SCMPCR

South Asia Centre for Medical Physics and Cancer Research

SCMPCR Newsletter

A Project of Alo-BT

July 2024 | Volume 6 | Issue 2

QUALITY EDUCATION AND HEALTH SCIENCE FOR PATIENT BENEFIT

Inside This Issue

Editor's Notes

In this edition of the SCMPCR Newsletter, we are privileged to showcase the remarkable strides made in the field of medical physics and cancer research activities across South Asia. From exploring advanced radiation therapy techniques to addressing dosimetric challenges in head and neck radiotherapy, the scientific articles featured in this issue exemplify the dedication and expertise of our community.

Our commitment to fostering excellence in medical physics is evident in the diverse range of educational and professional development programs conducted within our member states. The collaborative efforts and resourceful initiatives highlighted in the News and Events section underscore our unwavering support for every medical physicist striving for excellence in their professional endeavours.

As we celebrate achievements such as the SCMPCR EBAP Accredited Hands-on training in Kolkata, India, and the 6th Annual Conference on the International Day of the Medical Physicist in Karachi, Pakistan, we reaffirm our dedication to enhancing radiotherapy in cancer care facilities and overcoming challenges in the region.

I extend my sincere appreciation to all the contributors, collaborators, and readers who continue to drive progress and innovation in the field of medical physics. Your passion and commitment are instrumental in shaping a brighter future for healthcare in South Asia.

I wish everyone success and fulfilment in their endeavours in the upcoming year. Let us strive for excellence and make a meaningful impact in the world of medical physics and cancer research together.

Editor-in-Chief
SCMPCR Newsletter.

Published bi-annually by SCMPCR, B-66, Rd No:E/4, Eastern Housing, Mirpur, Dhaka-1216, Bangladesh.

SUBMISSION DEADLINE FOR NEXT ISSUE: November 30, 2024

Insights from SCMPCR Hands-on Workshop HW-07: Quality Assurance in High Precision Radiotherapy

Ms Shayori Bhattacharjee
Medical Physicist and Radiological Safety Officer, Assam Medical College and Hospital, Assam, India

Medical physics is a dynamic field that plays a vital role in the convergence of medicine and technology. The field of Medical Physics is growing rapidly and requires a high degree of knowledge and professional competency owing to the rise in complexity of treatment procedures, increasing access to medical technology, and the need for coordination between the disciplines of medicine, physics, and biomedical engineering.

According to GLOBOCAN 2012, about 57% of the cancer cases worldwide occur in low- and middle-income countries (LMIC) and Radiotherapy is one of the main components of modern cancer treatment and requires substantial capital investment, trained professionals in several disciplines, high precision equipment, and a particular external and internal organisational structure.

Further, as health care across the world is undergoing a period of rapid transformation because of economical, technological, and regulatory forces, we may find a huge diversity and all these developments have been seen quickly implemented in developed countries at a full scale but unfortunately lacked in most of the developing and underdeveloped countries. Therefore, the task of homogenising the medical Physics education and profession is quite challenging because of heterogeneity in terms of socioeconomic and educational standards. To address such heterogeneities, we are glad to have South Asian Centre for Medical Physics and Cancer Research with the objective to gather the Medical Physics professionals in this South Asian region with National and International Expert Facilitators for sharing of knowledge, expertise, scientific discussions, cultural exchange and with many other updates in Medical Technologies in best possible way with a series of different learning and training Programs.

On the other hand, as technology advances, enabling ever precise delivery of radiation doses, the need for meticulous QA measures becomes increasingly vital. In the realm of modern oncology, precision is paramount. Each treatment decision, each radiation dose being delivered, carries profound significance for patients battling cancer. Without stringent QA protocols in place, there exists the potential for errors that could compromise treatment outcomes and patient well-being. Recognizing this imperative and also to acquaint adequate theoretical and practical knowledge on

I gained valuable insights into critical topics such as Image-guided radiation therapy (IGRT), surface guided radiation therapy (SGRT), and various Patient Specific Quality Assurance (PSQA) methods. The hands-on sessions were particularly enlightening, enabling me to directly apply QA principles in practical scenarios. It significantly enhancing my understanding of QA practices in high precision radiotherapy.

Mr. Dinesh Saroj, Medical Physicist & RSO-III, Balco Medical Centre, Raipur, India.

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Inauguration Ceremony of the Scientific Event

Quality Assurance, SCMPCR convened a Hands-on Workshop (HW-07), focused on the critical topic on "Quality Assurance in High Precision Radiotherapy" in collaboration with Saroj Gupta Cancer Centre and Research Institute (SGCCRI), Kolkata, India from February 1, 2024 to February 4, 2024 to enriched with the knowledge and skills in order to move towards efficient Quality Assurance techniques and utilize in the clinic for improved cancer treatment.

The inauguration of the hands-on workshop kicks off on 1st Feb, 2024, with a keynote address delivered by a visionary Leader Prof. Dr Golam Abu Zakaria, the Chairman of SCMPCR, setting the tone for the event, speaking the importance of Scientific workshops, marking the commencement of a journey into the realm of knowledge and innovation, along with addressing the pressing challenges facing by the Medical Physics Society and reaffirming the belief in the transformative potential to shape a more sustainable and equitable world. As the curtains rise, the spotlight shines on the heart of the event with sharing insights, visions of SCMPCR that has the potential to shape the future in the respective field by Prof. Dr Hasin Anupama Azhari, the CEO of SCMPCR.

The Hands-on Workshop (SCMPCR HW-07), 2024 titled "Quality Assurance in High Precision Radiotherapy" has acquired Accreditation from European Board for Accreditation in Medical Physics (EBAMP) as a CPD event for Medical Physicists at EQF Level 7 which is equivalent to 43 CPD points. The event has been judged to have 13.5 hours of Educational Experience with 7.5 hours of Practical workshops along with a final written Examination.

Key topics Covered:

Day 1: The very first lecture of the session was being delivered on 1st Feb, 2024 by renowned Medical Physicist from India, Dr. T. Ganesh on topic "Quality Assurance: TG-100 way" covering a comprehensive QA guideline that provides a structured methodology to identify the weakest link in the radiotherapy process by prospective risk Management using FMEA method. The guideline ensures the accuracy, safety and efficacy of medical devices and procedures used in radiation therapy. It encompasses range of activities right from equipment calibration, maintenance and periodic testing as well as developing crafted guidelines to provide robust framework for implementing effective QA protocols to optimize patient safety and treatment outcomes thereby mitigating errors in the workflow.

The second lecture was focused on "Motion Management in Radiotherapy" delivered by Dr Raju Srivastava, Medical Physicist from Belgium, provided an insightful presentation and shedding light on techniques such as grating, tracking and breath hold methods, especially in cases where tumors are affected by respiratory or other types of motion ensuring that radiation is accurately targeted while minimizing exposure to healthy tissues. The integration of advanced imaging

The invaluable skills and insights from the workshop, we can directly apply in our work.

One of the highlights was the presence of an international faculty of experts. Their diverse perspectives and extensive experience enriched every session, offering us a global outlook on quality assurance in radiotherapy. Interacting with such esteemed professionals not only broadened our understanding but also inspired us to strive for excellence in our practice.

Subhas Halder, Consultant and Chief Medical Physicist, Smt Jayaben Mody Multisuperspeciality Hospital, Gujarat, India.

Practical Session with Ruby Octavius Phantom

modalities and real-time monitoring further enhances treatment efficacy and safety.

The third lecture of the session explored on "Role of Surface Guided Radiation Therapy in Modern Radiotherapy Techniques" by Dr. Raju Srivastava, Medical Physicist from Belgium, highlighting the advancements in SGRT, which has become a revolutionized tool providing real time tracking and monitoring of patient surface anatomy during treatment. By utilizing optical or infrared cameras to capture images, SGRT ensures precise patient positioning and alignment, reducing setup uncertainties thereby facilitating sub-millimetre accuracy improving treatment accuracy.

The fourth lecture of the session delved into the "Automated QA" by Dr. T. Ganesh, shared his valuable expertise on Automation and AI based systems used either for QA or in radiotherapy workflow systems such as Auto-contouring (AI based), Auto-planning (Radiation Planning Assistant – RPA), Testing software upgrade, Chart check and plan check (initial and weekly), Patient specific QA (AI based), Delivery QA and Dose prediction thereby highlighting considerable improvement in consistency in planning, productivity, quality of planning, staff focus on patient care. Overall, this lecture provided valuable insights into the evolving landscape of precision radiotherapy.

Day 2: The fifth lecture of the session started on 2nd Feb, 2024 presented by Mr. Markus Zelch on "LAP GmbH – Introduction Quality Control Equipment". The lecture has provided a comprehensive overview of different radiotherapy dosimetry Phantoms. Explored in detailed about THALES 3D MR SCANNER- a Motorized water phantom for commissioning and quality assurance of MR-guided LINACs and RadCalc- a dosimetric verification software for secondary check and also explained on its applications as well as advantages in modern radiotherapy practice for accurate measurement and verification.

The Sixth lecture of the session was on "PTW Octavius 4D 1600 systems, SRS/SBRT Patient Specific QA" presented by Mr. K. Kanakaval, Manager from PTW Dosimetry India was informative and impactful. The presenter adeptly navigated through the systems features, its capabilities and the advantages, it offers in patient Specific QA. The lecture effectively communicated the sophisticated design of Octavius 4D array which allows for precise dose verification and its user friendly interface and intuitive software make it easy accessible for Physicists.

The seventh lecture of the session provided insights into "Patient Specific Quality Assurance" by Dr Raju Srivastava in context of SRS/SBRT. The lecture has basically focused into the methodologies and challenges associated with ensuring accuracy and safety in delivering of these

Buddhika Srimal Sesath,
Medical Physicist,
Teaching Hospital-Badulla,
Sri Lanka

This workshop provided a comprehensive platform for learning and hands-on training in the latest advancements in radiotherapy quality assurance.

The sessions, led by esteemed experts from India, Belgium, Germany, and the United States, covered a range of crucial topics. Highlights included the integration of Artificial Intelligence in QA, intrafraction motion monitoring for SBRT and SRS treatments, and patient-specific QA techniques using advanced tools like the Octavius 4D 1600 SRS array and the Ruby Phantom.

This workshop has significantly enhanced my knowledge and skills in high precision radiotherapy, and I am confident that the insights gained will greatly benefit my professional practice.

Examination

high-dose radiation therapies, thereby offering thorough knowledge for improved precision.

The eight lecture of the session delved into the "Rotational Motion Correction in Precision Radiotherapy" delivered by Dr. Biplab Sarkar, Chief Medical Physicist from India. The session was thoroughly informative and engaging. The speaker provided comprehensive overview of the importance of both translational and rotational motion and adeptly outlined the necessity of Six-dimensional corrections, highlighting how these advancements allow for precise targeting of tumors. Moreover, the technical requirements were explained in a clear and understandable manner, making the complex concepts accessible to all the attendees.

The ninth lecture of the session named "In-vivo dosimetry with RadCalc's 3D EPID module: commissioning and first clinical results" was presented by Dr. Florian Kamp, demonstrates the commissioning process with RadCalc's 3D EPID, detailing the steps involved and the challenges encountered. Moreover, the presentation showcased the initial clinical results obtained with the module. Through detailed case studies and data analysis, the attendees gained valuable insights into the practical applications and benefits of this innovative module. Overall, the lecture served a a compelling testament to the significance of invivo dosimetry in modern radiotherapy practice and highlighted the potential of the RadCalc's 3D EPIDmodule to enhance the treatment quality and outcomes.

The tenth lecture of the session was on "End to End verification in SRS/SBRT-Ruby Phantom" presented by Mr. K. Kanakaval. The lecture commenced with a detailed overview of the principles underlying SRS and SBRT QA. The instructor adeptly elucidated the various steps involved in the End-to-End verification process, laying a solid foundation for the subsequent discussion. The practical representation using Ruby head phantom, Base phantom and related inserts served as the highlight of the session. Overall, the practical lecture on end-to-end verification in SRS/SBRT using the Ruby Phantom provided invaluable educational experience.

Day 3: The 3rd day (3rd Feb, 2024) of the workshop was purely a hands-on practical session where participants were divided into two groups to engaged participants accordingly. Topics being covered for practical session were:

Lap EPID based Quality Assurance – Data Analysis: The session delved into patient specific QA highlighting the steps of plan verification, Pre-treatment verification and in-vivo verification with RadCalc. Furthermore, the session incorporated evaluation of EPID based patient specific IMRT and VMAT QA empowering participants to extract meaningful insights from QA data and drive continuous improvement initiatives with practical guidance on data interpretation, dose analysis and performance metrics.

Patient Specific QA with RUBY Octavius Phantom: The Practical session on patient specific QA utilizing the Ruby Octavius phantom provided an enriching hands-on experience that deepened participants' understanding the QA processes. The session commenced with an introduction to the Ruby phantoms design and uses of corresponding inserts for QA. Participants are guided through all the step-by-step processes along with setup of the phantom. This hands-on approach

The powerful inspiring missions of this organisation makes the developing countries of South Asia regions to come up with a vibe of strong knowledgable field in medical physics associated with a world class performance in cancer care along with remarkable cancer research opportunities internationally. I am extremely overwhelmed of being a part of this training organised by SCMPCR. A lots of knowledge I have gained through this 4 days training period which will really help me in my day to day clinical work practice as a physicist. I will say we are the lucky warriors in the field of medical physics as a physicist to get in touch of SCMPCR."

Ms. Sudipto Santra, Medical Physicist & RSO, Ruby General Hospital , Kolkata -700107

The event was very well organized, featuring a diverse range of lectures about different important topic of Medical Physics. The speakers were very experts, offering valuable insight into the latest research and advanced techniques of medical physics. Esteemed foreign faculties and expert trainers hailing from India, Belgium, Germany, and the United States have leaded the workshop. One of the program's strengths was its selection of the different hot topic of Medical Physics such as AI, SGRT, SRS-SRT-SBRT Planning and QA, InVivo Dosimetry which was discussed elaborately during a very short span of time. The entire atmosphere was collegial and stimulating, encouraging in depth discussion and the sharing of diverse perspectives. Apart from the scientific lectures, one of the incredibly enriching experience was its Hands on training by the expert Physicist from PTW, Germany. The hands on training was meticulously designed to offer practical and indepth knowledge in SRS/SRT/SBRT patient specific QA. The entire audienence was divided into small groups to setting allowed for individuazed attention, enabling participants to ask detailed queries and immediate response. This interactive approach significantly enhanced the learning experience, making complex concepts more accessible and easier to grasp. This hands on training was invaluable, as it bridged the gap between theory and practical for the Medical Physics students and the professionals. Truely speaking, I had participated many of conferences, but realize that maximum number of participants lost their interest and the conference room become almost empty after day 1. But I really surprised to see that the entire programme was such meticulously designed that it keeps audience attention till the day 4.

Mr. Rajdip Mitra, Physicist cum Radiation Safety Officer (Govt. Of West-Bengal) Murshidabad Medical College and Hospital, Murshidabad, West Bengal, India.

allowed the participants to familiarize themselves with the phantom's functionalities and gain proficiency in point dose verification and dose measurements as well. In conclusion, the session's hands-on approach, coupled with comprehensive instruction and interactive discussions, made it a standout practical hands-on experience for radiation therapy professionals seeking to enhance their QA expertise.

The third lecture of the session was on "Data Analysis Lecture and discussion on Lap EPID based QA". The session commenced with an in-depth overview of data analysis techniques specific to LAP EPID based QA. Participants were introduced to the fundamental principles of data analysis, including data acquisition, processing and interpretation. Through interactive discussions and case studies, participants gained practical insights into various data analysis methodologies and their relevance to LAP EPID based QA.

Day 4: Apart from all the lectures and hands-on training, on the last day on 4th Feb, 2024 a group discussion session has been arranged to engage all the participants, special guest faculties and all the speakers, a suitable platform to resolved all the queries. The questions being raised by participants were addressed during the session. Thus, the session served as a forum for brainstorming and problem solving and helped to connect with peers, exchange ideas and expand their professional network.

To receive the certificates with the CPD points, an assessment examination was conducted for all the participants to evaluate the course learning outcomes.

As a participant, it was my great pleasure to be part of SCMPCR Hands-on workshop, 2024. The workshop organized by SCMPCR has provided participants with a comprehensive understanding of QA principles tailored specifically for high-precision radiotherapy techniques. Through a combination of theoretical sessions, practical demonstrations and hands-on exercises, attendees were immersed in the intricacies of Quality assurance processes for both conceptual and practical standpoint. It is crucial to reflect on the invaluable experiences, form mastering new techniques to exchanging insights, each moment has contributed to our professional growth through this workshop.

As reviewer, its evident that the knowledge and skills gained here will not only enhance our individual capabilities but also empower us to drive positive change within our respective field.

In conclusion of this comprehensive report, I would like to express my sincere gratitude to all the esteemed facilitators and the special guest faculty members for sharing their expertise, guidance, and insights throughout the workshop. A special thanks to all the co-ordinators especially for Prof. Dr Golam Abu Zakaria, Prof. Dr Hasin Anupama Azhari, Prof. Dr. Gautam Bhattacharjee and Mr. Subhas Halder for their tireless efforts, their passion, their patience, and undying spirit, whose generous support made this workshop possible. Your commitment to professional Development and education is deeply appreciated and has had significant impact on the success of this event. This initiative has demonstrated its commitment to community to enhance accessibility and engagement within the community.

As wrapping up, I want to extend my deepest appreciation to Prof. Dr Hasin Anupama Azhari madam for this incredible opportunity to share my insights and perspectives about the SCMPCR hands-on workshop, 2024. This opportunity not only allows me to reflect on my own journey and learnings but also reinforces the importance of collaboration and knowledge sharing within our professional community. As we continue our journey of professional development, looking forward to being a part of this community in future again.

SCMPCR HW-07: Inaugural talk by Dr Goutam Bhattacharjee HOD, Dept of Radiation Oncology, SGCC&RI

Mr Chairman Sir, Dignitaries on the Dias, Distinguished Delegates (Both National & International), Esteemed Guests & Colleagues, Ladies and Gentlemen:

I am truly honored to stand before you as the HOD of Radiation Oncology of the Saroj Gupta Cancer Centre and Research Institute, Thakurpukur, Kolkata, India, on this momentous occasion of our 50th-anniversary celebration. This significant workshop, scheduled from February 1-4, 2024, is a testament to our commitment to excellence in cancer care and research. I am pleased to acknowledge the collaborative efforts of the renowned Saroj Gupta Cancer Centre & Research Institute on one hand and "SCMPCR HW-07," a project of Alo Bhubon Trust in Bangladesh on the other. It fills me with immense joy to participate in the upcoming Hands-on workshop program at our esteemed institution, titled **"Quality Assurance in Precision Radiotherapy.** "Together, we aim to contribute to the advancement of medical physics and cancer research.

As we embark on this journey of knowledge-sharing and skill enhancement, it's essential to reflect on the remarkable history of our institution. In the early 1970s, Dr. Saroj Gupta, a visionary Radiation Oncologist, stood on a marshy land in Kolkata, envisioning a center that would provide world-class cancer care and conduct groundbreaking research. His dream materialized into the Saroj Gupta Cancer Centre & Research Institute, a beacon of hope for the underprivileged cancer population residing in Eastern India and neighboring countries.

The institution's journey began with voluntarism & philanthropy and Dr. Saroj Gupta's unwavering commitment was supported by donors from various strata of society. Over the last fifty years, this institution has evolved into a symbol of excellence in cancer care, attracting luminaries and leaders from different fields. The recognition got extended globally, with organizations like the World Health Organization (WHO) and the Union for International Cancer Control (U.I.C.C) acknowledging our contribution to the global fight against cancer.

On this momentous occasion, we pay tribute to the indomitable spirit and compassionate soul of Dr. Saroj Gupta who was a FRCR from the London College of Radiology 1965 and also happens to be my incomparable mentor. His impact on my professional and personal journey, starting from my early post-graduate days in Radiation Oncology since 1981, is immeasurable. His special classes and mentorship shaped my understanding of oncology and laid the foundation for my career.

Dr. Gupta's leadership style, characterized by making difficult decisions for the hospital's betterment, is commendable. As we celebrate our 50th year, let us not only acknowledge the milestones achieved but also honor the enduring spirit of this remarkable human being. Dr. Saroj Gupta will forever remain an unforgettable figure—a teacher, mentor, and employer whose legacy continues to inspire us all.

The focus of our upcoming workshop program on **"Quality Assurance in Precision Radiotherapy"** underscores the critical importance of ensuring the safety and effectiveness of cancer treatment. Medical physicists play a vital and crucial role in guaranteeing the accuracy, safety, and reliability of the entire treatment process. All these efforts ultimately enhance outcomes for cancer patients undergoing radiation therapy.

This workshop, is designed to be an immersive experience in the critical field of medical physics, specifically focusing on ensuring the highest standards of quality assurance in precision radiotherapy. Let me remind you Medical Physicists, who are my partners in delivering Radiotherapy that your role in guaranteeing the accuracy, safety, and reliability of the entire treatment process, from planning up to delivery, is pivotal in enhancing outcomes for cancer patients undergoing radiation therapy.

The field of high-precision radiotherapy has seen remarkable advancements, and with these advancements come greater responsibilities for ensuring the highest level of quality in patient care. This workshop aims to equip you with the latest knowledge, tools, and hands-on skills needed to meet these challenges head-on.

Throughout the program, you will have the opportunity to engage with leading experts in the field, share experiences with fellow participants, and delve into practical sessions that simulate real-world scenarios. The curriculum will cover a range of topics, including but not limited to the following items:

1. Explore the latest techniques in treatment planning to optimize dose distribution and minimize side effects.
2. Learn and implement quality assurance protocols to ensure the accuracy and precision of radiation therapy treatments.
3. Understand the role of IGRT in enhancing target localization and treatment accuracy.
4. Gain insights into the latest dosimetry techniques and calibration procedures to maintain accurate radiation doses.
5. Enhance your skills in patient safety protocols and effective communication with the multidisciplinary team.
6. Stay abreast of the latest technological advancements in precision radiotherapy, including the use of artificial intelligence and machine learning.

As you actively participate in this workshop, I encourage you to ask questions, share your insights, and make the most of this collaborative learning experience. Your dedication to advancing your knowledge and skills is commendable, and it aligns with our shared commitment to excellence in cancer care and research.

I extend my sincere appreciation to the organizers, faculty members, and partners who have made this training program possible. As a special mention I am delighted to share that distinguished professors and expert trainers from around the world, including Prof. Dr. Golam Abu Zakaria (*Cologne, Germany*), Dr. Biplab Sarkar (*Apollo Cancer, Kolkata*), Dr. Tharmarnadar Ganesh (*India*), Dr. Raju Srivastava (*Belgium*), Mr. Carlos Bohorquez (*USA*), Dr. Florian Kamp (*Germany*), Mr. Krakus Zelch, and Mr. K. Kanakavel, who all have graciously agreed to participate as trainers for this event. Let us seize this opportunity to strengthen our capabilities, foster collaboration, and contribute to the continuous improvement of patient care in the field of precision radiotherapy. Together, let us continue the legacy of excellence set by Dr. Saroj Gupta and strive for continuous improvement in cancer care and research.

Thank you, and I look forward to an engaging and enriching workshop.

Bridge Builder Dr. Golam Abu Zakaria: A Pioneering Journey in Medical Physics - Book Reviews

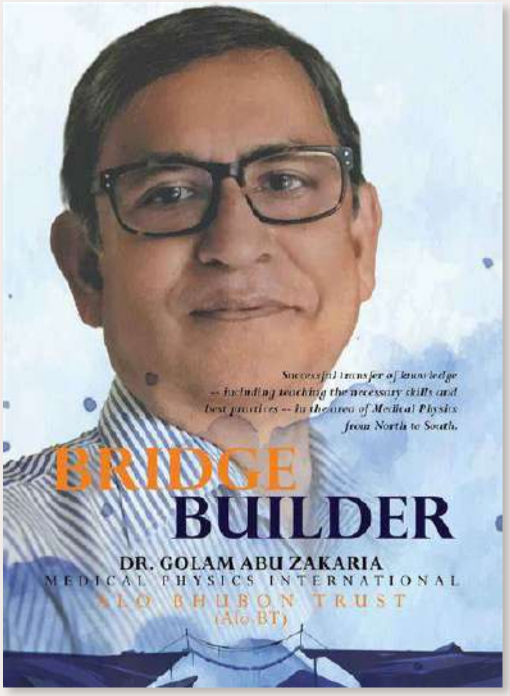
Ijaj Ahamed Rifat and Md. Mokhlesur Rahman, Dept. of Medical Physics and Biomedical Engineering, Gono University

"Bridge Builder Dr. Golam Abu Zakaria: Medical Physics International" provides a detailed look into Dr. Golam Abu Zakaria's life, career, and significant achievements. This book demonstrates his devotion to the field of medical physics and his strong dedication to promoting international collaboration. Arranged into six carefully selected parts, the book captures Dr. Zakaria's diverse journey through 43 articles written by a variety of contributors. These contributors include colleagues, friends, students, and relatives from across the globe, reflecting the wide-reaching impact of Dr. Zakaria's work.

Study and Professional Life in Germany: This part explores Dr. Zakaria's educational and career experiences in Germany. It focuses on his journey to success in the medical physics field and his positions as Chairman and Chief Medical Physicist at Gummersbach Hospital, along with his role as a professor at Anhalt University of Applied Sciences. By sharing personal stories and professional achievements, readers can understand the commitment and skill that have shaped Dr. Zakaria's career.

Historical Development of Medical Physics in Bangladesh

At this point, the book turns its attention to Bangladesh, the birthplace of Dr. Zakaria, providing a thorough history of the development of medical physics there. This section highlights his important contribution to the development of this important discipline and highlights his efforts to close the gap between developed and underdeveloped nations.



Medical Physics in Bangladesh: Cooperation between Germany and Bangladesh

Focusing upon the historical background, the third segment delves into the productive collaboration in medical physics between Bangladesh and Germany. Dr. Zakaria has been leading this relationship, which has been very helpful in promoting research projects and educational exchanges. The stories in this area highlight how crucial global collaborations are to the advancement of science and medicine.

Medical Physics in South Asia and Beyond: International Perspectives and Cooperation

The fourth segment provides a more comprehensive view of medical physics in South Asia and other locations, spreading the focus beyond Bangladesh. It highlights Dr. Zakaria's work as a global ambassador for medical physics and highlights his efforts to enhance international cooperation. The fact that authors from Austria, Egypt, the United States, Canada, China, Poland, Lebanon, and Rwanda have contributed attests to the work's extensive effect.

Development of Medical Physics: Views from the Students in Bangladesh and Germany

A particularly heartwarming section, it captures the voices of students from both Bangladesh and Germany. Their testimonials reflect the profound impact Dr. Zakaria has had as a mentor and educator, inspiring a new generation of medical physicists through his dedication and passion.

Professor Zakaria with His Friends: Other Aspects

The final section offers a more personal glimpse into Dr. Zakaria's life, featuring contributions from friends, colleagues, and relatives. These intimate accounts reveal the man behind the professional accolades, celebrating his character, values, and the personal relationships that have enriched his life. "Bridge Builder: Dr. Golam Abu Zakaria. Medical Physics International" is a comprehensive tribute to a remarkable individual whose work has significantly advanced the field of medical physics. Dr. Zakaria's story is one of dedication, innovation, and international collaboration. This book is not only a valuable resource for professionals in the field but also an inspiring read for anyone interested in the global impact of scientific cooperation. Through its well-organized sections and diverse array of contributors, the book successfully captures the essence of Dr. Zakaria's contributions and the far-reaching influence of his work. It stands as a testament to the power of dedication and the importance of building bridges across borders in the pursuit of scientific and medical excellence.

This book can be found at
www.power- publishers.com
or
www.amazon.de

Brachytherapy – Still a Modern and Innovative Treatment Modality

Frank W. Hensley

Former Medical Physicist, Department of Radiation Oncology, Heidelberg University Hospital, Germany

Although the first cancer treatments with brachytherapy were performed in 1901, only 5 years after the discovery of radioactivity in 1896, brachytherapy still remains a modern and innovative treatment modality in our days [chapter 1 in 1]. After introduction of Co-60 irradiators in the 1950ies and linear electron accelerators in the 1970ies, treatment of deep-seated tumors largely converted to irradiation with high energy X-rays which can be combined to opposing and multi-field techniques delivering higher doses in depth than in the beam portals at the surface (due to their less steep depth dose curves). This was thought to render obsolete the previous invasive implantation of sealed radioactive sources or external irradiation with low (around 50 keV) and median energy (100-500 keV, so-called orthovoltage) X-rays. Nevertheless, both techniques are still present, and play an important role in small, albeit important fields of radiotherapy where they can often compete at eye level with the most innovative high-tech modalities in a much less expensive and much more commonly accessible manner.

Today, localized solid tumors are conjointly treated by surgery and radiation therapy with additional chemotherapy for systemic and disseminated disease or, e.g., to reduce the tumor before further treatment (as adjuvant) [2]. Radiotherapy is applied in about 50% of patients, of which the majority is treated with external beam radiotherapy (EBRT). Brachytherapy plays an important role in niches (about 10 % of radiotherapy is performed with brachytherapy) [1,3,4,5]. In many cases, brachytherapy can supplement other therapy modalities to escalate dose, to treat close to risk structures or to re-irradiate recurrent disease and is therefore often used as salvage treatment. But brachytherapy is also applied as definitive (sole) therapy in a number of diseases. For many applications of brachytherapy, detailed descriptions and further references are given in the GEC ESTRO Handbook of Brachytherapy, for which a free download is available from the ESTRO website [1].

Important applications of brachytherapy are gynecological cancers which can be accessed via the vagina [1, Ch. 15-19]. Here, especially brachytherapy of cervical cancer (for early cancers as sole treatment!) plays an essential curative role and provides comparable results to surgery, the second alternative, for locally advanced tumors [6, 7]. In a low and middle income setting as present in parts of the South Asian region where cervical cancer often is the most frequent cancer in women, brachytherapy generally causes lower overall costs due to cheaper labor costs and less infrastructure than surgery. Newer developments using image (especially MRI-) guided tumor location and target definition and the combination of intracavitary therapy with interstitial extension of the involved target area have further increased the efficacy in the treatment of cervical cancer and now define the gold standard [8].

Other important fields are skin treatment, and interstitial treatments especially for superficial lesions like superficial lymph nodes but also accessible deeper locations like breast (often as a boost) and Head & Neck tumors, here often in addition to surgery to compensate for incomplete resection [all chapters in 1]. Additional applications where brachytherapy is in the league of best treatment options or at least comparable are radioactive plaques for tumors in the eye [Ch. 31 in 1], interstitial treatment of certain solitary metastases, e.g. liver, [Ch. 26,28 in 1] or prostate and other seeds implantations [Ch. 21 in 1, 9, 10]. Treatment of prostate cancer is an example for brachytherapy's ability to provide cutting edge advanced therapy by using transrectal ultrasound (TRUS) in combination with a calibrated needle insertion template and a stepper (to position the ultrasound probe) [10]. This method combines on-site imaging used to delineate the target, to plan the dose distribution with interactive navigation, and to guide needle insertion and seed deposition. Simultaneous imaging of the inserted needles allows a real-time update of the dose distribution to the actually applied seed configuration, and, if necessary, its correction. It is worth mentioning that the optimization algorithms developed for seed application were the first in radiotherapy, and therefore the starting point also for the optimization algorithms used in EBRT [11]. The efficacy of seed application for early stages of prostate cancer is comparable to surgery but burdened with a lower risk of side effects, and in comparison, to a wait-and-see strategy, which also proposed in some of these cases, ensures an early onset of treatment [12]. For advanced prostate cancer the same TRUS based techniques can be used to plan and guide an HDR after loading application [13].

Advancements of recent years have again greatly improved brachytherapy efficacy and precision. A few years later than in EBRT, due to a meanwhile overcome lag in development of computer algorithms, image guided treatment planning has lead to clearer three dimensional guidance in target definition and applicator design, e.g. to the abovementioned combination of intracavitary with interstitial brachytherapy of cervical cancers [8].

The second major advancement was the standardized dose calculation with the TG43 formalism [14, 15] which has provided verified consensus source data for use with a standardized calculation algorithm and is now the basic algorithm used in most planning systems. TG43 calculations provide sufficient accuracy for most brachytherapy applications with total uncertainties of 3.4-4.4% [16] and only few limitations at large density boundaries. Improved calculation overcoming these limitations is possible with the newly developed model-based dose calculation algorithms (MBDCAs), the first of which are presently being implemented in commercial planning systems for Ir-192 applications [17, 18]. These algorithms are still under investigation. They provide small improvements in accuracy, however must be further discussed since they generically calculate dose to tissue, not dose to water on which therapeutic experience is based. The (small) difference between the numerical values of these two dose entities must be further evaluated in order to make any changes to prescription doses or acceptable doses at patient structures [17, 18]. Additionally, one must consider the costs for the respective upgrades of planning systems, and the substantial workload and expertise needed to commission the individual implementation [18].

The introduction of small Co-60 HDR sources employable in HDR after loaders largely increases source lifetime and can thus lessen treatment costs. Co-60 dose distributions for typical HDR applications are almost identical to the common Ir-192 distributions [19, 20], however Cobalt's higher photon energy requires stronger room shielding. A limiting factor may be the up to now exclusive production of Co-60 HDR sources in Russia which however could possibly be circumvented in future by development of production facilities in other countries possessing reactor technology.

Details of these advancements of recent years which have greatly improved efficacy and precision developments with a large body of references can be found in: Berger et al. (2023) Modern Tools for Modern Brachytherapy [21]. A recent novelty is electronic brachytherapy using miniature X-ray sources, in one case resembling an afterloader source (Xoft Axxent), but mostly larger X-ray devices (e.g. Intrabeam, Papillon, Wolf X-50, Esteya) which are also termed "brachytherapy" because they are applied in direct contact with the target tissues [22, 23]. All of these devices produce low energy X-rays around 50 kVp, so that their dosimetry is comparable to low energy seeds. A large advantage is the minimal need for personnel and room shielding, comparable to diagnostic X-rays. The applications of electronic brachytherapy are somewhat limited to a small number of treatment types by the technical design of the sources as they mostly do not fit into the typical brachytherapy applicators. First and largest treatment group of many devices was intra- and perioperative radiotherapy for breast cancer (either replacing EBRT or as boost, depending on stage) using spherical applicators fitting into the surgical cavity after breast conserving tumor removal. Large studies have proven comparable results to conventional breast conserving therapy including other forms of radiotherapy, however no clear superiority [24, 25]. The second large areas of application are skin and rectal cancers, and for a few of the devices other forms of intraoperative radiotherapy [22]. Development of further applications is difficult due to the technical design of sources and applicators. Major limitations of electronic brachytherapy are therefore the high costs of the devices for a very limited number of treatments and, so far, the lack of commercial treatment planning systems for low energy X-rays.

The future promises some interesting advancements in the development of directionally modulated brachytherapy (DMBT). This is achieved either by using shielded applicators [26] or with directionally shielded sources [26]. For both methods, to achieve the required shielding, low and median energy radioisotopes must be used. Due to their short half-lives, sources are costly and must be purchased at short notice of the time of application. This may lead to difficulties due to customs and safety regulations delaying quick delivery which would need to be circumvented, as described below. The dose calculation will require further development and use of MBDCAs. Their implementation in planning systems will most probably require costly upgrades of planning systems and laborious commissioning [18]. However, DMBT can probably provide better dose adaption in situations close to strongly endangered risk structures, and should therefore be considered as one of the future options.

The ongoing development of robotic brachytherapy application treatment is mainly focused on prostate treatment, where it is largely driven by time savings which can reduce the treatment costs, especially in high income countries. However, this technology will probably also lead to improved precision of seed deployment [10, 28] and can therefore also be an interesting option in specialized centers.

Special issues in introducing advanced technology arise in a region like South Asia with a small fraction of high-income population which can afford treatment in the few existing modernly equipped and sufficiently maintained, typically private, hospitals, and a much larger low-income population with very limited access only to a few, often underequipped, public hospitals. Here, a major task in introducing and providing modern brachytherapy will be finding ways to organize treatment of larger parts of society. A possible pathway could be sharing limited access time between the owning advanced treatment facilities and associated public hospitals. This, of course requires agreements between the operating administrations and medical professionals, and sufficient training of guest personnel.

An example is prostate seed treatment which is costly, and largely driven by the reimbursement situation in high income countries. However, its excellent efficacy gives reason to search for strategies to implement this modality also in lower income environments, e.g. by organizing patient reference to a small number of shared specialized centers. Issues to be solved are the high costs for seeds (which could possibly be circumvented by special contracts or by own seed production) and for the additional treatment instrumentation and specialized software. A further issue can be unacceptable delays in seed delivery due to import regulations when the seeds must be purchased from abroad and import of short-lived radioactive sources is impaired by difficult import procedures. Here, influence on politics is needed e.g. by radiotherapy professional societies to reduce customs and security regulations and procedures, and to secure fast access. On the other side this requires regulations and corresponding measures for safe transport, distribution and storage of radioactive materials, as well as regulation of the disposal of radioactive waste [29, 30].

Establishing advanced brachytherapy (or any other advanced technology) requires training of technical and medical personnel [31, 32]. Basic training must be provided by universities and higher education institutions. In fields like medical physics, collaboration is needed between general universities providing basic scientific and societal knowledge and specialized institutions training medical physics professional skills. Finally, continuing education of medical and medical physics personnel as provided by SCMPCR is needed to continuously adapt expertise to advancing technology.

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From Struggles to Progress and Ongoing Development: A Woman's Path in Becoming Nepal's First Female Medical Physicist

Pratiksha Shahi
B.P. Koirala Memorial Cancer Hospital, Chitwan, Nepal

Pratiksha Shahi, MS, MSc, is the first female medical physicist of Nepal. She is a Medical Physics graduate of the University of Trieste (UniTs) in Trieste, Italy, and is currently working at B.P. Koirala Memorial Cancer Hospital, one of the largest cancer hospitals in Nepal.

Nepal, a naturally blessed developing country in Southeast Asia, boasts diverse cultures, religions, and breathtaking scenery, making it one of the most captivating countries in the world. Growing up in Nepal, I developed a strong passion for physics and recognized the significant demand for skilled medical physicists in my country. Despite steady progress in the medical field, many challenges persist, particularly in radiation practices. Consequently, I aspire to pursue a fulfilling career in medical physics.

I recently graduated with a degree in medical physics from the University of Trieste (Units) in Trieste, Italy. However, my journey was far from easy. In Nepal, no universities offer specialization courses in medical physics. Thus, I had to secure admission at an international university with a full scholarship, as affording international costs was beyond my means. After multiple application attempts in various universities, I was accepted by the University of Eastern Finland. Unfortunately, I had to decline the offer due to the pandemic.

Determined, I applied to the Master of Advanced Studies in Medical Physics (MMP) program jointly offered by the University of Trieste and ICTP. Finally, in 2021, I was accepted. Amid the challenges posed by the COVID-19 pandemic, I embarked on this life-changing journey in January 2021. The program offered a comprehensive curriculum encompassing theoretical classes, practical sessions in Trieste hospitals, and clinical training across a network of hospitals in Italy. Despite the initial struggles of adapting to a new environment and online classes, the support from professors and ICTP staff enabled me to thrive. My time at ICTP provided invaluable training opportunities and equipped me with the knowledge and skills necessary to contribute to the field of medical physics. I am grateful to the University of Trieste, ICTP, and the International Atomic Energy Agency (IAEA) for their support throughout my studies.

After completing my studies in December 2022, I enthusiastically returned to Nepal, equipped with invaluable knowledge and skills from my intensive two-year course at ICTP. In February 2022, I embarked on a new chapter of my professional journey as a Clinical Medical Physicist at B.P. Koirala Memorial Cancer Hospital, one of the

Nepal

biggest cancer hospitals in Nepal. While many Nepali medical physicists practice both in Nepal and abroad. My return marked a significant milestone, as I became the first Nepali female medical physicist in the country, filling me with immense pride, overwhelming joy and anticipation, expecting warm wishes and celebrations.

However, the reality I encountered differed from my expectations. With the assistance of my senior colleagues, I swiftly mastered the requisite skills in radiotherapy, allowing me to independently handle all major tasks. My daily routine as a medical physicist at the hospital commences with morning QA of the linear accelerator (Linac) and progresses to routine work in the treatment planning system (TPS) and Brachytherapy Treatment. Recently, I marked the completion of my first year working as a medical physicist. The journey has not been easy, with both learning and struggles ongoing.

Although there is a notable presence of medical physicists, including women, in nearby South Asian countries, the situation in Nepal differs significantly. I observed that the number of Nepalese medical physicists within the country is insufficient, leading some medical physicists from the neighbouring country India, including women, to help fulfil the Radiotherapy needs of the Nepalese people.

Being the only female medical physicist in the country presented unique challenges, testing my resolve and determination. Like many Asian countries, Nepal also faces gender inequality and biases, particularly within traditional societal structures. While I was fortunate not to encounter such bias in my early years, I couldn't remain untouched by it once I entered the workforce. The multidisciplinary nature of the medical field brings disparities in career stages, authority, expertise, and mindset, with gender disparities being an additional challenge for women. Unfortunately, some individuals exhibit biases and a penchant for dominance, and I encountered instances of both.

It's important to note that men don't solely perpetuate discrimination against women; female colleagues also play a significant role. Some females find it challenging to accept a new female colleague working in a higher position within the department. Being the sole female within the group of medical physicists means always working closely with male colleagues and sharing experiences and learning together. However, other co-workers within the department and hospital may not always view these close relationships positively. They may misinterpret our interactions, leading to misunderstandings and rumours.

This pressure often forces me to distance myself from additional work or after-work opportunities in the department to avoid negative perceptions. These social, emotional, and physical consequences can be particularly harsh for women in such circumstances, impacting their well-being and professional opportunities. However, I remained resilient. My writing became more active, aiming to raise awareness of medical physics through articles in EFOMP's newsletter and Nepal's national daily. I am dedicated to inspiring the next generation and highlighting the crucial role of medical physicists, from diagnosis to radiotherapy, to the government. Collaborating with the South Asia Centre for Medical Physics and Cancer Research (SCMPCR) aligns with my goal of advancing medical physics in Nepal. Contributing to the SCMPCR newsletter allows me to share my experiences and raise awareness about the field. Furthermore, the online courses offered by SCMPCR will help me enhance my knowledge and skills, with the aspiration of eventually becoming a moderator and presenter in these courses

While acknowledging the real struggles I face, I see them as opportunities and responsibilities to drive positive change in the field of medical physics. Despite the high demand for medical physicists in Nepal, many young individuals are unaware of the promising opportunities it offers. As a female medical physicist, I embrace the chance to inspire, break barriers, and pave the way for aspiring female professionals. Without a female role model or source of inspiration, it took immense courage and the overcoming of fear to choose this career. After all I have been through, I want to be a true role model and supporter for women in physics who wish to pursue medical physics careers. Through perseverance, resilience, and continuous learning, I have overcome obstacles and carved a path for myself in a field where women are underrepresented. My journey has not been without its difficulties, but each challenge has made me stronger, both professionally and personally.

In conclusion, my journey as a medical physicist is driven by multifaceted aspirations. From advancing diagnostic radiology within medical physics to serving as a role model for aspiring female professionals, my goals are ambitious yet achievable. This collaboration with SCMPCR marks my first, but not my last, step towards these goals. Recognizing the need for continuous growth, I am dedicated to pursuing advanced education, participating in research initiatives, and playing a role in the advancement of medical physics in Nepal. As I embark on this journey, I eagerly seek out opportunities for learning and self-improvement, knowing that each step forward brings me closer to realizing my dreams and making a meaningful impact in the field.

Innovations in Nuclear Medicine

Savera Camran
SIMU Model School, Karachi, Pakistan

Introduction to Radiopharmaceuticals

Tc99m, I131, Ga67, Sm153, Tl201, Kr81m, Ra223, F18, Y90, Re186, and Er169 are examples of radiopharmaceuticals that are effectively employed in the pharmaceutical business for both diagnostic and therapeutic purposes. Radioisotopes are frequently utilized for the detection and treatment of disease. Medication and radionuclide make up pharmaceuticals. The choice of radiation is based on the radionuclide the illness; X-ray and β+ particle emitting radionuclides are employed for diagnosis. When considering treatment, consider isotopes that emit α- and β-particles.

Advancements in Nuclear Medicine

Numerous advancements have been achieved to improve nuclear medicine's applications and outcomes for both diagnosis and treatment. One use is Cerenkov luminescence (CL), a blue glow light created by charged subatomic particles moving faster than the phase velocity of light in a dielectric medium. It is employed for therapeutic purposes in addition to imaging. It functions in tandem with the optical imaging device. Due to its high resolution imaging time and low infrastructure cost, it is extensively utilized in cancer research for both diagnosis and treatment. One advantage is that the agent can be identified using two separate modalities: positron emission tomography (PET imaging) and optical imaging.

Theranostics and Cardiac Imaging

Another forward-thinking development in nuclear medicine that aims to increase treatment efficiency and diagnostic precision is theranostics. Nuclear medicine benefits from the integration of radiomics and AI since it provides quantitative imaging biomarkers and decision support tools. This method is groundbreaking for the imaging or therapy of medical conditions.
Nuclear Cardiac Imaging is a technology that can be used to diagnose people with a variety of heart illnesses. Patients with reduced left ventricular function and probable congestive heart failure are evaluated using the I-123 MIBG. It was less expensive and produced better images.

AI in Nuclear Medicine

The integration of AI methods in positron emission computed tomography and single photon emission computed tomography (SPECT) presents unique challenges and opportunities in health care. It revolutionizes diagnostic precision and therapeutic innovation. "No-shows" present one of the biggest scheduling issues for medical exams; in the case of nuclear medicine, this challenge is especially significant due to tracer availability, decay, and expense. A highly pertinent study from Massachusetts General Hospital showed that logistic regression and rather straightforward machine learning techniques might be used to predict no-shows in the medical imaging department (patient appointments with planned radiological exams were included in the study by the authors).

Machine learning is already being used more and more in modern scanning technology, and new research indicates that significant technical gains will likely occur soon (. Attenuation maps and scatter correction are still hot concerns in nuclear medicine for PET and SPECT imaging, thus it's not unexpected that numerous AI organizations are devoting a lot of their effort to these topics.

Radiomics and Digital PET/CT Scanners

Medical imaging professionals are often confronted with referrer questions that, according to current knowledge and the state of the art, cannot be answered reliably or at all with the possibilities of imaging. In health care, AI is often intuitively associated with great performance, so it is not surprising that there is such a high level of research activity in prediction of unknown outcomes.

Comparing newly reported difficult cases or rare disease cases with similar cases from databases and case collections is frequently beneficial. While searching textually (in archival reports, for instance) is simple, image-based searches are frequently unfeasible. Large-scale, direct picture-based and ad hoc database searches are becoming more feasible thanks to AI-based automatic image annotations and content-based image retrieval. This makes it possible to identify possibly similar cases that could be useful in a real diagnostic situation.

Radiomics is also a new advancement in nuclear medicine. For solving clinical problems, radiomic features can be employed alone or in conjunction with demographic, histologic, genomic, or proteomic data to capture tissue and lesion characteristics.

First, using serial imaging, radiomics can be used to record the form, heterogeneity, and other aspects of the lesion and tissue as well as how they change over time, for example, during therapy. Evaluating tissue heterogeneity is particularly important in oncology, as genetic investigations have shown that the variety of tumors both predicts survival and presents a challenge to cancer treatment.

Research has indicated a high correlation between heterogeneity indices at the cellular level and radiomic characteristics. Radiomics captures heterogeneity over the entire tumor volume, whereas biopsies typically only capture heterogeneity within a limited section of the tumor and at a specific anatomic site. Thus, it should come as no surprise that radiomic characteristics are linked to tumor aggressiveness as well.

The recent introduction of digital PET/CT scanners for routine clinical use represents a significant milestone for nuclear medicine and molecular imaging. Although PET/ CT scanners have always been truly "digital" insofar as their outputs were in the form of digital signals, the replacement of analogue photomultiplier tubes with solid-state detection systems resulted in the frst fully "digital" PET/CT and has surmounted many of the inherent physical limits placed by previous-generation analogue technologies. Shorter acquisition times have traditionally been associated with reduced lesion detectability or the requirement for larger amounts of radiotracer activity. The data confirms that this is not the case for new-generation digital PET scanners, where the known higher sensitivity results in clinically adequate images for shorter acquisitions. Only a small variation in the semi-quantitative parameters SUVmax, SUVmean and TBR was seen, confirming that either reduction of acquisition time or (by analogy) applied activity can be reduced as much as 75% in digital PET/ CT without apparent clinical detriment.

Summary

Advancements in nuclear medicine provide a bright future for the medical field by transforming research, treatment, and diagnosis. Thanks to developments in targeted radionuclide therapy, theranostics, and molecular imaging methods, physicians may now better tailor their care to each patient and enhance treatment results. These advancements open the door to early disease detection and monitoring in addition to improving the accuracy and effectiveness of therapies.

Nuclear medicine has enormous potential to change healthcare and usher in a time of more individualized, accurate, and efficient medical interventions as research into the field pushes new frontiers.

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The Role of CBCT in Transforming Orthodontic Care in Sri Lanka

Madhumali Nissanka

Department of Nuclear Science, Faculty of Science, University of Colombo

Cone Beam Computed Tomography (CBCT) technology has significantly transformed the landscape of dental and maxillofacial radiography by providing precise, three-dimensional imaging of the maxillofacial region at a lower cost compared to traditional computed tomography (CT) scans [1]. This advanced imaging modality offers numerous benefits, including the ability to visualize anatomical structures in all three dimensions, minimizing the superimposition of structures, and producing slices of varying thicknesses. CBCT is capable of generating multi-planar reformatted images, volume renderings, and maximum intensity projections, which collectively offer a comprehensive diagnostic view for clinicians [2, 3].

CBCT technology is widely appreciated for its ability to deliver high-resolution images that are crucial for diagnosing and planning treatments in various dental and maxillofacial conditions. The technology's superiority over conventional 2D radiographs lies in its detailed visualization capabilities, which are essential for procedures such as implant placement, assessment of jaw pathologies, and complex orthodontic evaluations. Despite these advantages, CBCT is not universally applicable to all dental procedures due to the inherent risks associated with radiation exposure. Multiple radiographic examinations can cumulatively increase the patient's radiation dose, escalating the risk of radiation-induced malignancies [4]. Given the high frequency of dental radiography procedures, this risk is particularly relevant [5, 6]. Consequently, numerous professional bodies, such as The Swiss Association of Dento maxilla facial Radiology, The American Dental Association (ADA), The American Academy of Oral and Maxillofacial Radiology (AAOMR), the European Academy of Dento Maxillo Facial Radiology (EADMFR), and the International Commission on Radiological Protection (ICRP), have issued recommendations and guidelines on the appropriate use of CBCT to balance diagnostic benefits against potential radiation risks [7–9].

In Sri Lanka, the adoption of CBCT technology in dental practice is in its early stages. The country's healthcare facilities, including dental clinics, are progressively incorporating CBCT units to enhance diagnostic capabilities. Currently, these units are primarily concentrated in the Western Province, which has the highest population density and the most developed healthcare infrastructure, with the remaining 50% of the units distributed among major teaching hospitals in other parts of the country. These CBCT units are utilized for various applications, including endodontics, maxillofacial pathology assessment, and implant planning, reflecting the advanced healthcare services and higher demand for specialized dental procedures in the region.

Government teaching hospitals across the country that have CBCT technology, as well as a few private clinics, offer enhanced diagnostic services in dental and maxillofacial radiography to their patients. These teaching hospitals also leverage CBCT technology to provide comprehensive training for dental students, ensuring they gain practical experience with advanced imaging techniques. This hands-on experience is crucial for the next generation of dental professionals, equipping them with the skills needed to utilize CBCT effectively in their future practices. The technology's ability to provide detailed, high-resolution images aids in accurate diagnosis and precise treatment planning. For example, in endodontics, CBCT helps in the detailed visualization of root canal anatomy. Volumetric imaging allows the dentist to accurately trace the morphology of the canals and roots and see anatomical details that are invisible or hardly noticeable on X-rays. Using tomography, clinicians are able to analyze not only the number but also the configuration of root canals, which is essential for successful treatment outcomes. In maxillofacial pathology, CBCT imaging allows for the accurate assessment of cysts, tumors, and other pathological conditions, facilitating early detection and intervention. Implant planning is another critical application of CBCT, enabling dentists to evaluate bone density and structure accurately, ensuring the optimal placement of dental implants. As the demand for dental implants grows, the role of CBCT in treatment planning becomes increasingly important [10–12].

Despite the promising advancements, the broader adoption of CBCT technology across Sri Lanka faces several challenges. The high cost of acquiring and maintaining CBCT units limits their availability, particularly in rural and less developed regions. Additionally, there is a need for standardized training programs to ensure that dental professionals across the country can effectively use CBCT technology. Tackling these challenges is essential to ensure the availability of advanced dental care services throughout Sri Lanka.

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developed regions. Additionally, there is a need for standardized training programs to ensure that dental professionals across the country can effectively use CBCT technology. Tackling these challenges is essential to ensure the availability of advanced dental care services throughout Sri Lanka.

The future of CBCT in Sri Lanka looks promising, with several opportunities for growth and improvement. Establishing national guidelines for CBCT usage and radiation dose management is essential to standardize practices and ensure patient safety. Increasing the availability of CBCT machines across the country will help expand access to advanced dental imaging for a broader population. Investing in the training and education of dental professionals is also crucial for the effective use of CBCT technology. Continued professional development programs can help practitioners stay updated with the latest advancements in CBCT and improve their diagnostic capabilities.

In conclusion, CBCT technology holds great potential for improving dental care in Sri Lanka. By addressing the current limitations and building on the existing framework for dose optimization, Sri Lanka can ensure that CBCT technology is used effectively to benefit both patients and healthcare providers.

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Breaking Down the Science: How Radiomic Features Can Improve Chronic Kidney Disease Diagnosis

Anuradha Goonaratna, Jeyasingam Jeyasugiththan, Duminda Satharasinghe

Department of Nuclear Science, Faculty of Science, University of Colombo, Sri Lanka

Chronic kidney disease (CKD) or chronic renal failure (CRF), as it was historically termed is a term that encompasses all degrees of decreased kidney function, from damaged at risk through mild, moderate, and severe chronic kidney failure. CKD is an increasing public health issue of worldwide scope. The prevalence of CKD continues to rise worldwide. Therefore, new strategies for diagnosis and treatment of CKD are much needed to reduce its morbidity and mortality.

End-stage kidney disease (ESKD) and cardiovascular disease are linked to a higher incidence of chronic kidney disease (CKD). The world's tenth greatest cause of death is kidney disease.

CKD is characterized by abnormalities in kidney structure or function for over three months with implications for health of an individual. Commonly accepted criteria for CKD include glomerular filtration rate (GFR) under 60 ml/min/1.73m^2 or kidney damage defined by structural or functional abnormalities other than decreased GFR, such as vascular obliteration, tubular atrophy, and kidney shrinkage. A large portion of CKD eventually progresses to end-stage renal failure, which requires dialysis or kidney transplantation. CKD has grown to be a significant public health concern, placing a heavy financial burden on those who have it. As a result, prompt treatment actions are essential for CKD diagnosis to prevent the disease from getting worse.

Renal fibrosis is a crucial biomarker for diagnosing renal diseases, predicting outcomes in transplants and native kidney diseases, and being easily detected and quantified in experimental models of chronic kidney disease (CKD). Accurate detection and staging are essential for diagnosing kidney disease, prognosing progression, and guiding therapeutic interventions.

Kidney biopsy is currently considered the gold standard for evaluating renal fibrosis, but it has inherent complications such as bleeding, pain, and potential acute renal failure. The sampled tissue may not be representative, leading to unreliable

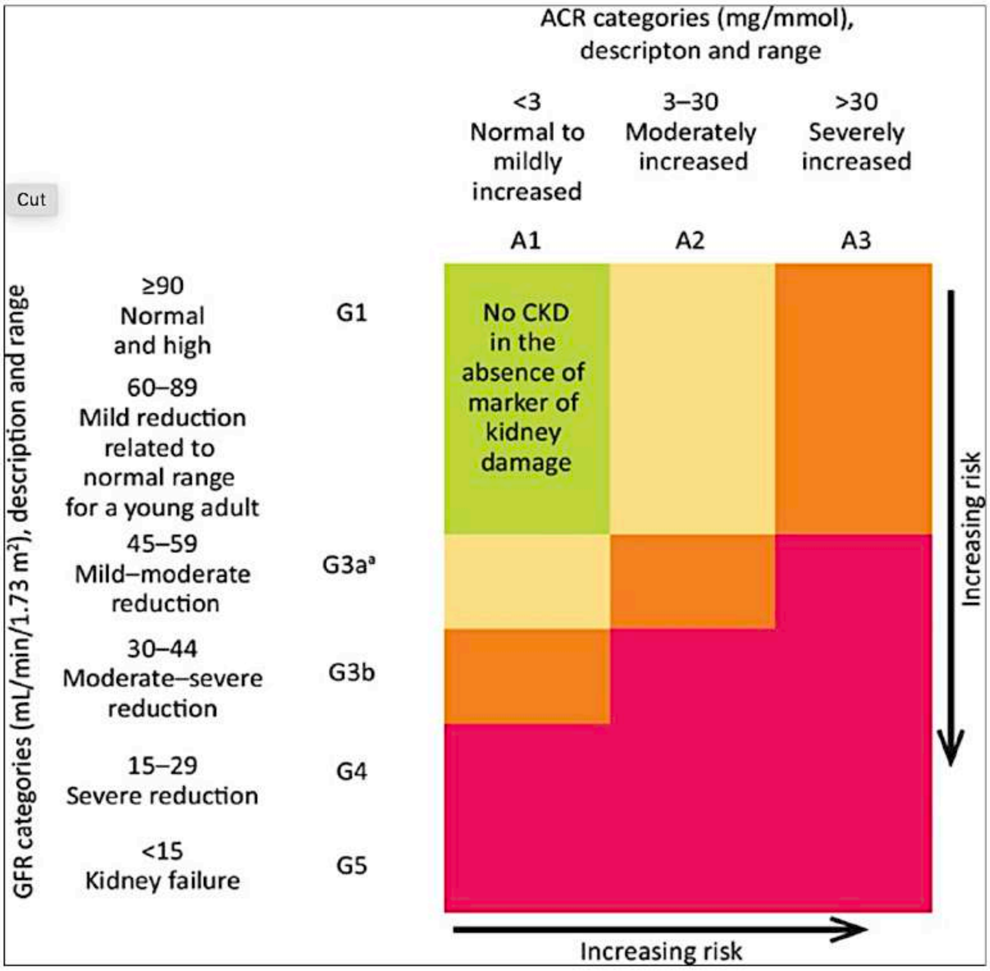

Figure 1: Classification of chronic kidney disease using glomerular

Sri Lanka

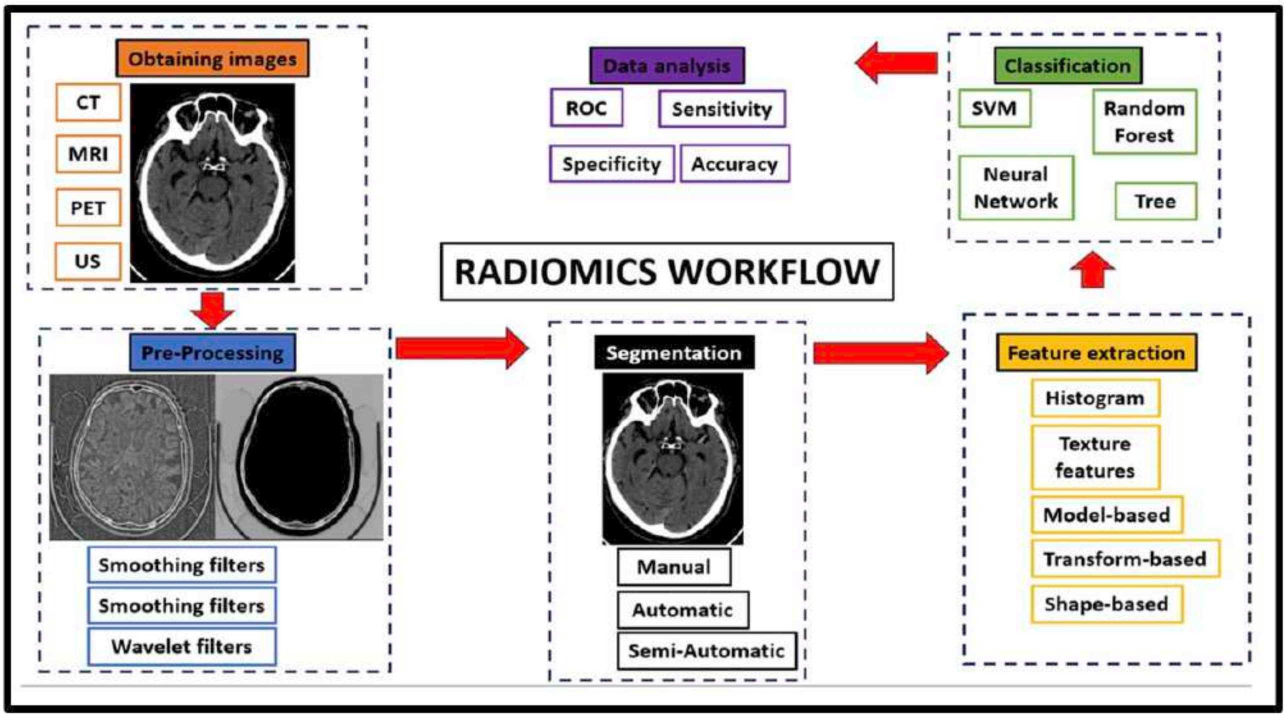

Figure 1: The Radiomics workflow

diagnoses. Histopathological assessment of renal fibrosis may also be unreliable. Other clinical markers used to identify and stage chronic kidney disease (CKD) include estimated glomerular filtration rate (eGFR) and proteinuria, but these are not specific to the underlying histopathologic abnormalities, which are important predictors of prognosis. Although high-grade proteinuria and low eGFR indicate a higher chance of unfavorable clinical outcomes, these biomarkers are not enough to predict which specific mild CKD patient would advance.

Recent advances in diagnostic imaging techniques, including magnetic resonance imaging (MRI) and ultrasound elastography (UE) and Computed Tomography (CT) have shown promise for noninvasive assessment of renal fibrosis. The use of radiomics, a method that extracts many features from medical images using data- characterization algorithms, may uncover patterns, texture, or characteristics that may serve as digital fingerprints of disease [1]. Such methods have shown promise in individuals with liver disease, kidney cancer, kidney transplants, for early kidney damage in diabetic patients [2], and kidney stone differentiation [3].

Radiomics is a process that extracts quantifiable features from medical images to aid diagnostic decisions. It uses artificial intelligence analysis methods to quantify textural information. Radiomics can be applied to medical images from various modalities, enabling an integrated cross- modality approach. This approach considers the additive value of imaging information extracted from various imaging techniques, such as MRI, CT, and PET. The next part contains helpful guidance on initiate radiomics by outlining key points and all necessary processes in the radiomics pipeline (as shown in Figure 2). This is the schematic illustration of the patient journey including image acquisition, analysis utilizing radiomics, and derived patient- specific therapy and prognosis. After image acquisition and segmentation, radiomic features are extracted. High-level statistical modeling involving machine learning is applied for disease classification, patient clustering, and individual risk stratification.

Image acquisition is the initial phase, which entails extracting various pixel/voxel characteristics from raw data volumes generated by radiological modalities, including CT, MRI, PET/CT, and even PET/MR, and storing these features in large databases. Image segmentation, which defines the volume of interest (VOI) in three-dimensional (3D) techniques or the region of interest (ROI) in two- dimensional (2D) approaches, is the next stage. This can be done totally automatically (nowadays utilizing deep learning algorithms) or semi- automatically (using traditional picture segmentation methods like region-growing or thresholding) or manually. There are many different software options available, both commercial and open source. A few often used open-source programme include 3D Slicer, MITK, ITK-SNAP, MeVisLab, LifEx, and ImageJ. The third phase is called "Feature Extraction and Selection." Feature extraction is the process of extracting features that are helpful for categorization or for correlating with states or results that are expected. After the features are retrieved, feature selection is carried out, with the goal of minimizing the number of variables that are fed into the classifier or used in regression analysis. Eventually, the model may be trained for the corresponding classification task using the remaining, highly relevant, and uncorrelated characteristics.

Let's have a look how radiomics work with MRI.....

First step is to perform kidney diffusion-weighted MRI on individuals with and without CKD, and it is necessary to maintain a proper inclusion and exclusion criteria when selecting the study population. Then acquire diffusion weighted images in five coronal planes during free breathing [4] and repeat acquisition 5 times and average, to improve signal-to-noise ratio and to minimize motion artefact.

Next part is MRI Analysis which involves the manual definition of regions of interest (ROI), quantitative parametric mapping, and radiomic feature extraction. Here diffusion-weighted images are directly loaded to FireVoxel (FV), and the images with different b values are co-registered by rigid transform to correct for respiratory motion. ROIs can be defined on 5 slices of the left and right kidney cortices separately and functional ROI maps can be generated with FireVoxel software of the left and right kidneys separately. It is good to maintain a constant bin value for a range of ADC values for all individual datasets. Then generate maximum number of radiomic features for left and righty kidney ADC maps and averaged for a single representative value for each participant. FV software includes several categories of radiomic features. Then separate radiomic features into first order (histogram features), such as central tendency parameters (mean, median, standard deviation, kurtosis, and skewness), gray level co- occurrence matrix (GLCM), and gray level run length matrix (GLRLM) texture features.

Finally compare the obtained radiomic features in healthy volunteers and individuals with CKD, where the exposure variable is CKD status (CKD vs. healthy volunteer). Here it is possible to investigate the association of the radiomic features with CKD status and CKD progressor status, while exposure variables are the radiomic features, and the outcomes are CKD status and rapid progressor status, respectively. To perform the descriptive statistics, it is necessary to collect participants demographics, diabetes mellitus status, body mass index (BMI), and eGFR, blood pressure, proteinuria, and additional eGFR measurements. Ultimately, the integration of radiomic features holds immense promise in revolutionizing the diagnosis and management of chronic kidney disease (CKD). By leveraging advanced computational techniques to analyze subtle patterns within CT images, MRI images, radiomics offers a non-invasive and highly informative approach to characterizing renal tissue and identifying early signs of fibrosis. This innovative methodology has the potential to enhance diagnostic accuracy, enable personalized treatment strategies, and ultimately improve patient outcomes in the fight against CKD. As research in this field continues to evolve, the incorporation of radiomic features into clinical practice may pave the way for more effective screening, early intervention, and tailored therapies, heralding a new era of precision medicine in nephrology.

"Let's build wellness rather than treat disease, so protect your kidneys today for a healthier tomorrow."

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Artificial Intelligence (AI) Based Auto Contouring for Prostate Cancer: A Literature Review

Bushra Intakhab[1], M Saif Sartaz[2] Mansoor Rafi[3], Muhammad Abbas[3]

[1]Department of Physics, Florida Atlantic University, Boca Raton, FL 33431-0991, USA
[2]Department of Computer Science, Florida Atlantic University, Boca Raton, FL 33431-0991, USA
[3]Department of Radiation Oncology; Sindh Institute of Urology and Transplantation, Karachi, 74200, Pakistan

Introduction

In radiation therapy, accurately identifying the tumor and nearby organs is very important. Traditionally, this task is done manually by doctors, which can be time-consuming and may vary between different clinicians. Auto-contouring is a technology in radiation therapy that uses artificial intelligence (AI) to draw precise outlines of tumors and important organs on medical images. This is crucial for creating effective treatment plans, as it helps target cancer while protecting healthy tissue. Auto-contouring helps by providing quick and consistent outlines, making the process more efficient and accurate. Using auto-contouring in prostate cancer treatment helps doctors and medical physicists work faster and more reliably. The aim of this article is to briefly describe AI technologies in auto contouring and refer to some literature that utilizes AI for contouring of prostate cancer patients.

AI Technologies in Auto-contouring

Machine Learning Models

In auto-contouring, various machine learning models are used to accurately identify and outline tumors and organs on medical images. Deep learning models, such as Convolutional Neural Networks (CNNs) and U-Nets, are particularly effective in this field.

- CNNs: These networks are designed to process image data and can identify patterns and features within the images. They are highly effective for tasks like identifying the boundaries of tumors.
- U-Nets: This type of model is specifically designed for biomedical image segmentation. U-Nets can produce detailed and precise outlines, making them ideal for auto-contouring tasks.

Algorithm Performance

The effectiveness of AI systems in auto-contouring is measured using several performance metrics:

- Accuracy: This metric indicates how correctly the model identifies the contours of the tumor and organs. High accuracy means the model's contours closely match the actual boundaries.
- Precision: This refers to how many of the identified contour points are relevant. High precision means the model avoids marking irrelevant areas.
- General Performance: Overall performance includes factors like speed and consistency. Effective models produce consistent results quickly, making the treatment planning process more efficient.

These AI technologies help create more reliable and precise treatment plans, ultimately improving outcomes for patients undergoing radiation therapy.

Current Implementations and Result

Timo Kiljunen et.al. evaluated a commercial deep learning-based tool for segmenting CT scans in prostate cancer treatment planning. It compared the accuracy and efficiency of automated segmentation to manual methods, focusing on time savings and consistency improvements. 30 prostate cancer patients from six clinics were included in this study. Manual contouring (MC), automated contouring (AC), and automated contouring with expert editing (AEC) were compared. Regions of interest were prostate, seminal vesicles, bladder, rectum, femoral heads, penile bulb, and lymph nodes (in one clinic). Results showed that the automated tool reduced contouring time by 46%, saving about 12 minutes per patient. For lymph nodes, time savings were 60%, cutting time from 20 to 8 minutes. Mean DSCs for AC compared to MC were prostate (0.82), seminal vesicles (0.72), bladder (0.93), rectum (0.84), femoral heads (0.69), and penile bulb (0.51). After expert editing (AEC), DSCs improved significantly, averaging 0.94 for all regions and 0.91 for lymph nodes. Consistency among clinicians improved with AEC, with DSCs increasing from 0.76 (MC) to 0.91 (AEC) for lymph nodes and from 0.78 (MC) to 0.94 (AEC) for all other regions.

Gabriele Palazzo et.al. validate a commercial AI-based auto-contouring system for prostate cancer radiotherapy by comparing its performance against manual contouring. It also assessed the impact of manual editing on auto-contours and evaluated improvements in interobserver variability and time savings. Two experienced radiation oncologists manually contoured CTVs and OARs on CT images of 20 prostate cancer patients. These contours were compared with those generated by an AI-based system (MIM Protege). Automatic contours were generated and edited as

USA

needed by the same oncologists. Performance metrics included Dice Similarity Coefficients (DSCs) and Hausdorff Distances (HDs) to measure geometric similarity between manual and automatic contours, both pre- and post-editing. Clinical quality was assessed using a scoring system from 1 (major recontouring needed) to 5 (no editing needed). Time spent on contouring (manual vs. automatic + editing) was recorded. The result showed the DSCs between manual and automatic contours ranged from 0.65 (seminal vehicles) to 0.94 (bladder). Editing improved DSCs for all structures, with significant gains for seminal vehicles (0.76) and prostate (0.86). Median clinical quality score was 4, indicating little editing required for most patients. Only a few cases required significant editing. Manual contouring showed variability with DSCs ranging from 0.73 (seminal vesicles) to 0.93 (bladder). Automatic contouring followed by editing significantly improved interobserver consistency, particularly for femoral heads, rectum, and seminal vesicles. Manual contouring took 17-24 minutes, whereas editing auto-contours took 3-7 minutes, representing a significant reduction in time ($p < 0.01$).

Jeffrey Zabe et. al. conducted a study aimed to evaluate and compare the efficiency and accuracy of deep learning and atlas-based auto-contouring methods against manual contouring for the bladder and rectum in prostate cancer radiation therapy. Three workflows were defined for this study.

Manual Contouring (MAN): Radiation therapists manually contoured the bladder and rectum.

Atlas-Based Auto-Contouring (ATLAS): Used the Smart Segmentation Knowledge-Based Contouring (SSKC) software, which relies on a library of previously contoured images (atlases).

Deep-Learning Auto-Contouring (DEEP): Utilized a deep learning model (Limbus Contour software) trained on a large dataset of contoured images.

For each workflow, initial contours were generated for 15 prostate cancer patients. Radiation oncologists (ROs) then reviewed and edited these contours while being blinded to the initial contouring method. The workflows were compared based on the time taken for initial contour generation, the extent of RO editing, geometric similarity of contours, and dosimetric evaluation. Study shows initial contour generation times were 10.9 minutes for MAN, 1.4 minutes for DEEP, and 1.2 minutes for ATLAS. RO editing times were 4.1 minutes for MAN, 4.7 minutes for DEEP, and 10.2 minutes for ATLAS. However, DEEP contours showed better geometric similarity to MAN contours compared to ATLAS, with higher Dice similarity coefficients (DSC) and lower mean surface separation (MSS) values. ROs made fewer edits to DEEP contours compared to ATLAS, indicating higher initial accuracy of DEEP contours. MAN contours required the least editing, followed by DEEP and then ATLAS. No significant differences in clinically relevant dose-volume metrics were observed between MAN, DEEP, and ATLAS workflows.

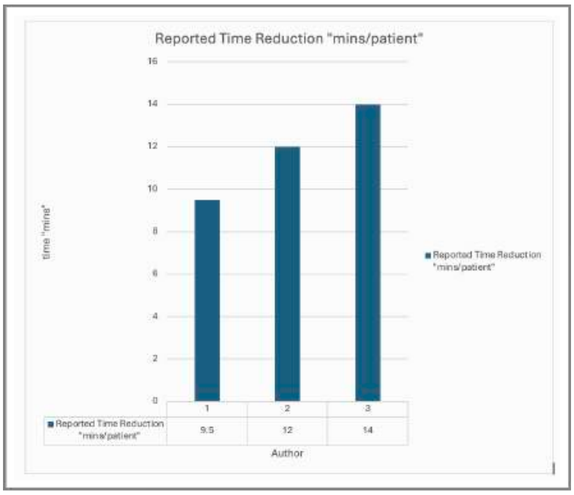

Figure 1: Reported Time Reduction "mins/patient" by authors. (1), (2) and (3) shows time reduction from the study conducted by W. Jeffrey Zabe et. Al, Timo Kiljunen et.al and Gabriele Palazzo et.al respectively.

Marcel Nachbar et.al. train and validate a fast, accurate deep learning model for automatic MRI segmentation on the MR-Linac system for future implementation in clinical MRgRT workflows. T2-weighted MRI data from 47 patients were acquired on a 1.5 T MR-Linac (Unity, Elekta) over five different days, resulting in 232 data sets for training the deep learning model. The model was validated on 20 unseen T2-weighted MRIs, comparing automatic contours (AIC) against gold standard contours (GSC) provided by a radiation oncologist using metrics such as dice similarity coefficients (DSC), 95% Hausdorff distances (95% HD), added path length (APL), and surface DSC (sDSC).Results Shows the model achieved high accuracy with a median DSC of 0.97 for the bladder and 0.73 for the penile bulb. The 95% HD ranged from 2.7 mm for the bladder to 6.9 mm for the rectum. Qualitative evaluation by five radiation oncologists showed that 80% of the contours were clinically acceptable without modifications, 16% required minor adjustments, and 4% needed major adjustments. The overall mean score for AICs across all organs and patients was 1.2, with the prostate having the lowest mean score of 2.0, indicating a need for improvements in this area. Figure 1 shows Reported Time Reduction "mins/patient" by authors. (1), (2) and (3) show time reduction from the study conducted by W. Jeffrey Zabe et. Al, Timo Kiljunen et.al and Gabriele Palazzo et.al respectively.

Discussion

Auto-contouring technologies using artificial intelligence have markedly advanced the field of radiation therapy, particularly in prostate cancer treatment. These technologies not only enhance the precision of treatment but also streamline the workflow of medical professionals. This synthesis of recent studies underscores the transformative impact of machine learning models, such as Convolutional Neural Networks (CNNs) and U-Nets, in this domain. The integration of AI in auto-contouring primarily addresses the challenges posed by the traditional manual contouring method, which is often time-consuming and subject to variability between clinicians. As evidenced by the studies of Kiljunen et al., and Zabe et al., automated tools considerably reduce contouring time while improving consistency across clinicians. For instance, Kiljunen et al. observed a 46% reduction in contouring time with automated tools, which significantly expedites the treatment planning process. Such advancements are crucial in clinical settings where time efficiency correlates directly with increased patient throughput and improved care.

However, the adoption of AI technologies in clinical practices is not without challenges. The precision of auto-contouring varies significantly across different anatomical structures. For example, Kiljunen et al. reported lower Dice Similarity Coefficients (DSCs) for complex structures like the seminal vesicles and penile bulb. This variability highlights a critical area for ongoing refinement in AI models to achieve uniformly high accuracy across all relevant anatomical features.

Further, the studies by Palazzo et al. and Nachbar et al. bring attention to the critical role of clinician oversight. Despite AI's ability to streamline the contouring process, the necessity for manual edits remains, particularly in cases where the AI system's contours do not adequately capture the clinical reality. Palazzo et al. found that manual adjustments were necessary in instances where the automatic contours had lower DSC values, particularly for the seminal vesicles and prostate. This iterative process of auto-contouring followed by expert editing ensures that the treatment plans are both accurate and clinically viable.

The comparative analysis of different AI methodologies by Zabe et al. offers insight into the effectiveness of deep learning versus atlas-based approaches. The study indicates that deep-learning methods, represented by the Limbus Contour software, generally provide more accurate initial contours than atlas-based methods, suggesting that the former may be more suitable for clinical applications requiring high precision.

Moreover, the ongoing development and validation of AI systems, as seen in Nachbar et al.'s study on MR-Linac systems, indicates the potential for these technologies to be adapted for emerging radiation therapy modalities. The high accuracy and clinical acceptability of the automatic contours in MRgRT workflows exemplify AI's potential to enhance complex and specialized treatment techniques.

In conclusion, while AI-driven auto-contouring technologies have significantly advanced prostate cancer radiation therapy, their full integration into clinical practice requires continuous improvement and adaptation. Future research should focus on enhancing the accuracy of contouring for complex anatomical structures, refining deep learning models based on real-world clinical feedback, and exploring the integration of AI in newer radiation therapy technologies. Such advancements will not only improve clinical outcomes but also ensure that AI tools align seamlessly with the workflow and practical realities of cancer treatment.

Conclusion

The advent of auto-contouring technologies using artificial intelligence marks a pivotal shift in the field of radiation therapy, particularly in the treatment of prostate cancer. These technologies, primarily driven by machine learning models such as Convolutional Neural Networks (CNNs) and U-Nets, have demonstrated significant potential to enhance the accuracy, consistency, and efficiency of radiation treatment planning. Studies such as those by Kiljunen et al., Palazzo et al., Zabe et al., and Nachbar et al. illustrate the transformative benefits of AI in reducing contouring time and improving geometric accuracy, while also highlighting the importance of human oversight in achieving optimal clinical outcomes.

Despite the progress, the implementation of AI in clinical settings underscores an essential balance between automation and expert intervention. The necessity for manual edits, even with advanced AI systems, points to the current limitations of these technologies and the critical need for ongoing refinement. The variable accuracy across different anatomical structures suggests that further enhancements in AI algorithms are required to achieve uniformly high precision across all regions of interest.

As we move forward, the integration of AI into clinical practice must focus on continuous improvement driven by feedback from real-world applications. The potential for AI to adapt to new and emerging radiation therapy technologies also presents an exciting frontier for further research and development.

In conclusion, while AI-driven auto-contouring represents a significant advancement in radiation therapy, its full potential can only be realized through a combine effort to refine the technology, enhance its adaptability to complex clinical scenarios, and maintain a collaborative synergy between AI applications and medical expertise. This will ensure that the benefits of AI are fully harnessed to improve patient outcomes in prostate cancer treatment and beyond.

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Dr Raju Prasad Srivastava completed the Diploma in Radiological Physics from Bhabha Atomic Research Centre (BARC) Mumbai India in the year 2000 and PhD in Medical Physics from Ghent University Belgium in 2012 and working at the Department of Radiotherapy, Ghent University Hospital, Belgium. He is recognized as a Radiological Safety Officer (RSO) in India and an Expert in Medical Radiation Physics by the Federal Agency for Nuclear Control, Belgium. Dr Srivastava's contributions to SCMPCR activities especially the teaching and training programs are popularly respected and fondly acknowledged. He actively participated in numerous training programs conducted and also supported many medical physicists from Nepal, Bangladesh and India to Belgium for training sessions. He played a crucial role in facilitating collaborations between various institutes, aiming to benefit physicists. His personal and dedicated efforts significantly contributed to the advancement of medical physics in the region.

Empowering Medical Physicists in South Asia through Dedicated Partnerships and Innovative Training

Interview with Experts

Belgium

The South Asia Centre for Medical Physics and Cancer Research (SCMPCR) is dedicated to advancing the field of medical physics and cancer research across South Asia, ultimately aiming to improve patient care and global health. Through a comprehensive array of teaching and training initiatives, SCMPCR addresses the challenges faced by medical physicists in the region, transitioning from its early stages to a period of significant growth through strategic collaboration and cooperation. Visionary leaders in medical physics from the region laid the groundwork even before SCMPCR's inception to tackle the diverse needs of the area. SCMPCR has built on these foundations, accelerating progress with innovative and effective training programs. The SCMPCR newsletter serves to highlight the achievements of medical physicists and promote ongoing medical physics activities, fostering sustainable partnerships and cooperative efforts throughout South Asia.

For this issue of newsletter, we are privileged to have Dr Raju Srivastava to share his experiences and insights. Here is a snippet of the chat with Dr Srivastava by Dr. Mary Joan regarding his contributions and involvement in establishing SCMPCR activities.

Dr Raju Prasad Srivastava completed the Diploma in Radiological Physics from Bhabha Atomic Research Centre (BARC) Mumbai India in the year 2000 and PhD in Medical Physics from Ghent University Belgium in 2012 and working at the Department of Radiotherapy, Ghent University Hospital, Belgium. He is recognized as a Radiological Safety Officer (RSO) in India and an Expert in Medical Radiation Physics by the Federal Agency for Nuclear Control, Belgium. Dr Srivastava's contributions to SCMPCR activities especially the teaching and training programs are popularly respected and fondly acknowledged. He actively participated in numerous training programs conducted and also supported many medical physicists from Nepal, Bangladesh and India to Belgium for training sessions. He played a crucial role in facilitating collaborations between various institutes, aiming to benefit physicists. His personal and dedicated efforts significantly contributed to the advancement of medical physics in the region.

MJ: Glad to have this opportunity to hear you. Would you please share your early experiences and what prompted you to venture into medical physics as a career?

RS: When I started my career in medical physics, there was only one radiotherapy centre in Nepal and medical physics was unknown to medical domain. I learned about medical physics when I had to choose the subject of my M.Sc. thesis. For the practical experiments I was guided by Prof A. Agrawal in BHU, India. Seeing the problematic situation of the patients and the hard work medical physicist had to do even without computer, it has touched me. I got inspired to become a medical physicist. Prof S.P Mishra from Allahabad suggested me to study Dip. R. P. and I am glad I followed his advice. At the time, there was no medical physics study in Nepal and till today there is still not any medical physics institute in Nepal.

After my medical physics education from BARC, India, I became eager to learn more in this domain. The Western countries had already started the new techniques 3DCRT, IMAT and IMAT. I was willing to learn these new techniques and about development and research. In 2006, I received a scholarship for a Ph.D. programme from Ghent University Hospital, Belgium to develop Intensity Modulated Arc Therapy (IMAT), now promoted under the commercial name Volumetric Modulated Arc Therapy (VMAT). Travelling all these paths made me who I am now, a qualified medical physicist in heart of Europe, Belgium.

MJ: what are the professional differences in being a medical physicist in Belgium compared to South Asia? Please elaborate on the important aspects?

RS: Belgian medical physicists typically work in well-resourced environments with access to the latest technology and equipment. This allows for advanced diagnostic and therapeutic procedures, ensuring high standards of patient care. South Asia is often a significant constraint. Many regions struggle with outdated equipment and limited access to new technologies. This disparity can affect the quality of care and the ability to implement advanced medical physics practices.

Belgium is at the forefront of adopting new technologies in medical physics. The country's hospitals and research institutions often participate in cutting-edge research and development, ensuring that medical physicists are well-versed in the latest advancements. Technological advancement in South Asia is irregular. Only a few centres in South Asia are as good as and perform to the standard of western countries.

Belgium offers a more structured, well-resourced environment with robust professional recognition. Medical physicists are more dedicated to quality of treatment in Belgium. Each patient has been treated by IGRT and followed by SGRT in Belgium. The quality of image verification is much higher compared to South

Asia. Each patient needs 18 to 24 minutes of treatment schedule. Each machine has 25-30 patients per day treatment while in South Asia this number is much higher.

Each medical physicist has budget to go to conferences, seminars, workshops or courses each year. They will select themselves which congress to participate in. In Belgium, Medical physicists need to renew their licence every six years. They must achieve minimum 50 points every year from different activities. For renewal of their licence, they have to submit their activities to the Federal Agency for Nuclear Control, Belgium.

MJ: You have personally nurtured many collaborations for SCMPCR. Please enlighten us on the early status and challenges.

RS: The major challenges are finance, faculty members, practical materials, and library to SCMPCR. One of the main challenges is the uneven distribution of resources and training facilities across the region. South Asian countries are still developing their capabilities.

MJ: How do you look at the present professional scenario for medical physicists in South Asia?

RS: The number of educational programs in medical physics is increasing, but there remains significant variability in the quality and structure of these programs across the region. In my opinion there is some gap between medical physicists and management. Medical physicists rarely work at one center for a long time. This happens because the management does not acknowledge their

hard work, the physicists are not encouraged to participate in conferences, workshops, or to do research. On the other hand, the medical physicists are not enough motivated and often quit their center, running behind a higher salary.

Conferences and workshops play a crucial role in professional development by providing platforms for knowledge exchange and the latest advancements in the field.

MJ: Kindly share your most memorable experiences in your collaborations?

RS: Providing detailed explanations and tutoring in various topics, SBRT, SRS/SRT, SGRT, has been fulfilling. Assisting students and young medical physicists in understanding complex concepts and seeing their progression is a highlight.

MJ: What are the future prospects medical physicists in South Asia needs to be prepared for?

RS: Medical physicists in South Asia need to prepare for several future prospects to stay relevant and advance in their careers. These prospects encompass technological advancements, enhanced educational frameworks, interdisciplinary collaboration, and increasing emphasis on patient-centered care. Medical physicists need to acquire skills in data analysis and machine learning algorithms to effectively integrate these technologies into clinical practice.

Techniques such as functional MRI, PET-CT, and hybrid imaging are becoming more widespread. Being updated with these technologies and understanding their clinical applications will be important. Implementing robust quality assurance (QA) programs is necessary for maintaining high standards in diagnostic and therapeutic procedures. Medical physicists should be expert in QA protocols and regularly update their knowledge to comply with international standards.

Medical physicists need to be oriented to clinic job as well as research in South Asia. By doing research and publishing their work, they bring a valuable contribution to the medical field community. Engaging in research projects and clinical trials will be important for advancing the field and implementing evidence-based practices. There is a high demand of medical physicists not only in radiotherapy but also in radiology and nuclear medicine.

MJ: What would be your advice to young medical physicists of South Asia for career development?

RS: The professional scenario for medical physicists in South Asia is currently evolving with both challenges and opportunities. The field is gaining more recognition and importance due to the growing healthcare needs and advancements in medical technology. I would suggest to young medical physicist of South Asia focusing their career development on research. Young physicists have great talent. Now the research involves more and more artificial intelligence. The physicists do not need a large laboratory. They can collaborate to any hospital or university all over the world from their working place.

MJ: What are your visions for SCMPCR and where do we need to focus more?

RS: I would like to generate funds for SCMPCR so that we can have easier access to the medical physics community in South Asia. The education and training across the South Asia region needs to develop and standardized. Young medical physicists should get better support. The SCMPCR should collaborate with universities or hospitals in each South Asian country. It should provide high level training to medical physicists and students, among others by offering sandwich programs between western and South Asian institutions.

MJ: Thank you very much sir for sharing your personal and professional journey to be an established medical physicist in a reputed institute narrating the roadmap for excelling in one's profession through persistence and perseverance. It is really motivating for the young medical physicists to not loose hope at the face of challenges and struggles. As you pointed out the technological advances will take us forward improve the medical physics professional status in the healthcare domain and with the help of collaboration, support and solidarity we can be prepared to achieving excellence and SCMPCR is a perfect platform for medical physicists and radiation and oncology professionals. Thank you very much for your wholehearted efforts to upgrade the SCMPCR activities in every aspect. Together we will strive for consistent progress and an excellent future.

Dr Mary Joan is Associate Professor and Radiological Safety Officer at Christian Medical College and Hospital Ludhiana, India. She is Chair, Professional Relations Committee AFOMP, Member- Science Committee IOMP and Executive Committee AMPI-NC and Co Editor-in-Chief of SCMPCR Newsletter.


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IMPORTANT DATES
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Online Abstract submission
30th September
Deadline of Abstract submission
10th November
Notification of Acceptance
1st July
Online Registration System Opens
30th November
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Participant on 11th Annual Conference of Bangladesh Medical Physics Society (ACBMPS -2023) KIB, Dhaka, Bangladesh

Mohona, Umaya, Urmi, and Md. Mokhlesur Rahman

Dept. of Medical physics and Biomedical Engineering, Gono Bishwabidyalay (University), Savar

The Bangladesh Medical Physics Society (BMPS) organized the 11th Annual Conference on Medical Physics on January 26, 2024, at the Krishibid Institution of Bangladesh. The conference gathered leading experts, researchers, and practitioners in the field of medical physics to discuss the latest advancements, share innovative research, and foster collaboration. The program included Scientific Session-1, Vendor Presentation, Scientific Session-2, a parallel Poster Session, a Session/ Award Ceremony, and the AGM of BMPS. The aim of the program was to advance medical physics in the South Asian region, facilitate experience sharing among scientists, and support the medical community through collaborative efforts.

Over 100 students from Gono University participated in the conference, showing great enthusiasm for enhancing their knowledge of Medical Physics. The event commenced with registration and kit collection, followed by an inspiring inaugural ceremony. After a brief tea break, attendees proceeded to the first scientific session. After COVID-19, this was the first conference for us as medical physics students. We are happy to be part of the 11th Annual Conference on Medical Physics in Bangladesh.

In Scientific Session-1, Biplab Sarkar (India) presented the significant impact of artificial intelligence on radiotherapy practices in his presentation on "Advances of AI in Radiotherapy." Abdus Sattar Khalid (UK) presented "Quantification of Intra-fraction Organ Motion in MRI-Guided Brachytherapy for Cervical Cancer," and Syeda Fariha Hasan (GB) presented "Retrospective Study of CRV-PTV Margin: An Institutional Experience."

Vendor presentations included Kartik KP from Varian discussing advancements in treatment planning solutions, and Sajan Hossain from Trade House focusing on cancer centers.

In Scientific Session-2, Md. Akhtaruzzaman (EHC) presented "Dosimetric Impact of Grid Size and Statistical Uncertainty on Monte Carlo Algorithm in VMAT Planning." Md. Abdullah Al Mashud (IU) delivered "Unlocking the Therapeutic Potential of Mangifera Indica Leaf Extract Compounds." Md. Saiful Islam (CMH) presented "A Comparative Dosimetric Study of EGS Based Monte Carlo Simulation." Adiba Hasan Prova (GB) discussed "Prevalence of Breast Cancer Incidence in Bangladesh," and Shahadat Hossen Shuvo (GB) spoke on "Aspects of Medical Physics in Bangladesh: A Growing Field with a Bright Future."

During the AFOMP Session on medical physics education, training, and profession, Prof. Dr. Golam Abu Zakaria presented "Training and Career Opportunities for Medical Physics Graduates: Global Perspectives," and Prof. Dr. Hasin Anupama Azhari spoke on the "Importance of a Unified Medical Physics Syllabus in AFOMP."

The closing ceremony featured the BMPS president, former president, vice president, secretary, and treasurer sharing their experiences about organizing the annual program to inspire the younger generation. Both local and international participants provided feedback on the conference's outcomes.

After the conference concluded, an election was held for the new AGM of BMPS. Prof. Dr. Golam Abu Zakaria, serving as the election commissioner, conducted the AGM program and announced the new EC committee of BMPS for 2023-2025. The newly elected president, Dr. Md. Aktaruzzaman, delivered a speech about the new EC committee.

Bangladesh

Participating in the International Cancer & Palliative Care Conference 2024, Kumudini

Md. Mokhlesur Rahman[1], Md. Anwarul Islam[2], Md. Hafizur Rahman[3]

[1]Gono Bishwabidyalay(University), Savar, Dhaka, Bangladesh.
[2]Square Hospital Ltd. Dhaka, Bangladesh
[3]Gazi cancer Center, Dhaka, Bangladesh

The International Cancer & Palliative Care Conference 2024, organized by the Kumudini Welfare Trust of Bengal (BD) Ltd., is set to be a landmark event in global healthcare. This conference not only marks Kumudini's remarkable ninety-year journey of philanthropic efforts but also underscores the importance of international collaboration in the fight against cancer and the progress of palliative care. With the participation of esteemed institutions such as Harvard University (Foreign Speakers: Assist. Prof. Elizabeth Buchbinder, MD and Assist. Prof. Andrew R Branagan), Simmons University (Heather A. Shlosser, Dean), and Massachusetts General Hospital (Dr. Jeannine Ritchie, Dr.Seth wander, MD, PhD, Dr. Alphonse Taghian, Radiation Oncology, Dr. Shams Iqbal, Interventional Radiology, Anooja Rai, MSc, Molecular Diagnostic, Dr. Arul Mahadevan, MD, Medical Director, Radiation Oncology, MGH, Boston) USA and A Glimpse of Foreign Delegates: Dr. Leslie Lehman, MD, Director, Clinical Transplantation, Edward Robinson Adam, CEO, Security Innovation, et. al.), the conference promises to bring together leading experts, researchers, Medical Physicists (BD) and practitioners from around the world. These collaborations highlight the event's commitment to fostering cutting-edge research, sharing best practices, and exploring innovative approaches to cancer treatment and palliative care. Attendees can expect a diverse program featuring keynote speeches, panel discussions, and workshops that address the latest advancements in oncology and palliative care, with a particular focus on integrative and patient-centered approaches. The conference has provided an invaluable platform for networking, knowledge exchange, and the development of new strategies to tackle the challenges posed by cancer. As Kumudini Welfare Trust celebrates its nine decades of service, this conference stands as a testament to its enduring dedication to healthcare excellence and its vision of improving the quality of life for patients through compassionate care and medical innovation.

Kumudini Hospital: Pioneer of Radiotherapy in Bangladesh

Kumudini Hospital has carved a notable place in the history of medical advancements in Bangladesh, particularly in the field of Radiotherapy. Established in 1938 by the esteemed philanthropist and industrialist Rai Bahadur Ranada Prasad Shaha, the hospital has provided healthcare services to the rural poor. A significant milestone in its illustrious history is the introduction of radiotherapy for cancer treatment. In 1950, Kumudini Hospital became the first institution in East Pakistan (now Bangladesh) to offer radiotherapy treatment for cancer survivors. This pioneering effort marked a significant advancement in the medical landscape of the region, providing much-needed hope and treatment options for cancer patients at a time when such services were virtually nonexistent in the area. The introduction of radiotherapy at Kumudini Hospital was a groundbreaking step, positioning the

Medical Physicists and Faculties (Gono University) in front of first Deep X-ray Machine in Bangladesh.

hospital as a leader in cancer care and treatment in the region.

Historical Anecdote in Radiotherapy Development at Kumudini

In 1992, Prof. Dr. Golam Abu Zakaria (University of Cologne, Germany) visited Kumudini with Prof. Gias Uddin Ahmad, where they were shown a radiotherapy machine by Ms. Jeya Pati, the daughter of R.P. Saha. She requested assistance in reviving the radiotherapy services at Kumudini. In response, Prof. Zakaria facilitated the delivery of a new brachytherapy machine to BUET for Kumudini. This machine had been purchased by a hospital in Regensburg, Germany, but had not been used for radiotherapy for unknown reasons. The director of the German hospital requested a photo of the first patient treated with the machine. Unfortunately, he was unable to send the requested photo, for reasons known to many, including Dr. Fatima Nasreen, who was involved in this effort. Consequently, Prof. Zakaria shifted his focus to establishing the field of medical physics in Bangladesh to produce manpower for quality cancer treatment instead of merely providing equipment.

Kumudini International Institute of Medical Sciences & Cancer Research (KIIMS CaRe)

Kumudini has started construction of Kumudini International Institute of Medical Sciences Cancer Research (KIIMS CaRe). Among others KIIMS CaRe will have a 300-bed general hospital, a 50-bed cancer hospital, cancer research center, nursing institute and medical technology institute including a women's medical college. It is expected that, after setup, by 2030, KIIMS CaRe will be able to serve more than 3.5 million patients.

Professor Dr. Golam Abu Zakaria honoured with Germany's Federal Cross of Merit

Professor Dr. Golam Abu Zakaria founder and mentor of SCMPCR was awarded the Federal Cross of Merit (Bundesverdienstkreuz), Germany's highest honor at the Burghaus of Bielstein in Wiehl. He is the first expatriate from Bangladesh to have received this distinction.

Professor Dr. Zakaria is the Chairman and Chief Medical Physicist at the Department of Medical Radiation Physics, Gummersbach Hospital/Klinikum Oberberg. He is also a Professor of Clinical Engineering at Anhalt University of Applied Sciences in Germany. His dedication and significant contributions specially in health and education to society earned him this prestigious award from the German government.

This award serves as a motivation and inspiration for scientists and researchers around the world, especially those from the Global North-South and the diaspora communities in Germany. Improving knowledge transfer and providing quality education to underprivileged populations is Germany's key foreign policy goals of Human Rights, Democracy, and Climate Action. It would also encourage more philanthropic and scientific research efforts like those led by Professor Dr. Zakaria, which are essential for global peace and security.

The recognition of Professor Dr. Zakaria's work emphasizes the significant impact of scientific diplomacy and the vital role of the diaspora in creating a diverse and evolving society in Germany. This honor strengthens the bond between Germany and Bangladesh, based on shared values and a commitment to global progress.

Bangladesh Medical Physics Society Celebrates International Medical Physics Week 2024

Md. Mokhlesur Rahman and Sunjidha Islam Supti

Department of Medical Physics and Biomedical Engineering (MPBME) Gono University, Bangladesh

The Bangladesh Medical Physics Society (BMPS) proudly celebrated International Medical Physics Week (IMPW-24) from April 22nd to April 26th, 2024. The event featured a series of insightful and educational sessions, led by esteemed professionals from around the world, focusing on the latest advancements and challenges in the field of medical physics. The virtual program was meticulously scheduled to accommodate participants across different time zones, ensuring widespread engagement and participation. This global event aimed to promote the contributions of medical physicists and underscore their importance in advancing medical technology and improving patient care.

Md. Jobairul Islam, the General Secretary of BMPS, presided over the opening day of IMPW-2024. He welcomed the invited speaker, Assistant Professor Dr. Thiansin Liamsuwan, who is the Chair of the Ph.D. Program in Medical Physics and Medical Engineering at the Princess Srisavangavadhana College of Medicine, Chulabhorn Royal Academy, Thailand. Dr. Liamsuwan explored the essential elements of establishing strong graduate programs in medical physics, emphasizing the challenges and prospects in advancing educational structures.

Dr. Md. Akhtaruzzaman, Chief Medical Physicist and RCO at Evercare Hospital Chattogram and President of BMPS, moderated the second day of IMPW-2024. The speaker was Assoc. Prof. Dr. Vanessa Panettieri, Senior Medical Physicist at Peter MacCallum Cancer Centre in Australia. Her topic was "RapidPlan and the Power of Automated Planning: Model Sharing and Collaboration to Standardize Patient Treatment Quality." she discussed the advantages of automated planning in radiotherapy, highlighting the significance of sharing models and collaborating to guarantee uniformity and excellence in patient care.

On the third day of IMPW-2024, the program was moderated by Dr.Munima Haque, Associate Professor and Director of the Biotechnology Program at BRAC University, Dhaka. The speaker was Dr.Biplab Sarkar, Chief Medical Physicist and RSO at Apollo Multispeciality Hospitals in Kolkata, India. Dr.Sarkar Provided a comprehensive comparative review of the latest advancement in Stereotactic Body Radiotherapy (SBRT) techniques, focusing on the distinctions and innovations between C-Arm and O-ring linear accelerators.

On the fourth day of IMPW-2024, the program was moderated by Md. Motiur Rahman, Chief Medical Physicist and Assistant Project Director at TMSS Cancer Center, Bogura. The speaker was Dr. Supriyanto Pawiro, Lecturer in the Department of Physics at the University of Indonesia and President of the Indonesian Association of Physicists in Medicine. Dr. Pawiro shared insights into the progress and development of medical physics in Indonesia, emphasizing the recognition and professional growth fostered by regional associations.

In the final session of IMPW-2024, the program was moderated and concluded by Dr. Md. Akhtaruzzaman, Chief Medical Physicist at Evercare Hospital and President of BMPS. The last speaker was Md. Mokhlesur Rahman from the Department of MPBME at Gono University, Bangladesh. The final session focused on the critical considerations in selecting detectors for radiotherapy, discussing the implications for clinical practice and patient outcomes. IMPW-2024 was a notable success, uniting a diverse group of professionals to share knowledge, discuss innovations, and address the pressing challenges in medical physics. BMPS extends its gratitude to all the speakers and participants who contributed to the success of IMPW-2024. Society looks forward to continuing this tradition of excellence and international collaboration in future events.

Where is Physics in Medicine? – Event at Karakoram International University, Department of Physics, Gilgit- Pakistan

The interactive session was organized by Karakoram International University, Department of Physics, Gilgit. This event unfolded in two distinct yet interconnected sessions, enlightening and engaging a diverse group of young attendees. The first part of the event, dedicated to general cancer awareness. The session focuses on the significance of cancer awareness today, where nearly everyone is touched by the disease in some manner.

Transitioning to the second part of the event, the focus shifted towards a more specialized audience comprising physics and medical physics students. The theme was "Cancer: A Medical Challenge for Physics." This session was particularly designed to explore the intersection of physics and medicine, highlighting how principles of physics are applied innovatively to diagnose, treat, and research cancer. Discussing the significant role of physics in medical imaging techniques such as MRI, CT scans, and PET scans, all of which rely on physical concepts to create detailed images of the human body that are crucial for cancer diagnosis. Further, the advancements in radiation therapy, such as the precise targeting of tumorous cells while sparing surrounding healthy tissue, showcasing how developments in physics have directly impacted treatment efficacy and patient outcomes were discussed.

The engagement of the students was outstanding with many expressing their newfound appreciation for the role of their field in such a critical area of medicine. The event, through its comprehensive approach to both general awareness and specialized education, not only informed but also inspired. Students left with a greater understanding of cancer as both a biological and physical challenge, equipped with knowledge that transcends the boundaries of their specific academic pursuits. Such events are crucial in nurturing a new generation of scientists and healthcare professionals who are ready to apply their skills in diverse and impactful ways, contributing to the ongoing efforts to combat cancer and enhance patient care globally.

Medical Physicist from AECH- NORIN Awarded Gold Medal

Mr. Muhammad Waqar Qureshi from AECH-NORIN received the Chairman's Distinguished Service Award on Youm-e-Takbeer, 28th May 2024, in recognition of his untiring services. He serves as Principal Medical Physicist and head of the Medical Physics Division at NORIN Cancer Hospital Nawabshah. He joined the commission in 2013 after completing his Masters in Medical Physics from PIEAS, Islamabad. He is an alumnus of the University of Sindh Jamshoro, where he graduated with distinction and received gold and silver medals. He has published his research in reputed journals, with over 16 research articles credited to him in the field of medical physics. In addition to his core assignments, he has been actively involved in the ISO certification of the institute and the supervision of postgraduate students of Radiology and Radiotherapy from different universities. He served as Publication Secretary in the renowned Pakistan Society of Nuclear Medicine (PSNM) and is a member of the Pakistan Organization of Medical Physics (POMP). He actively participates in and presents his research at nationwide seminars and workshops. He efficiently manages the QA & QC program of NORIN, installation and commissioning of equipment, Brachytherapy, EBRT, patient simulation, Radiation Protection, and welfare of cancer patients. In recognition of his valuable services, the Director of AECH-NORIN nominated him for the award.

Mr. Saleem Awarded Gold Medal for Excellence in Medical Physics

Mr. Saleem, a distinguished Medical Physicist at MINAR (Multan Institute for Nuclear Medicine and Radiotherapy), has been honored with a prestigious Gold Medal for his outstanding contributions to the field of medical physics. This recognition not only honors Mr. Saleem's individual achievements but also underscores the importance of continued investment and research in medical physics to enhance treatment outcomes for patients worldwide.

Pakistan

Medical Physicist Transdisciplinary Network, A Look at Our Top Content on YouTube!

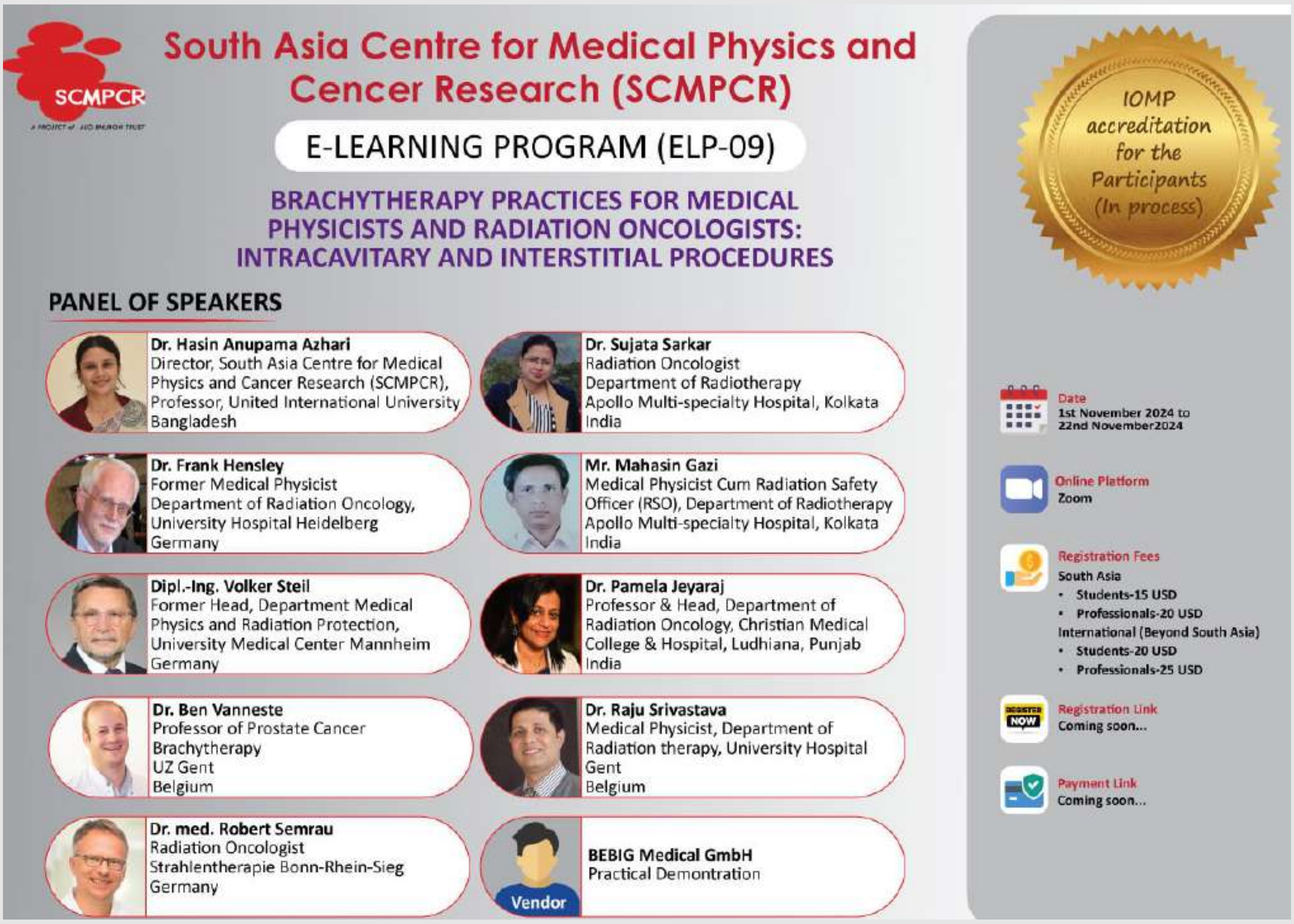
2.79K subscribers

Aim: Building MP network in Pakistan

Mission Statement: To provide a platform for continuous education of Medical Physics and to enhance knowledge, skill, and understanding of the discipline for the benefit of patients.

Featured Hits:

- Volumetric Modulated Arc Therapy (VMAT): Discussing advanced therapy techniques.
- Breast Treatment Planning & Simulation: A detailed exploration of Breast treatment planning and simulation.
- LINAC Basics: Focus on Linear Accelerator Components. Our most watched video.
- DVH: Dose Volume Histogram: This concise yet informative video on DVH.
- MLC: Multi-leave Collimator: Demonstrating advanced techniques.
- LINAC Quality Assurance: A critical guide, highlighting the importance of maintaining LINAC systems.
- Treatment Planning of CSI: This video goes in-depth for Treatment Planning of CSI.
- SRT: ICRU Report 91: Drawing attention to standards and reports.
- Peer Review Importance: A quick yet vital video, emphasizing the value of peer review.
- Dosimetry Protocol TG 51 & TRS 398: A fundamental topic for Quality Assurance.



SI	Topic Name	Date & Time	Speaker
1	Introduction to Dosimetric Terms and Quantities for Brachytherapy Procedures	1st November (Friday), 2:30 PM – 3.30 PM (GMT)	Prof. Dr. Hasin Anupama Azhari (MP), SCMPCR
2	Advanced Techniques in Brachytherapy: Present Status and Future Development	2nd November (Saturday), 2:30 PM – 3.30 PM (GMT)	Dr Frank Hensley (MP), Germany
3	Electronic Brachytherapy: Physical Basics and Medical Applications	3rd November (Sunday), 2:30 PM – 3.30 PM (GMT)	Dipl.-Ing. Volker Steil (MP), Germany
4	Prostate Brachytherapy: Interstitial Procedures, Imaging and Contouring	8th November (Friday) 2:30 PM – 3.30 PM (GMT)	Prof. Dr. Ben Vanneste (RO), Belgium
5	Intraoperative Breast Brachytherapy: Implementation and Clinical Considerations	9th November (Saturday), 2:30 PM – 3.30 PM (GMT)	Dr. Sujata Sarkar (RO), India Mr. Mahasin Gazi (MP), India
6	Intracavitary Brachytherapy in Gyneacological Cancer: Techniques and Planning	10th November (Sunday), 2:30 PM – 3.30 PM (GMT)	Dr. med. Robert Semrau (RO), Germany
7	Application of Viena Applicator/Cylinder Applicator in Gyneacological Brachytherapy	15th November (Friday) 2:30 PM – 3.30 PM (GMT)	Prof. Dr. Pamela Jeyaraj (RO), India
8	MRI Based Adoptive Gyneacological Brachytherapy	16th November (Saturday), 2:30 PM – 3.30 PM (GMT)	Dr. Raju Srivastava (MP), Belgium
9	Practical Demontration from Vendors	17th November (Sunday), 2:30 PM – 3.30 PM (GMT)	(Bebeg, Xoft)
10	Examination	22nd November (Friday), 2:30 PM – 3.30 PM (GMT)	

Article Submission Guidelines for the articles for South Asia Center for Medical Physics and Cancer Research (SCMPCR) Newsletter

Article Types

- News items, reports, announcements about medical physics activities
- Workshop/Conference announcements
- Reports on current states of Medical Physics activities in South Asian/ African developing countries.
- Medical Physics Book Reviews
- Scientific article (Featured Articles)- In-depth discussions of topics of your interest (Article will be peer-reviewed before placement).
- Submit anything else you would like to share with the Medical Physics Community.

Article Guidelines

- Articles should be provided in Microsoft Word files (.doc or .docx). Do not send articles in PDF format.
- Do not send drafts. Send the final, polished article that has been signed off by all applicable persons or departments in your organization.
- Include the name, title, and affiliation of all authors.
- Articles may have section headings and adding pictures with captions are strongly encouraged.
- Words limits (Font size 12, Times New Roman)
  - News items and announcements - ½ page including graphics.
  - Reports - 1 page (maximum 2 pages) including graphic
  - Scientific article (Featured Articles)- 2 page (maximum 3 pages) including graphics and citations.

Graphics/Photos/Figures Guidelines

- You must either own or have permission (in writing, which you include with the submission) for each graphic submitted.
- Do not embed photos, figures, and other graphics in the text of the submission. Include each one in a separate file instead.
- Include photo captions of each graphic in a Microsoft Word document (.doc or .docx) correlating the graphic file name and photographer credits.
- Include the names of each person appearing in the photo whenever possible.
- All photos/graphics must be
  - Professional and appropriate to the article
  - Attached as a separate file in the same email as your article
  - File format: GIF, JPG, JPEG
  - Maximum file size: 2-3 MB
  - Quality: High Resolution (Printable quality)

Article Submission Deadline:

30thNovember for January issue and 31st May for June issue.

SOUTH ASIA CENTRE FOR MEDICAL PHYSICS AND CANCER RESEARCH

SCMPCR

(A Project of Alo Bhubon Trust)

SUBMISSION DEADLINE FOR NEXT ISSUE: November 30, 2024

The main objectives of SCMPCR

To organise awareness, prevention, and screening program for cancer disease.

To provide adequate training to all personnel associated with cancer treatment.

To establish the clinical residency training program for medical physicists.

To develop the infrastructure of e-learning and library.

To establishment welfare home for poor cancer patients.

To build a self-help groups for cancer patients

To establish a team who will assist in the management and quality control (QC) procedure for the diagnostic radiology equipment in the districts levels.

SCMPCR was established on 3rd July 2018 and is comprised of a group of philanthropic personnel with representatives from different regions of South Asia to work on different projects. SCMPCR is an autonomous body under Alo Bhubon Trust (Alo-BT) and is accountable to its board of trustees/governors. It is a non-profit public partnership which will seek support from other sources. It shall work conjointly with various national and internationals organisations. The major activities of SCMPCR are: to produce skilled manpower, enhance health education and establish a welfare home for cancer patients.

MISSION

TO Achieve UNDP SDG-goal 3 & 4

OUR VISION

TO

PROVIDE QUALITY SERVICES IN CANCER TREATMENT THROUGH TRAINING, EDUCATION INCLUDING E- LEARNING IN RADIOTHERAPY AND IMAGING DISCIPLINES.

GOALS OF SCMPCR

Major activities of SCMPCR are to produce skilled manpower, enhance health education and establish a welfare home for cancer patients.

UNDP SDG-goal 3 (Good Health & Well-being)

Awareness program for the mass people for different communicable and non-communicable diseases, especially for cancer patients.

UNDP SDG-goal 4 (Quality Education)

Arranging and conducting training programs to develop skilled manpower. It realizes the need to educate specially; women regarding the screening and prevention of cancer treatment under UNDP SDG-goal 4.

SCMPCR

PROJECT of ALO BHUBON TRUST (Alo-BT)

FIND US

B-66, Rd No:E/4, Eastern Housing, Mirpur, Dhaka-1216, Bangladesh.

info@scmpcr.org

+8801711-841063

www.scmpcr.org

OUR MOTTO

QUALITY EDUCATION AND HEALTH SCIENCE FOR PATIENT BENEFIT