally advanced carcinoma cervix with unilateral or bilateral parametrial involvement at presentation. All patients received definitive chemoradiation consisting of EBRT with concurrent weekly cisplatin followed by CT-based HDR intracavitary brachytherapy. Parametrial dose during each brachytherapy application was evaluated using treatment planning software, and dose distribution to parametrium was assessed. Patients underwent clinical evaluation at three, six months after completion of treatment to assess local disease status and recurrence.

Results: Adequate cumulative dose to the involved parametrium was achieved in the study following EBRT and ICBT. Of the 20 patients, 17 completed the scheduled six-month clinical follow-up. One patient developed local recurrence, while two patients were lost to follow-up. The observed recurrence rate among evaluated patients was low, suggesting satisfactory early local control following treatment with intracavitary brachytherapy.

Conclusion: This retrospective study demonstrates that adequate cumulative parametrial dose can be achieved with intracavitary brachytherapy following EBRT in selected patients with upfront parametrial involvement. The low rate of local recurrence at six months supports the feasibility of ICBT as a treatment approach in appropriately selected patients who demonstrate a favorable response after EBRT.

Is Adjuvant Brachytherapy an alternate in early Tongue cancer: A Single-Institution Cohort Analysis

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Background: Oral tongue cancers with adverse pathological features after surgical resection, such as close or positive margins, perineural invasion (PNI), or deep tumour invasion, carry elevated risk of locoregional recurrence and require adjuvant radiotherapy. EBRT achieves robust locoregional tumour control, but its therapeutic efficacy is counterbalanced by inherent treatment related morbidity. Post-operative interstitial brachytherapy (ISBT) offers a highly conformal therapy to the tumour bed and a critical organ sparing alternative to EBRT. This study describes a single-institution cohort of tongue cancer patients treated with post-operative ISBT and evaluates their tumour and treatment characteristics, dosimetry, acute toxicity and outcomes.

Methodology: Data were extracted retrospectively from clinical database of 14 consecutive tongue cancer patients treated between August 2025 and June 2026. Recorded variables included risk factors, AJCC staging, indication for brachytherapy, surgical details including nodal yield, brachytherapy dose-fractionation schedule and dosimetric indices (coverage, conformity, homogeneity, and organ-at-risk doses), CTCAE v4-graded acute toxicity, and sequential post-treatment response, recurrence, and survival status recorded at scheduled follow-up visits. Overall survival at observed follow-up period was estimated descriptively using the Kaplan-Meier method.

Key Findings: The cohort (n=14) was predominantly T1-T2 and node-negative. Indications for ISBT were PNI (n=7, 50%), close or positive surgical margins (4, 28% including one case with early recurrence), short-interval recurrence (n=2, 14%), and depth of invasion ≥ 9 mm (n=1, 8%). All patients underwent wide local excision of tumour followed by primary closure, with adequate neck dissection performed in 11 patients (79%). All patients received ISBT alone as adjuvant therapy, without EBRT, delivering a median HR-CTV dose of approximately 45Gy (IQR:40-45) in 8-10 fractions of 4-4.5Gy/fraction achieving a median BED of 65.25Gy (IQR:56-65.25Gy). Median dosimetric indices were favourable (conformity index ~ 0.89 , gradient index ~ 1.02 , homogeneity index ~ 0.45). Acute toxicity was minimal, limited to Grade 2 mucositis (1/14) and Grade 2 dysgeusia (1/14) with no treatment interruptions attributable to toxicity. At data cutoff, 7 of 14 patients had reached at least one scheduled follow-up assessment and 3 patients completed 9 months follow up visit. Adequate recovery noted at post therapy visits. No locoregional recurrence across the observed follow-up period, with no morbidity events and expected functional outcome recorded in the entire cohort.

Conclusion: This analysis demonstrated that ISBT was able to deliver BED equivalent to EBRT with minimal inherent toxicities, favorable dosimetric coverage, excellent early disease control, and survival. These finding projects post-operative ISBT monotherapy as a well-tolerated viable standalone, EBRT-sparing conformal therapy for early tongue cancer patients with adverse pathological features. Validation using larger cohorts with extended follow-up is needed to assess long-term survival and quality of life.

Role of Brachytherapy in Head and neck cancers. Dosimetric comparison with conformal EBRT and Cyberknife.

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Introduction: To analyze dosimetric parameters of target and organs at risk (OARs) in brachytherapy compared with conformal external beam radiotherapy techniques (IMRT/VMAT) and in Cyberknife and clinical outcome with adjuvant brachytherapy in oral cavity cancers.

Materials and Method: From 2025 -2026 six patients (five -Carcinoma Tongue) treated in our institute undergone wide local excision and adequate neck dissection, received adjuvant interstitial brachytherapy and one Carcinoma lip received definitive RT- Brachytherapy to primary (35 Gy in 10 fractions, BID) using HDR Ir-192. using flexible catheters. CTV and OARs were contoured and planned in Oncentra TPS. Corresponding IMRT/VMAT plans (60 Gy in 30 fractions) were generated in Eclipse Treatment planning system and Cyberknife plan (35Gy in 10 fractions) generated in CK Planning system for dosimetric comparison.

Results: Target and OAR doses for all six patients were recorded: The median relative doses (%Rx) to the ipsilateral parotid, contralateral parotid, mandible D2cc, and spinal cord D2cc were approximately 5%, 3%, 5%, and 6% with BT, compared with 37%, 9–13%, 50%, and 12–20% for IMRT and VMAT, respectively. OAR sparing in Brachytherapy and Cyberknife are Comparable. Brachytherapy holds superior in dose heterogeneity with high dose regions V200% -30% and V150%-54% inside the target and steep dose fall off. V50% and V70% coverage volumes are significantly lower with brachytherapy than Cyberknife. There is no recurrence in all 6 patients in follow up. No late toxicities noted.

Conclusion: These results highlight that inherent rapid dose fall-off of brachytherapy, enables minimal irradiation of adjacent organs at exceeding the sparing, achievable with conformal EBRT techniques such as IMRT or VMAT. However Dosimetrically Brachytherapy and Cyberknife are comparable. Brachytherapy preferred over cyberknife. Brachytherapy is effective as an EBRT boost or adjuvant to surgery, definitive RT in early stage head and neck cancer providing small-volume radiation with precise geographic targeting of the tumour bed with excellent clinical outcome.

Dosimetric Comparison and Clinical Outcomes of CT-Guided Intracavitary Central Tandem with Interstitial Brachytherapy Versus Interstitial Brachytherapy Alone in Locally Advanced Cervical Cancer

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Introduction: Image-guided brachytherapy has improved the precision of brachytherapy delivery in locally advanced cervical cancer by enabling accurate target delineation and optimization of dose distribution. Interstitial brachytherapy (ISBT) provides excellent dose sculpting for bulky and irregular residual disease. Addition of an intracavitary central tandem along with interstitial needles may further improve central dose distribution by combining the advantages of intracavitary and interstitial techniques. This study compares the dosimetric parameters and clinical outcomes of CT-guided IC central tandem + ISBT versus ISBT alone in locally advanced carcinoma cervix.

Methods: A comparative retrospective study in 30 patients with locally advanced cervical cancer treated with CT-guided brachytherapy. Fifteen patients underwent intracavitary central tandem combined with interstitial brachytherapy (IC tandem + ISBT), while 15 patients underwent ISBT alone. CT-based planning was performed for all patients with target and organ-at-risk delineation. Dosimetric evaluation included target volume parameters V150 and V200 and organ-at-risk parameters including rectum D2cc and bladder D2cc. Clinical outcomes, including treatment response were assessed and compared between both groups.

Results: CT-guided planning demonstrated improved central dose distribution in patients treated with IC central tandem + ISBT compared with ISBT alone. The hybrid technique provided better optimization of the high-dose region with improved central tumour coverage. V150 and V200 values showed a favorable distribution pattern in the IC tandem + ISBT group, reflecting improved dose conformity and homogeneous dose deposition around the central target region. Rectal dose exposure was lower in the IC tandem + ISBT group, with reduced rectum D2cc compared with ISBT alone. Bladder D2cc was comparable between both groups, with no significant difference observed. The improved dose distribution achieved with IC tandem + ISBT allowed adequate target coverage while maintaining acceptable organ-at-risk constraints. Clinical outcomes were comparable between both groups, with similar local response rates and acceptable early toxicity profiles.

Conclusion: CT-guided IC central tandem combined with interstitial brachytherapy provides superior central dose distribution and improved rectal sparing compared with ISBT alone in locally advanced cervical cancer. The hybrid approach offers better dosimetric optimization while maintaining comparable clinical outcomes. IC tandem + ISBT may be preferred whenever anatomical feasibility permits intracavitary tandem placement cervical cancer.

When Point A Falls Short: Agreement with HRCTV D90 in Image-Guided Adaptive Brachytherapy

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Background: Point A has historically been the cornerstone of dose prescription and reporting in cervical cancer brachytherapy. Contemporary image-guided adaptive brachytherapy (IGABT), however, is based on volumetric optimization using high-risk clinical target volume (HRCTV) D90. Whether Point A continues to reflect volumetric target coverage after modern optimization remains uncertain. We evaluated the agreement between Point A and HRCTV D90 and investigated factors influencing their discrepancy.

Materials and Methods: This retrospective dosimetric study included 31 patients with locally advanced cervical cancer treated with external beam radiotherapy followed by CT/MRI-guided intracavitary brachytherapy. A single optimized brachytherapy plan was delivered over three fractions. HRCTV D90, Point A doses, HRCTV volume, V150, V200, and organ-at-risk dose-volume parameters were recorded. Agreement between Point A and HRCTV D90 was assessed using Bland–Altman analysis. Correlation was evaluated using Spearman's coefficient. Univariable regression and subgroup analyses were performed to identify predictors of disagreement.

Results: Point A demonstrated poor correlation with HRCTV D90 (Spearman $\rho = 0.12$, $p = 0.51$). Bland–Altman analysis demonstrated a consistent systematic bias, with HRCTV D90 exceeding Point A by a mean of 3.99 Gy. HRCTV volume was significantly associated with the discrepancy between Point A and HRCTV D90 ($\rho = -0.56$, $p < 0.001$). On univariable regression, HRCTV volume explained approximately 34% of the variability in the observed disagreement ($R^2 = 0.34$, $p < 0.001$). Patients stratified by HRCTV volume demonstrated significantly different levels of agreement between Point A and volumetric dosimetry (Kruskal–Wallis $p = 0.0138$). No significant association was observed between Point A dose and acute urinary or rectal toxicity, although toxicity analyses were limited by the low event rate.

CONCLUSION: Point A demonstrated limited agreement with HRCTV D90 following contemporary image-guided adaptive brachytherapy. The observed discrepancy was influenced by HRCTV volume, suggesting that conventional point-based dosimetry cannot reliably represent individualized volumetric target coverage after inverse planning. These findings support HRCTV D90 as the preferred metric for target evaluation while redefining the role of Point A as a historical reporting parameter rather than a surrogate for treatment quality. Modern brachytherapy treats a target volume, not a geometric point. Our findings suggest that our dosimetric evaluation should reflect that evolution.

ILBT (Intraluminal Brachytherapy) as a Boost to EBRT (External Beam Radiation Therapy) in Esophageal Cancers: A Dosimetric Comparison between ILBT boost and EBRT boost.

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Introduction: Esophageal cancer is one of the leading causes of cancer-related mortality worldwide. Definitive concurrent chemoradiotherapy remains the standard treatment for patients with unresectable disease or those unfit for surgery. Escalating the radiation dose using EBRT is often limited by the tolerance of surrounding organs at risk (OARs), including the lungs, heart, and spinal cord. High-dose-rate intraluminal brachytherapy (ILBT) offers a method of delivering a highly conformal radiation boost directly to the tumour, producing a steep dose gradient that allows dose escalation to the tumour while minimizing radiation exposure to adjacent normal tissues.

This study compares the dosimetric parameters of HDR intraluminal brachytherapy (10 Gy in 2 fractions) used as a boost to EBRT with those of an EBRT boost with the same dose, in patients with esophageal cancer.

Methods: This retrospective dosimetric study included patients with histologically confirmed esophageal cancer treated with definitive EBRT. For each patient, two boost treatment plans have been generated: One with HDR intraluminal brachytherapy delivering 10 Gy in 2 fractions and a corresponding EBRT boost plan delivering an equivalent boost dose. Dosimetric evaluation includes target coverage parameters such as D90, D100, V100, conformity index, and homogeneity index along with V200, V150 in brachytherapy and OAR parameters includes mean lung dose, mean heart dose, maximum spinal cord dose has been analysed and compared between the two techniques. Statistical analysis was performed using paired statistical tests, with a p-value <0.05 considered statistically significant.

Results: ILBT provides superior dose escalation to the primary esophageal tumour providing better tumour control while significantly reducing radiation doses to the lungs, heart, and spinal cord compared with an EBRT boost as confirmed by the paired statistical test with a p-value <0.05. The rapid dose fall-off characteristic of brachytherapy improved target conformity and reduced unnecessary irradiation of surrounding healthy tissues, thereby enhancing the therapeutic ratio.

Conclusion: HDR intraluminal brachytherapy using 10 Gy in 2 fractions as a boost following EBRT has the potential to improve tumour dose delivery while reducing OAR exposure compared with an EBRT boost. This dosimetric comparison is an evidence supporting the selective use of ILBT as a boost technique in patients with esophageal cancer, optimizing local control with dose escalation while minimizing treatment-related toxicity to normal tissues.

Customized Surface Mould HDR Brachytherapy for Palatal Malignancies: A Case Series

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Background: Surface mould high dose rate (HDR) brachytherapy offers a highly conformal treatment option for palatal malignancies, particularly in anatomically challenging locations where interstitial implantation may not be feasible or necessary. Despite its potential advantages, evidence describing real-world utilization of customized surface mould brachytherapy for palatal malignancies remains scarce. We present our institutional pattern of care, highlighting patient selection, treatment approaches, dosimetric characteristics, toxicity, and early clinical outcomes.

Aims and objectives: To report the institutional pattern of care, dosimetric parameters, treatment-related toxicity, and early clinical outcomes of customized HDR surface mould brachytherapy in patients with palatal malignancies.

Materials and Methods: A retrospective review was performed of patients with palatal malignancies treated with customized HDR surface mould brachytherapy between July 2024 and January 2026. Patient demographics, tumour characteristics, treatment details, dosimetric parameters, toxicity, and clinical outcomes were retrieved from electronic medical records. Surface mould brachytherapy was delivered either as definitive treatment or as a boost following external beam radiotherapy (EBRT). Dosimetric evaluation included high-risk clinical target volume (HR-CTV), target coverage (V100/TV), and conformity index (CI). Toxicities were graded according to CTCAE v5.

Figure 1. (A) Customized palatal HDR surface mould. (B) Clinical application of the customized surface mould. (C–E) Axial, coronal, and sagittal CT images demonstrating the brachytherapy dose distribution. (F) Dose–volume histogram (DVH) of the treatment plan.

Results: Three male patients underwent customized HDR surface mould brachytherapy. The median age was 56 (Range, 41–74, IQR – 33). Two patients had isolated hard palate involvement, while one had extension into the soft palate. Histopathology revealed squamous cell carcinoma in two patients and mucoepidermoid carcinoma in one. Two patients had early-stage disease and one had locally advanced disease without nodal involvement. Radical radiotherapy was delivered in two patients, while one received adjuvant radiotherapy. Two patients received mould brachytherapy as a boost following EBRT (50 Gy in 25 fractions), whereas one underwent definitive mould brachytherapy alone.

The median HR-CTV was 3.44 cc (range, 2.37–8.61 cc). Median target coverage (V100/TV) and conformity index were both 0.97 (range, 0.92–0.97), demonstrating excellent dosimetric coverage. All patients completed treatment without major toxicities, and had complete response till the last follow-up. Excellent quality-of-life outcomes were observed, with preservation of speech and swallowing in all patients, without requiring long-term enteral nutritional support.

Conclusion: Customized HDR surface mould brachytherapy is a feasible, safe, and highly conformal treatment option for selected palatal malignancies, providing excellent target coverage with minimal toxicity, achieving early local control and excellent preservation of quality of life.

Time-Dependent Effects of Ir-192 Source Decay on Circulating Blood Dosimetry During HDR Brachytherapy

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Purpose: Circulating blood irradiation is increasingly recognized as a potential mediator of systemic radiobiological effects during radiotherapy. In high-dose-rate (HDR) brachytherapy, radioactive decay of the Ir-192 source prolongs treatment delivery while maintaining the prescribed dose, potentially increasing repeated blood transit through irradiated tissues. We developed a cumulative blood-recirculation memory model to quantify the effect of source decay on circulating blood dosimetry during HDR brachytherapy.

Materials and Methods: A clinically delivered HDR brachytherapy treatment using a 10-Ci Ir-192 source served as the reference. Simulated source activities of 10, 5, 2, and 1 Ci produced treatment durations of 487, 973, 2434, and 4867 seconds while preserving the prescribed dose. A Monte Carlo model tracked 20,000 virtual blood particles using cumulative exposure memory, explicit circulation timing, and physiologic pelvic blood flow assumptions. Blood volumes receiving ≥ 0.01 , ≥ 0.05 , and ≥ 0.10 Gy and mean blood dose were quantified.

Results: Reducing source activity from 10 to 1 Ci increased treatment duration tenfold and estimated blood circulation cycles from 8.1 to 81.1. The proportion of circulating blood exposed to radiation increased from 34.0% to 98.4%. Blood volume receiving ≥ 0.01 Gy increased from 1048.7 to 2949.3 mL (2.8-fold), while blood volume receiving ≥ 0.05 Gy increased from 490.9 to 785.0 mL (60%). In contrast, blood volume receiving ≥ 0.10 Gy decreased by 53% (333.6 to 156.2 mL), and the mean blood dose remained stable (~ 0.025 Gy) across all source activities.

Conclusions: Simulated Ir-192 source decay markedly increased the proportion of circulating blood exposed to radiation and substantially expanded low-dose blood irradiation without increasing higher-dose blood exposure. These findings suggest that prolonged treatment associated with source decay redistributes radiation across a larger circulating blood volume rather than increasing peak blood dose. This time-dependent effect may represent an underrecognized determinant of systemic radiation exposure and need further evaluation

Adjuvant HDR interstitial brachytherapy after immediate flap reconstruction in soft tissue sarcomas: a two-patient case series.

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Introduction: Soft tissue sarcomas usually require multimodality management. Wide local excision with clear margins followed by adjuvant radiotherapy optimizes local control, particularly for high grade tumours or with close margins. Perioperative HDR interstitial brachytherapy offers radiobiological advantages by delivering conformal radiation directly to the operative bed while sparing adjacent normal tissues and reconstructive flaps. The integration of interstitial brachytherapy with immediate flap reconstruction in soft tissue sarcoma is technically challenging because of concerns regarding flap viability, catheter geometry, and wound healing. We report our experience with two patients treated using adjuvant HDR interstitial brachytherapy following flap reconstruction.

Methods: We review two patients managed at a tertiary care centre. CT-based brachytherapy planning and simulation was done prior to brachytherapy. The first patient was a 65-year-old male with a 10-year history of progressive upper back swelling. Following multidisciplinary tumour board discussion, he underwent wide local excision, latissimus dorsi flap reconstruction, intraoperative interstitial catheter placement, and postoperative vacuum-assisted closure. Biopsy revealed a spindle cell neoplasm, with microscopically negative margins. Brachytherapy was started on postoperative day 13, delivering 36 Gy in 10 fractions, two fractions per day, 6 hours apart, over 7 days.

The second patient was a 50-year-old female with recurrent high-grade spindle cell sarcoma of the left forearm following prior incomplete excisions. Histopathology confirmed a poorly differentiated high-grade spindle cell sarcoma with inadequate margins. She underwent radical re-excision, reconstruction using an anterolateral thigh free flap, and placement of brachytherapy catheters. Brachytherapy was started on postoperative day 8, delivering 42 Gy in 12 fractions, two fractions per day, 6 hours apart, over 9 days.

Results: Catheter placement was modified to accommodate flap reconstruction while maintaining adequate target coverage and protecting the vascular pedicle. Both patients successfully completed prescribed brachytherapy without any acute toxicities or complications. Catheters were removed aseptically on treatment completion.

Conclusion: Adjuvant HDR interstitial brachytherapy following immediate flap reconstruction appears feasible and safe in selected patients with primary or recurrent soft tissue sarcoma. Customized catheter placement enabled successful treatment delivery, achieving excellent early local control with preserved flap integrity and satisfactory wound healing. At a 3-month median follow-up, both patients remained free of local recurrence without late radiation-related toxicities, supporting the feasibility of HDR interstitial brachytherapy following flap reconstruction and highlight the importance of close multidisciplinary collaboration for successful treatment delivery.

Complete regression of advanced anal canal carcinoma with perianal skin nodule by interstitial brachytherapy.

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Introduction: Salvage surgery is one of the options to treat locoregional recurrence in carcinoma anal canal. But, if it cannot be performed due to extensive disease, then brachytherapy may be used in palliative intent to treat the disease. In a case of Carcinoma anal canal, post definitive chemoradiation, the patient had residual disease which was considered to be unresectable as it was involving the root of penis and left ischioanal fossa. There was radiologically stable symptomatic disease despite 5 cycles of chemotherapy (paclitaxel + carboplatin), hence was considered for salvage interstitial brachytherapy by MUPIT.

Materials And Methods: Disease mapping and preplanning was done using patient's MRI. The patient was taken under combined spinal and epidural anesthesia. Examination under anesthesia revealed a left perianal skin nodule 3.5*3cm, gaping wound starting from the anal canal with everted edges, necrotic material, with induration over surrounding perianal gluteal region. 3 flexible plastic catheters were inserted into the skin nodule. Base plate was sutured in the perianal area using silk sutures and central obturator. 14 needles were inserted and 4 free needles were inserted in a plane above. CT simulation was done. TV included local disease in the anal canal, mesorectal node, perianal skin nodule, which were contoured separately. Plan was made. Dose prescribed- to the HRCTV- 4Gy in 5 fractions. 90% of the hrctv received a dose of 3.84Gy, perirectal node received 1.74 Gy, perianal skin nodule received 4.74 Gy. 2CC of bladder received 1.99 Gy, penile bulb received - 2.84 Gy, penis received 1.84 Gy, skin received 2.72 Gy.

Results After 3 months, there is complete response in the perianal skin nodule, partial response in the disease in anal canal, Stable disease in mesorectal node Subjective improvement as the patient is able to sit, walk and sleep in supine position.

Conclusion: Brachytherapy in locally recurrent inoperable anal canal carcinoma, can be used as a salvage procedure and can achieve tumour regression and pelvic disease control with improvement in quality of life.

3D-Printed Mold Brachytherapy for Primary Scalp Malignancies

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Introduction: Customized mold brachytherapy offers a highly conformal technique of treatment for superficial malignancies. However, there is restricted scope for improvement of dose distribution once a mold is prepared. We set out to explore the value of 3D-printing in improving dose distributions.

Methods: Two plans were prepared on simulation CT scans for patients planned for Scalp brachytherapy: one with fixed distance from the surface and with fixed distance between the catheters; second with catheter positions which could be modified after seeing dose distribution. The final plans were dosimetrically compared.

Result: The plans showed around 10% reduction in the Dmax to the skin; no significant difference in Dmean of Brain. Dose non-uniformity ratio, Dose homogeneity index and Conformal index were not significantly different between the plans.

Conclusion: 3D-printing of mold offers a unique customization of dose distribution which allows increase in depth dose without increase in surface dose. 3D-printing of mold should be considered in surface mold brachytherapy, especially if there is expected heterogeneity in depth of prescription over the radiation field.

Clinical Experience and Dosimetric Outcomes of the Geneva Gynecological Applicator for Image-Guided Adaptive Brachytherapy.

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Introduction: The Geneva Gynecological Applicator is an MRI-compatible applicator that enables both intracavitary (IC) and hybrid intracavitary/interstitial (IC/IS) brachytherapy using single-plane interstitial needles. Evidence regarding its clinical use and outcomes remains limited. This study evaluated the clinical characteristics, dosimetric results, and treatment outcomes of patients treated with image-guided adaptive brachytherapy (IGABT) using this applicator.

Methods: This retrospective study included consecutive patients with gynaecological malignancies who underwent IGABT using the Geneva applicator between May 2023 and December 2024. Clinicopathological and treatment characteristics, brachytherapy details, dosimetric parameters, and clinical outcomes were retrieved from institutional records and the treatment planning system. Survival outcomes were estimated using Kaplan–Meier method.

Results: A total of 128 patients underwent 190 brachytherapy applications using this applicator. The median age was 58 years (IQR, 50–65). Cervical cancer was treated in 114 (89.1%) patients and post-surgical vaginal apex tumours in 14 (10.9%). Among patients with cervical cancer, 58% had T2b disease and 31.6% had T3b disease at diagnosis. Hybrid IC/IS brachytherapy was performed in 36 (28.1%) patients, accounting for 45 (23.7%) applications. At brachytherapy, residual parametrial disease was present in 66 (51.6%) patients, with 78.8% confined to the medial parametrium, while residual vaginal disease was present in 41 (32.0%) patients, predominantly involving the upper vagina (87.8%). The median HR-CTV volume was 37.8 cc (IQR, 28.3–50.6) in the IC/IS group and 28.0 cc (IQR, 22.0–35.6) in the IC group. The median cumulative HR-CTV D90 was 85.7 Gy10 EQD2 (IQR, 83–88.2) for cervical cancers and 78.2 Gy10 EQD2 (IQR, 72.6–81.5) for vaginal apex tumours. Median cumulative D2cc doses to the bladder, rectum, sigmoid colon, and bowel were 87.7 Gy3 (IQR, 82.2–90.0), 72.2 Gy3 (IQR, 68.0–75.0), 64.6 Gy3 (IQR, 58.9–71.3), and 62.9 Gy3 EQD2 (IQR, 57.1–72.3), respectively. The median overall treatment time was 56 days (IQR, 49–62). At a median follow-up of 27 months, the 2- and 3-year local control, disease-free survival, and overall survival rates were 97.6%/96.3%, 85.8%/84.7%, and 91.3%/88.1%, respectively. Grade $\geq 3/\geq 2$ gastrointestinal adverse events occurred in 3.9%/15.6% of patients, while grade $\geq 3/\geq 2$ genitourinary events occurred in 2.4%/3.2%.

Conclusion: The Geneva applicator facilitated both IC and hybrid IC/IS brachytherapy in patients with residual disease confined to the medial parametrium and upper vagina. It achieved favourable target coverage while maintaining acceptable organ-at-risk doses, with encouraging early oncological outcomes. Longer follow-up is required to confirm long-term disease control and late treatment-related morbidity.

Analysis of Toxicity Profile and Treatment Response Following Radical Interstitial Brachytherapy in Early and Locally Advanced Node-Negative Oral Cavity Cancers

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Introduction: Oral cavity cancers being the 2nd most common cancer in Indian men. Surgery is the mainstay of treatment in early and locally advanced oral cavity cancers that been deemed operable. However, they can be morbid and has poor cosmesis and impaired quality of life post-surgery.

Methods: Our study aims to evaluate the toxicity profile, treatment response, and recurrence-free survival following radical interstitial brachytherapy in patients with early and locally advanced node-negative oral cavity cancers. We retrospectively analyzed patients treated between June 2025 and June 2026 with radical interstitial brachytherapy, either alone or following external beam radiotherapy where indicated. Dosimetric parameters, including maximum dose (Dmax), conformity index (CI), homogeneity index (HI), and maximum dose to the mandible, were evaluated. Treatment-related toxicities were assessed at each follow-up visit using the Common Terminology Criteria for Adverse Events (CTCAE) grading system. Patients were followed from the initiation of treatment until their last follow-up, with treatment response and recurrence assessed through regular clinical and radiological evaluations.

Results: Out of 9 patients, 6 patients had locally advanced and 3 patients had early-stage oral cavity cancers. The patients were staged according to AJCC 8th TNM staging for oral cavity cancers. Patients with locally advanced oral cavity cancers recieved EBRT followed by brachytherapy whereas patients with early stage oral cavity cancers recieved brachytherapy alone. Median dose delivered to HRCTV was 369.78 Gy. During end of Brachytherapy, out of 9 patients, 2 patients developed grade 2 dermatitis. 5 patients developed grade 2 mucositis. No grade 3 toxicities noted. At first follow-up, no complications were noted. Median followup was 6 months. Out of 9 patients, 2 had lost to follow-up. Out of 7 patients who followed up, one patient had nodal recurrence at 6 months. 6 patients were clinically disease free at follow-up.

Conclusion: With the advent of interstitial brachytherapy, selected patients with node-negative oral cavity cancers can achieve effective disease control while avoiding the morbidity associated with surgery. This organ-preserving approach offers improved functional and cosmetic outcomes and maintains the option of salvage surgery in the event of persistent or recurrent disease.

The BELL Series: Brachytherapy in Eyelid Lesions

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Introduction: Eyelid malignancies require effective local treatment while preserving vision, eyelid function and cosmetic appearance. Brachytherapy provides highly localized radiation delivery with rapid dose fall-off, potentially reducing radiation exposure to adjacent ocular structures. This study presents our institutional experience with interstitial and surface-mould brachytherapy for eyelid malignancies.

Methods: This descriptive case series included 10 patients with upper- or lower-eyelid malignancies treated with brachytherapy at our institution. Clinical and treatment details were reviewed, including tumour location, histology, stage or lesion size, treatment indication, brachytherapy technique, number of catheters, dose-fractionation schedule, dosimetric parameters and early clinical outcome. All patients underwent complete ophthalmologic examination prior to treatment. Patients were treated using either single-plane/double plane interstitial brachytherapy or customized surface-mould brachytherapy. Interstitial implants used one to four flexible catheters depending on lesion size and anatomical extent. The predominant prescription was 4 Gy per fraction for 12 fractions.

Results: Seven tumours involved the upper eyelid and three involved the lower eyelid. Histology included squamous cell carcinoma in six patients, sebaceous gland carcinoma in three and meibomian gland carcinoma in one patient. Eight patients were treated using interstitial brachytherapy and two using customized surface-mould brachytherapy. Treatment settings included six definitive brachytherapy, two postoperative with positive margins with one case following excision and flap reconstruction, and repeat interstitial brachytherapy for one recurrent case. All patients received 4 Gy $\times$ 12 fractions with reported equivalent dose in 2-Gy fractions ranged from 58 to 62 Gy. The reported dose homogeneity index was generally between 0.4 and 0.5. Follow-up outcomes were explicitly documented, nine of them remained clinically free of disease at three to six months. One patient with recurrent left upper-eyelid sebaceous gland carcinoma, underwent repeat interstitial brachytherapy and later had to undergo left eye exenteration. One patient who was treated with customized surface mould brachytherapy, had grade III skin reaction which subsided subsequently.

Conclusion: Interstitial and surface-mould brachytherapy are feasible and adaptable techniques for organ preservation in selected eyelid malignancies in definitive, postoperative and recurrent settings. The observed early disease control was encouraging. Longer follow-up with systematic assessment of local control, ocular toxicity, eyelid function, vision and cosmetic outcome is required.

Precision meets personalization: A tailored image-guided HDR vaginal mould brachytherapy approach in recurrent pediatric vaginal yolk sac tumour

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Introduction: Vaginal yolk sac tumour (YST) is a rare malignant germ cell tumour occurring in infants and young children, managed effectively with multimodality therapy. Radiotherapy in pediatric vaginal tumours presents unique challenges due to small anatomical volumes, proximity to critical organs, and the need for long-term functional preservation. We present a case of a 15-months young girl, presented in February 2015, with spontaneous expulsion of a fleshy mass per vaginum associated with profuse vaginal bleeding, with no other significant clinical history. CECT abdomen & pelvis: A well-defined lobulated enhancing vaginal mass measuring $2.6 \times 2.2 \times 1.8$ cm. Genitoscopy: 2cm yellowish pedunculated lesion at the right lateral wall of the lower third of the vagina, approximately 1cm from the introitus. Excision biopsy confirmed a yolk sac tumour, with a markedly elevated S.AFP level of 1010 ng/mL.

Method: The patient received 6-cycles of neoadjuvant JEB chemotherapy (carboplatin, etoposide, and bleomycin), resulting in normalization of S.AFP levels. She underwent Excision of residual lower vaginal tumour with Martius labial fat pad graft reconstruction on 17/07/2015. During follow-up in 6 weeks' time postop, rising S.AFP levels prompted evaluation. Vaginoscopy: A 1-cm sessile polypoidal lesion at the previous excision site. She received 6-cycles of salvage VeIP chemotherapy (vinblastine, ifosfamide, and cisplatin). Persistent localized disease was identified on (EUA) Examination under anaesthesia in February 2016. Surgery for the residual would be vaginectomy. Hence organ preserving brachytherapy was considered. Personalized HDR Brachytherapy Technique: A cylindrical vaginal mould (Perspex) fabricated with channel for brachytherapy catheter was inserted under GA followed by CT acquisition. Target delineation was based on clinical examination, vaginoscopy and MRI findings. A CT guided Ir192 HDR brachytherapy was planned with optimization to achieve adequate target coverage while minimizing exposure to organs at risk including uninvolved vagina, bladder, rectum, and pelvic bones. Patient received 36 Gy in 12 fractions, delivered twice daily 6 hours apart over six consecutive days (14/03/2016 – 21/03/2016).

Result: Follow-up vaginoscopy demonstrated complete resolution of the lesion. Serial AFP levels remained normal. Recent follow-up in May 2025: S.AFP - 0.9 ng/mL, normal USG of abdomen & pelvis. The patient remains disease-free for >9 years following treatment.

Conclusion: This case highlights the role of customized image-guided HDR vaginal mould brachytherapy in achieving precise tumour control with organ preservation in a challenging pediatric malignancy.

Dosimetric comparison of single channel with Miami multi-channel in vaginal cuff brachytherapy

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INTRODUCTION: Vaginal Brachytherapy (VBT) is used as adjuvant radiotherapy with or without external beam radiotherapy in the treatment of endometrial, cervical and vaginal cancers. VBT is conventionally delivered using single channel cylinders. Multichannel applicator contains multiple peripheral channels surrounding the central channel. Literature suggests that this technique enables more conformal dose distributions with less doses to the organs at risk. This study was conducted to evaluate the dosimetric parameters of multichannel brachytherapy (MCBs) vs. single-channel cylinders brachytherapy (SCCs) for high-dose-rate vaginal cuff brachytherapy.

METHODS: A total of 50 consecutive patients were treated with high-dose-rate vaginal cuff brachytherapy with either MCB (14) or SCC (26). The treatment plans of these patients were reviewed prospectively. A brachytherapy dose of 1200 – 3000 cGy in 2-5 fractions was delivered to the high-risk clinical target volume (HR-CTV). The high-risk clinical target volume (HR-CTV) was defined as a 0.5 cm uniform expansion of the applicator surface from vaginal apex to 3 cm. For dosimetric comparison, we normalized prescription dose per fraction to 600 - 700 cGy and optimized each plan to achieve coverage of at least 90% of CTV.

RESULTS: Regarding the CTV coverage, the mean dose homogeneity index and dose nonuniformity index were superior for MCB than SCC. The mean D90 CTV for MCB vs SCC was 5.05Gy vs 5.03Gy respectively. The mean dose homogeneity index for MCB vs SCC was (68.11 ± 12.29) and (64.94 ± 12.56) , respectively ($p=0.0001$). The rectum single channel was 4.39 ± 0.75 (Mean $\pm$ SD) and the multichannel plan was 4.12 ± 0.72 (Mean $\pm$ SD) in our study, the sigmoid single channel was 1.77 ± 1.20 - 2.64 (Mean $\pm$ SD) and the multi-channel was 1.14 ± 0.77 - 1.64 (Mean $\pm$ SD), while the bladder single channel was 4.08 ± 0.79 (Mean $\pm$ SD) and the multi-channel was 3.96 ± 0.89 (Mean $\pm$ SD). Our findings showed that, without compromising coverage of the high-risk clinical target volume (HR-CTV), the MCB applicator significantly reduced the doses received by the rectum, sigmoid colon and bladder.

CONCLUSION: Our study suggested that when compared to SCC, MCB treats a larger volume and offers more conformal and homogeneous target coverage. The high dose brachytherapy with multi-channel applicator possibly plays a vital role in minimizing the potential late rectum and sigmoid complications.

High-Dose-Rate Intraluminal Brachytherapy for Hilar Cholangiocarcinoma: A Case Report

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Introduction: Perihilar cholangiocarcinoma is a rare and aggressive biliary tract malignancy, with the majority of the patients presenting with unresectable disease. While surgery offers the only curative option, intraluminal high-dose-rate (HDR) brachytherapy provides a means of delivering targeted radiation for local control. We report a case demonstrating its technical feasibility, favorable radiological response and symptomatic improvement.

Methods: A 43-year-old man presented with obstructive jaundice and was diagnosed with Bismuth type IIIA perihilar cholangiocarcinoma. He initially underwent endoscopic retrograde cholangiopancreatography (ERCP) with biliary stenting, which was complicated by severe acute pancreatitis requiring open necrosectomy. MRCP confirmed a hilar lesion with bilateral intrahepatic biliary dilatation. He subsequently underwent left percutaneous transhepatic biliary drainage (PTBD) and right portal vein embolization in preparation for right trisectionectomy. However, surgery was deferred because of persistent hyperbilirubinemia and recurrent episodes of cholangitis requiring multiple PTBD exchanges. Following multidisciplinary discussion, the patient was treated with external beam radiation therapy 45Gy in 25 fractions to PTV. An intraluminal brachytherapy catheter was placed through the biliary tract under fluoroscopic guidance. CT was taken with radio-opaque markers with a slice thickness of 2.5 mm and HRCTV contoured. Catheter reconstruction and planning was done in Oncentra TPS. Source dwell positions were activated 5 mm apart for a length of 5.4 cm and 4.8 cm each in the two catheters based on the target volume contoured on the CT. A total dose 15 Gy in three fractions (5 Gy per fraction) was prescribed to the high-risk clinical target volume. Dose was normalised to catheter points created at a radius of 7.5 mm around each dwell position. The optimised plan was exported to Elekta Flexitron remote afterloading brachytherapy machine loaded with an Iridium 192 radioactive source.

Result: The target dose achieved to HRCTV D90 was 5.7Gy and HRCTV D98 was 5.2Gy. The treatment was well tolerated without procedure-related complications with treatment response. He was followed up at 6 months with repeat MRCP which demonstrated interval reduction in the soft tissue lesion at the hepatic duct confluence, improvement in left-sided biliary dilatation, reduction in the porta hepatis biloma, and resolution of cholangitic changes.

Conclusion: HDR intraluminal brachytherapy is a feasible and well-tolerated treatment option for selected patients with unresectable hilar cholangiocarcinoma. In this case, it achieved radiological response with improvement in biliary obstruction without significant treatment-related toxicity and resulted in palliation of his symptoms and better quality of life.

Residual disease- An Unfinished Battle without Brachytherapy in Gynaecologic Oncology

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Introduction: Brachytherapy is an integral component of definitive radiotherapy for locally advanced gynaecological malignancies, enabling highly conformal dose escalation while limiting radiation exposure to surrounding organs at risk (OARs). However, brachytherapy may occasionally be technically or clinically infeasible because of extensive tumour involvement, anatomical distortion, critical OAR proximity, medical comorbidities, infection, or patient-related factors. We present a case of mucinous adenocarcinoma involving the vaginal vault in which brachytherapy could not be safely performed because of extensive residual disease in close proximity to the rectum.

Aim: To highlight the clinical challenges encountered when brachytherapy is not feasible for gross residual disease and to demonstrate the limitations of external beam radiotherapy (EBRT) as an alternative means of dose escalation.

Methods: A 45-year-old woman, post-total abdominal hysterectomy and bilateral salpingo-oophorectomy performed two years earlier for leiomyoma, presented in 2023 with per vaginum discharge for two months. Examination revealed a large, friable, circumferential growth in vaginal vault with bilateral parametrial involvement. Histopathology revealed papillary mucinous adenocarcinoma. CEMRI of the pelvis demonstrated a $7.5 \times 7.4 \times 6.0$ cm mass, with bilateral parametrial involvement and enlarged pelvic lymph nodes. She received concurrent chemoradiation with 50.4 Gy in 28 fractions over 5.3 weeks with weekly Cisplatin. Following treatment, gross residual disease persisted, with marked thinning of the adjacent rectal wall and enlarged mesorectal nodes. Because adequate target coverage with acceptable rectal dose constraints could not be achieved using either intracavitary or interstitial or both, an EBRT boost using IMRT was delivered, escalating the total dose to 66.6Gy in 37 fractions.

Results: On follow-up in 2026, the patient presented with recurrent/persistent per vaginum discharge. Examination revealed gross recurrent disease in the vaginal vault with a defect on the right side, clinically suggestive of a vesicovaginal fistula. In per rectal examination – large growth was felt anteriorly with smooth rectal mucosa. Despite escalation of the EBRT dose, durable local control was not achieved.

Conclusion: This case highlights the importance of brachytherapy in achieving effective dose escalation for gross residual disease in gynecological malignancy. When brachytherapy is technically or anatomically infeasible, EBRT/IMRT may provide an alternative, but may not reproduce the highly conformal dose distribution achievable with brachytherapy. The absence of which, can have a significant negative impact on ontological outcome and quality of life. In our case, IMRT technique employed for boost has not proven to be a significant substitute for brachytherapy.

Case report: Organ preservation, functional, cosmetic and good oncologic outcome with one year follow up in a patient treated with HDR brachytherapy for Carcinoma lip

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Introduction: Treatment of lip cancer is challenging, as the goal of treatment remains well-preserved functionality and aesthetics with good local control. High-dose-rate interstitial brachytherapy (HDR-BT) along with external beam radiation therapy (EBRT) delivers high-dose to tumour and lower doses to organs-at-risk. We report on the case of an elderly lady with locally advanced carcinoma lip with multiple comorbidities, treated at our institution with EBRT and HDR-BT.

Methods: In April 2025, 81-year-old lady from Vellore, presented with one-month history of progressive growth over lower anterior lip. She had hypertension, bileaflet mitral valve prolapse, mitral regurgitation, with no history of tobacco use. Examination revealed a 5x3cm proliferative lower lip lesion, anteriorly involving skin, away from both oral commissures, and gingiva-labial sulcus with palpable bilateral level 1b nodes. Nasopharyngolaryngoscopy did not show evidence of second malignancy. Imaging showed an ill-defined heterogeneously enhancing lesion approximately 1.3x0.9x1.8cm with bilateral subcentimetric lymphnodes and no distant metastases. Biopsy confirmed invasive squamous cell carcinoma. She was staged as cT4aN2cM0(Stage IVA). In multidisciplinary-tumour-board discussion, she was deemed inoperable due to cardiac risks. She received radiation therapy, first with EBRT to dose of 30 Gy in 10 fractions, using parallel-opposed-lateral beams to primary tumour with margins and bilateral submandibular region with Cobalt-60 beams, from 10.06.2025 till 20.06.2025. After completion of EBRT, she underwent HDR Interstitial Brachytherapy catheter placement under general anesthesia with insertion of 3 needles in superficial plane followed by 3 needles in deep plane on 03.07.2025. She received 1800 cGy in 4 fractions to HRCTV, from 03.07.2025 till 05.07.2025. She tolerated the procedure well and was managed with WHO step 3 analgesics, oral and skin care. The dose-equivalent calculations (EQD2) were targeted with objective of D90 for tumour > 80–90 Gy and D2cc to mandible < 50–60 Gy.

Results: Her acute skin changes resolved completely with no Grade 2 reactions. At first follow-up after one-month, clinical examination showed good clinical response with minimal induration, and maintaining good oral intake of both liquids and solids. In subsequent visits, she did not have any late side effects. In July 2026, she remains disease-free, without recurrence and late radiation toxicities.

Conclusion: Treatment of Carcinoma lip involves multidisciplinary approach, which can lead to better treatment and follow-up plan. The elderly lady with significant comorbid illnesses treated for squamous cell carcinoma of lip with HDR-BT is an effective alternative treatment along with EBRT, offering excellent local control, functional and cosmetic outcomes.

Brachytherapy as a Modality in Head and Neck Cancer Treatment: Long-Term Efficacy and Survival Outcomes

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Introduction: Brachytherapy (BT) is an established treatment modality in selected head and neck cancers (HNC), providing excellent dose conformity while preserving organ function and cosmesis. It can be used as definitive treatment, as a boost following external beam radiotherapy (EBRT), or in the re-irradiation setting. This study evaluated the long-term efficacy of brachytherapy in HNC with respect to disease-free survival (DFS), overall survival (OS), treatment-related toxicities, and prognostic factors influencing clinical outcomes.

Methods: A retrospective review was conducted of 53 patients with primary, recurrent, or second primary head and neck cancers treated with brachytherapy between January 2010 and December 2023. Brachytherapy was delivered as definitive treatment, EBRT boost, or re-irradiation using interstitial implants, surface mould brachytherapy, intraoperative radiotherapy (IORT), or image-guided techniques, as clinically indicated. Disease-free survival, overall survival, patterns of failure, and treatment-related toxicities were evaluated. Survival outcomes were estimated using the Kaplan–Meier method, and subgroup analyses were performed to identify prognostic factors associated with improved outcomes.

Results: At a median follow-up of 32.7 months, the median DFS and OS were 45 months and 89.9 months, respectively. The estimated 3-year and 5-year DFS were 58.9% and 42.9%, while the corresponding OS rates were 75.5% and 50.9%, respectively. Patients receiving EBRT followed by a brachytherapy boost demonstrated significantly superior DFS ($p=0.022$) and OS ($p=0.009$) compared with brachytherapy alone. Similarly, brachytherapy administered for newly diagnosed disease resulted in significantly better DFS ($p=0.002$) and OS ($p<0.001$) than re-irradiation. Treatment setting (newly diagnosed, second primary, and recurrent disease) was also significantly associated with DFS ($p=0.004$) and OS ($p=0.002$). Local recurrence was the predominant pattern of failure. Late toxicity was acceptable, with osteoradionecrosis observed in three patients, while no carotid blowout, fistula formation, or long-term feeding tube dependence was encountered.

Conclusion Brachytherapy is an effective and feasible treatment modality for selected head and neck cancers, providing durable disease control with acceptable long-term toxicity. The greatest benefit was observed in newly diagnosed patients and when brachytherapy was integrated as a boost following EBRT. These findings support the continued role of brachytherapy as an organ-preserving treatment strategy in appropriately selected patients, while larger prospective studies are warranted to further validate these results.

Clinical Factors Influencing the Therapeutic Dose Window in Cervical Cancer Brachytherapy: A Prospective Dosimetric Comparison of Tandem-and-Ring and Tandem-and-Ovoid Applicators

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BACKGROUND: Image-guided adaptive brachytherapy (IGABT) is the cornerstone of definitive treatment for locally advanced cervical cancer. Achieving the optimal therapeutic dose window—maximizing HR-CTV coverage while respecting organ-at-risk (OAR) constraints—remains challenging because of variations in tumour regression, uterine anatomy, and residual disease during treatment. Although tandem-and-ring (T&R) and tandem-and-ovoid (T&O) applicators are both widely used, existing comparisons are largely based on different patient populations and are therefore influenced by inter-patient anatomical variability. In our institution, occasional applicator changes during treatment occurred because of real-world clinical and logistical factors, including applicator availability, evolving tumour geometry, and anatomical considerations. This created a unique opportunity to compare both applicator systems within the same patients, allowing each patient to serve as her own control while minimizing anatomical confounding.

AIM: To identify the clinical and anatomical factors influencing achievement of therapeutic dose window in cervical cancer brachytherapy through a prospective within-patient comparison of tandem-and-ring and tandem-and-ovoid applicators.

MATERIALS AND METHODS: This prospective study included 30 women with biopsy-proven carcinoma cervix treated with definitive concurrent chemoradiotherapy followed by image-guided intracavitary brachytherapy. Each patient underwent three brachytherapy applications, yielding a total of 90 intracavitary applications. Patient demographics, FIGO stage, histology, uterine orientation (anteverted, retroverted, or acutely anteflexed), tumour extent, and applicator type were recorded. Patients underwent brachytherapy using either of the applicator systems whenever clinically indicated, providing a natural within-patient comparison. Applicator selection was individualized according to pelvic anatomy, tumour regression, insertion feasibility, and institutional workflow constraints. Dosimetric evaluation included HR-CTV D90, Point A dose, and D2cc doses to the bladder, rectum, and sigmoid colon for every application. Achievement of the EMBRACE therapeutic dose window was analysed according to applicator type and relevant clinical and anatomical factors.

RESULTS: Squamous cell carcinoma accounted for 86.7% of cases, followed by adenocarcinoma (10%) and adenosquamous carcinoma (3.3%). Most patients presented with FIGO Stage IIIB (40%) or Stage IIIC1 (30%), representing a predominantly locally advanced cohort. Among the 90 brachytherapy applications, 51 were performed using tandem-and-ring and 39 using tandem-and-ovoid applicators. Within the same patient, tandem-and-ring consistently demonstrated higher HR-CTV coverage together with lower bladder and rectal doses compared with tandem-and-ovoid. The greatest dosimetric advantage of tandem-and-ring was observed in Stage IIB–IIIB disease with centrally regressed tumours. Conversely, tandem-and-ovoid remained valuable in patients with distorted uterine anatomy, bulky residual parametrial disease, or difficult insertions where improved applicator stability was required. Histological subtype did not significantly influence dosimetric outcomes. The desired therapeutic dose window was achieved in 92% of tandem-and-ring applications compared with 84% of tandem-and-ovoid applications, demonstrating that both applicators achieved acceptable dosimetry when appropriately selected, while tandem-and-ring provided superior overall target coverage.

CONCLUSION: The present study highlights that successful cervical cancer brachytherapy depends not on a universally superior applicator but on selecting the right applicator for the right anatomy. By comparing both applicators within the same patients, this study minimizes inter-patient anatomical bias and provides pragmatic real-world evidence to guide clinical decision-making. While tandem-and-ring achieved superior dosimetry and higher therapeutic dose window attainment in most applications, tandem-and-ovoid remained indispensable in anatomically challenging situations. An individualized, anatomy-driven applicator selection strategy has the potential to optimize EMBRACE compliance, improve plan quality, and enhance the therapeutic ratio in cervical cancer brachytherapy.

Unexpected Vaginal Arterial Hemorrhage During Cervical Brachytherapy: A Case Report

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Introduction: Intracavitary brachytherapy is essential component of definitive treatment for locally advanced cervical cancer. Minor vaginal bleeding during applicator insertion or removal is relatively common; however, severe arterial hemorrhage requiring surgical hemostasis is rare. We report an acute arterial vaginal hemorrhage during brachytherapy following external beam radiotherapy (EBRT), necessitating emergency surgical intervention and modification of brachytherapy plan.

Case presentation: A 49-year-old woman with FIGO stage IIIA carcinoma of the cervix completed EBRT to 46 Gy in 23 fractions with concurrent chemotherapy, achieving a category 1 response (IBS GEC ESTRO Criteria) and was planned for intracavitary brachytherapy. Under spinal anesthesia and ultrasound guidance, a Saginova Fletcher-Suit applicator with 5 cm tandem and two small ovoids was inserted. During vaginal packing, brisk bleeding rapidly soaked the gauze. The applicator was gently removed, revealing a high-pressure pulsatile bleed from the left lateral vaginal wall. Sustained local pressure failed to achieve hemostasis, necessitating emergency surgical exploration, suturing of the posterolateral vaginal wall, and ligation of the suspected bleeding vessel. The brachytherapy procedure was abandoned for that session. Following stabilization with PRBC transfusion, hemostatic measures, and adrenaline-soaked vaginal packing, brachytherapy was resumed after one week to allow mucosal healing. Intravaginal brachytherapy using a 5-cm tandem and vaginal cylinder was subsequently completed safely in three fractions of 7 Gy, achieving an HR-CTV D90 of 82.65 Gy with acceptable organ-at-risk doses. The patient remains under follow-up one after completion of radiotherapy.

Discussion: Vaginal bleeding is a recognized acute procedural complication of cervical brachytherapy, although clinically significant hemorrhage is uncommon. Radiation-induced mucosal inflammation, epithelial denudation, hyperemia, endothelial injury, and reduced tissue compliance may increase mucosal fragility and susceptibility to vascular injury. In a study of 407 brachytherapy fractions in 125 patients, vaginal bleeding was among the common acute adverse effects at the time of applicator removal, with a mean blood loss of approximately 44 mL. In the present case, the abrupt onset of high-pressure pulsatile bleeding immediately after applicator insertion, together with failure of sustained compression, strongly suggested arterial injury rather than the more typical venous oozing. Although causality cannot be established, recent EBRT, mucosal vulnerability, and instrumentation may have contributed.

Conclusion: Severe arterial vaginal hemorrhage during brachytherapy shortly after EBRT is rare but potentially life-threatening. Awareness of radiation-related tissue fragility, meticulous applicator insertion, adequate visualization, and immediate availability of packing, surgical hemostasis, and resuscitation facilities are essential. Prompt recognition and multidisciplinary management permits safe completion of definitive brachytherapy without compromising tumour dose.

Feasibility and Toxicity of Concurrent Cisplatin versus Paclitaxel-Carboplatin Chemotherapy with Brachytherapy in Locally Advanced Cervical Cancer

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Introduction: Concurrent chemotherapy is frequently withheld on days of brachytherapy because of toxicity, although supporting evidence for this practice is limited. Cisplatin-based chemoradiation followed by brachytherapy remains standard for locally advanced cervical cancer. Comparative data on the safety of continuing concurrent chemotherapy specifically through the brachytherapy phase, rather than external beam radiotherapy alone, remain scarce. We compared acute toxicities of cisplatin versus paclitaxel-carboplatin given concurrently with external beam radiotherapy and high-dose-rate brachytherapy in locally advanced cervical cancer, with emphasis on toxicity during the brachytherapy phase itself.

Methods: In this prospective comparative study, patients with histologically confirmed FIGO stage IIB-IVA cervical cancer received Arm A (weekly cisplatin 40 mg/m²) or Arm B (weekly paclitaxel 50mg/m² with carboplatin AUC 2), concurrent with external beam radiotherapy (50.4 Gy/28 fractions, with nodal boost where indicated), followed by three weekly high-dose-rate intracavitary brachytherapy fractions with concurrent chemotherapy administered one day prior to each fraction. Acute hematological (anemia, neutropenia) and non-hematological (diarrhea, cystitis) toxicities were graded using CTCAE version 5.0 weekly during external beam radiotherapy and after each brachytherapy fraction.

Results: Ten patients were evaluated in each arm across the full treatment course. Grade 2 or higher diarrhea was more frequent with paclitaxel-carboplatin than cisplatin (9/10 versus 4/10), while Grade 2 or higher anemia (4/10 versus 3/10) and Grade 3 neutropenia (1 patient in each arm) were comparable. Among patients evaluable specifically for toxicity during the brachytherapy phase (5 in Arm A, 7 in Arm B), concurrent chemotherapy was administered alongside brachytherapy fractions with predominantly Grade 0-1 toxicity; only one chemotherapy dose was withheld for Grade 3 neutropenia, without brachytherapy interruption.

Conclusion: Concurrent chemotherapy could be safely continued alongside high-dose-rate brachytherapy, with acceptable, predominantly low-grade toxicity in both arms, supporting its integration during brachytherapy rather than routine omission. Paclitaxel-carboplatin showed a higher incidence of diarrhea than cisplatin but remained a feasible, tolerable alternative for cisplatin-intolerant patients, with comparable hematological toxicity between regimens.

Intraluminal Brachytherapy for Recurrent Esophageal Carcinoma

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Adaptive Intraluminal Brachytherapy as a Salvage Treatment After Chemoradiation in Recurrent Esophageal Carcinoma: A Case Report

An 80-year-old male with no known comorbidities presented with progressive dysphagia. Upper GI endoscopy revealed a growth in the upper esophagus, 20 cm from the incisors, with luminal narrowing and a large hiatus hernia. Biopsy confirmed moderately differentiated squamous cell carcinoma. Staging PET-CT showed FDG-avid circumferential mural thickening of the upper-to-mid thoracic esophagus (length $\approx$ 3.3 cm, maximum wall thickness $\approx$ 1.4 cm, at the D4–D5 level, SUV max 18.3), abutting the posterior tracheal wall without infiltration, and no lymphadenopathy. The patient was planned for concurrent chemoradiation.

He received 50.4 Gy in 28 fractions to the primary using image-guided radiotherapy on a 6MV linear accelerator, with five cycles of concurrent Injection Paclitaxel and Carboplatin, position and volumes verified daily by CBCT. On follow-up, he again developed dysphagia; repeat PET-CT showed disease length 2.2 cm and SUV max 11.7. Due to recurrent disease, he was planned for intraluminal brachytherapy of 500 cGy in 3 sessions.

For each session, the patient was positioned in the left lateral position and upper GI endoscopy repeated to reconfirm growth extent and the gastro-esophageal junction — a growth was visible from 20–25 cm from the central incisors, and an endoscopy-guided esophageal catheter was safely inserted over a guide wire to the GE junction at 40 cm, then fixed around the neck with a mouthpiece. CT simulation with a radio-opaque dummy wire verified applicator position before each fraction.

Treatment was adaptively planned at every session: gross tumour volume shrank across the three fractions as the tumour responded, with target coverage maintained (PTV D90 = 100%, V100 = 99.9%) and organ-at-risk constraints respected throughout. Dose was delivered by remote HDR afterloading — an Ir-192 source driven through the applicator to preplanned dwell positions, delivering the prescribed dose at 10 mm from the applicator surface. All three fractions were completed without acute complications.

This case demonstrates that adaptive intraluminal brachytherapy is a feasible and effective salvage treatment after chemoradiation in recurrent esophageal carcinoma, achieving consistent target coverage while respecting organ-at-risk constraints — though cumulative dose to the trachea and great vessels must be tracked carefully against the earlier external beam dose to minimize fistula risk.

Targeting The Orbit, Preserving The Eye: Interstitial Brachytherapy In Orbital Rhabdomyosarcoma

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Dr. Tanvir Pasha, Dr. Nikhila K.R., Dr. Sathiyaraj, Dr. Rekha Reddy, Dr Mithun,



Orbital rhabdomyosarcoma (RMS) is a rare Pediatric malignancy and the most common primary orbital tumour in children. Management is challenging, requiring effective local tumour control while preserving vision and minimizing long-term radiation-induced toxicity.

An 11-year-old girl with Stage I, Clinical Group II right orbital alveolar RMS presented with painful swelling of the right upper eyelid. MRI revealed a $2.4 \times 2 \times 1$ cm lesion involving the levator palpebrae superioris in the superior extraconal orbit. She underwent orbitotomy with excision, and histopathology, immunohistochemistry, and FISH confirmed FOXO1-negative alveolar RMS with positive surgical margins. Postoperative PET-CT and MRI showed no residual or metastatic disease.

After 12 weeks of multiagent chemotherapy, follow-up MRI demonstrated a localized $7.4 \times 9.5 \times 6.7$ mm recurrent lesion involving the anterior levator palpebrae superioris, abutting the superior rectus muscle, without intraconal extension.

Interstitial brachytherapy (ISBT) was planned for local control. Pre-planning CT imaging was performed, and a patient-specific 3D-printed eye mould with predefined catheter entry points was designed to ensure accurate and reproducible implantation geometry. Under general anesthesia, six catheters were inserted in two planes (two horizontal and four vertical) according to pre-planned positions and depths.

High-dose-rate (HDR) brachytherapy was delivered at 3.5 Gy per fraction for 7 fractions over four consecutive days. Treatment planning ensured optimal target coverage while minimizing dose to adjacent critical structures, including the globe, lacrimal gland, lens, and developing craniofacial tissues. Treatment parameters, dosimetry, toxicity, and early response were evaluated. The procedure achieved precise conformal dose delivery to the residual lesion with effective sparing of organs at risk, with no immediate procedural or treatment-related complications.

Interstitial brachytherapy offers highly conformal radiation with steep dose fall-off, enabling effective local tumour control while reducing radiation exposure to sensitive orbital and craniofacial structures. It also shortens overall treatment duration compared with external beam radiotherapy. ISBT represents a promising organ-preserving local treatment option in carefully selected pediatric orbital RMS, particularly for small, well-localized residual or recurrent disease.



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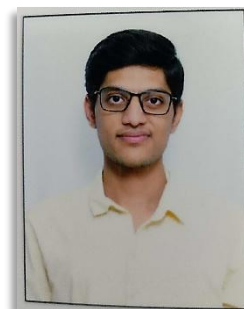
Infraorbital Recurrent Malignant Melanoma in Xeroderma Pigmentosum patient treated with Brachytherapy

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Dr Nithin Bhaskar



Background: Recurrent Malignant melanoma of the infraorbital region with Xeroderma Pigmentosum is uncommon, and achieving adequate surgical margins while preserving cosmesis and critical ocular structures is challenging. Adjuvant radiotherapy is considered in selected high-risk patients with positive margins, recurrent disease, or adverse pathological features. EBRT was deferred as it will irradiate larger skin tissue leading to risk of recurrent malignancy. Mould Brachytherapy was deferred as Deep margin was more than 1cm for which coverage can't be achieved. So Interstitial Brachytherapy was preferred. Interstitial high-dose-rate (HDR) brachytherapy provides highly conformal dose delivery while minimizing irradiation of adjacent normal tissues.

Material and methods: Patient had developed Right infraorbital swelling for which he underwent multiple wide local excision and reconstruction at non oncology setup and HPE- showed Deep margin positive and D/D- Malignant Melanoma / Malignant peripheral nerve sheath tumour. Slide reviewed at our institute showed malignant melanoma. Patient underwent Interstitial Brachytherapy with implant placed in 2 planes - superficial plane 4 catheters placed horizontally and deep plane 2 catheter placed vertically 1cm apart each to get good coverage and homogeneity. Patient received 38.5 Gy x 11fr with EQD2 - 42.5 Gy, 2fr per day 6 hours apart.

Results: Plan achieved good coverage and homogeneity with DNR, Conformity Index & homogeneity index, D90, Right Eye and lens dose within normal limits. Acute and late toxicity with the treatment were acceptable and within normal limits.

Conclusion: Here in a case of Xeroderma Pigmentosum with recurrent infraorbital Malignant Melanoma as EBRT and Mould Brachytherapy was not feasible. EBRT was not considered as it will irradiate larger skin tissue associated with recurrent malignancy in patient with Xeroderma Pigmentosum. Choice of brachytherapy depends on the topography of the CTV that has to be covered. So Deep margin was which was more than 1cm and can't be covered with Mould Brachytherapy. So patient was considered for Interstitial Brachytherapy. Brachytherapy is the most conformal technique to deliver adjuvant RT in critical locations such as the face for optimum cosmetic and functional outcome with shorter hospital visits. This has been observed in images of patient at 2 weeks post treatment and 7 months post treatment.

Interstitial Brachytherapy for Vulvar Cancer with Periurethral Involvement: Technical Nuances

Dr Kisa Saiyeda, Senior Resident

All India Institute of Medical Sciences, New Delhi, India

Dr. Karun Kamboj



Vulvar carcinoma is an uncommon gynecological malignancy that predominantly affects elderly women. Management of locally advanced or inoperable disease commonly involves external beam radiotherapy (EBRT) followed by an interstitial brachytherapy boost to improve local control. However, delivering high-dose EBRT in frail elderly patients may significantly increase the risk of acute and late toxicities involving the skin, urethra, vagina, and surrounding soft tissues. Image-guided interstitial brachytherapy (ISBT) provides a highly conformal treatment approach that enables dose escalation to the target while minimizing radiation exposure to adjacent organs at risk, making it an attractive organ-preserving option in carefully selected patients.

An 81-year-old woman with biopsy-proven squamous cell carcinoma of the vulva involving the periurethral region was treated with definitive image-guided HDR interstitial brachytherapy. Considering her advanced age, periurethral tumour location, and anticipated toxicity associated with high-dose EBRT, brachytherapy was selected as the primary treatment modality. Under appropriate anesthesia, ultrasound-guided transperineal implantation was performed with the patient in the lithotomy position. Five interstitial needles were inserted in two planes to achieve optimal target coverage while avoiding critical structures.

Following implantation, CT-based treatment planning was performed using the Oncentra Brachy treatment planning system. The gross tumour volume and organs at risk, including the urethra, bladder, and rectum, were contoured. Treatment planning incorporated geometric and graphical optimization with manual refinement to ensure adequate target coverage while maintaining acceptable dose constraints for adjacent organs. High-dose-rate brachytherapy was delivered using an Iridium-192 remote afterloading system to a total dose of 42 Gy in 14 fractions (3 Gy per fraction). Owing to the close proximity of the lesion to the urethra, a customized lead cutout was used to provide relative urethral shielding and reduce radiation exposure without compromising target dose coverage.

The patient completed the prescribed treatment without interruption or procedure-related complications. Acute toxicities were limited to Grade 1–2 localized skin and mucosal reactions, which were managed conservatively. At the first follow-up, she demonstrated a favorable local clinical response with symptomatic improvement and preserved urinary function.

This case demonstrates that image-guided HDR interstitial brachytherapy is a feasible, safe, and effective treatment option for elderly patients with periurethral vulvar carcinoma. Ultrasound-guided needle placement, CT-based planning, and customized urethral shielding facilitated precise dose delivery while minimizing exposure to surrounding critical structures. This organ-preserving approach may be particularly valuable in carefully selected patients where conventional dose escalation with EBRT alone would be associated with an unacceptable risk of treatment-related toxicity.

Customized HDR Mould Brachytherapy for Hard Palate Rhabdomyosarcoma

Dr Cijo S S, Senior Resident

National Cancer Institute, All India Institute of Medical Sciences,

Jhajjar, India

Dr Karun Kamboj, Dr Kisa Saiyeda, Dr Antara Bagchi



Alveolar rhabdomyosarcoma of the hard palate is a rare malignancy requiring multimodality treatment. Postoperative radiotherapy is technically challenging because of the complex anatomy of the oral cavity and the proximity of critical structures.

Customized high-dose-rate (HDR) mould brachytherapy enables conformal radiation delivery to superficial lesions while minimizing dose to adjacent normal tissues. This video demonstrates the fabrication and clinical application of a customized HDR mould brachytherapy applicator for the postoperative treatment of a 16-year-old male with hard palate alveolar rhabdomyosarcoma following subtotal maxillectomy.

The video illustrates the complete workflow, including fabrication of a patient-specific acrylic palatal mould, catheter placement, CT-based treatment planning, applicator positioning, and HDR brachytherapy delivery. It highlights a practical, reproducible, and cost-effective technique for achieving precise target coverage while sparing surrounding normal tissues in selected postoperative oral cavity malignancies.

Beyond Conventional boundaries- USG-guided Interstitial Brachytherapy for Curative Ablation of Liver Oligometastasis in Carcinoma Anal Canal

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Dr. Karun Kamboj, Dr. Indranee Swain, Dr. Aman Sharma, Dr. Supriya Mallick, Dr. Anil Gupta



The management of oligometastatic disease has evolved considerably over the past decade, with increasing emphasis on aggressive local ablative therapy in carefully selected patients. Interstitial high-dose-rate (HDR) brachytherapy has emerged as a promising minimally invasive alternative, offering excellent dose conformality with rapid dose fall-off, thereby facilitating tumour ablation while minimizing radiation exposure to surrounding normal tissues.

This video presents the multidisciplinary management of a 60-year-old gentleman with oligometastatic squamous cell carcinoma of the anal canal, who underwent definitive chemoradiation to the primary tumour followed by ultrasound-guided interstitial HDR brachytherapy for a solitary FDG-avid liver metastasis with curative intent. Following confirmation of stable oligometastatic disease on interval 18F-FDG-PET/CT, pre-procedural planning was performed by fusion of planning CT with PET/CT to accurately delineate the target lesion.

The video demonstrates the complete procedural workflow, including real-time ultrasound-guided transcutaneous insertion of interstitial needles under local anaesthesia, intraprocedural imaging for confirmation of optimal needle placement, CT-based treatment planning, catheter reconstruction and dosimetric evaluation. Practical aspects such as respiratory motion management, image guidance and target coverage are highlighted throughout.

By showcasing the technical execution and dosimetric advantages of this technique, this presentation aims to demonstrate that ultrasound-guided interstitial HDR brachytherapy can successfully extend beyond its conventional indications to serve as a precise, minimally invasive, and organ-sparing local ablative modality for selected patients with oligometastatic disease. Its excellent conformality, steep dose gradient, and ability to preserve uninvolved liver parenchyma make it a valuable addition to the multidisciplinary management of carefully selected patients.


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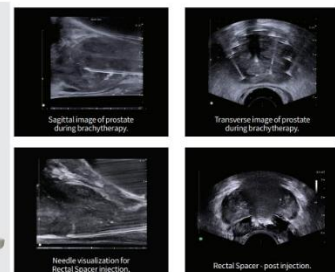
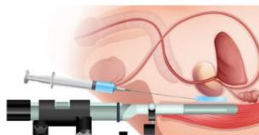
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