

Quarterly Newsletter

March 2023 | Vol 19 | Issue 01

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Medical Director & HOD, Radiation Oncology

JAWAHARLAL NEHRU CANCER HOSPITAL & RESEARCH CENTRE, BHOPAL

Advances in the Management of Brain Tumors over the Decades: Perspective of A Radiation Oncologist.

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Radiation therapy remains an integral part of treatment for most malignant brain tumors. Till 1990's the technology had remained 2D conformal with use of whole brain fields with either Co-60 or 6 MV photons for gliomas, brain metastases and CNS lymphoma with the exception of cranio-spinal (CSI) radiation for medulloblastoma. The common doses that were employed with whole brain radiation therapy were 50-60 Gy for glioma, 30 Gy for metastases and 45 Gy for CNS Lymphoma. The outcomes had remained poor with a median survival of 1 year for glioma and CNS Lymphoma and 3-6 months for brain metastases. 36 Gy CSI dose was used for medulloblastoma with a boost to posterior fossa to 54 Gy with a 50% survival with no focus on delayed toxicity or quality of life. These results had remained unchanged till two decades ago.

There has been an explosion of technology over the last two decades. Incorporation of CT simulation allowed non-coplanar 3D planning. Better visualization with MR and PET imaging has improved localization. Intensity modulated radiation therapy (IMRT) and Image guided radiation therapy (IGRT) have revolutionized delivery of treatment with sparing of normal tissue and improved localization. Improved immobilization techniques, higher energy beams, better beam shaping with mini multi-leaf collimation (MMLC) and proton beam therapy have all improved the dosimetry. However, the real question is - has all these technological improvements changed the outcome? The discussion will be focused on two important outcomes – Overall survival (OS) and quality of life (QOL). Three topics – adult glioma, brain metastases and pediatric brain tumors using medulloblastoma as a model will be discussed.

Adult Gliomas:

The Brain Tumor Cooperative Group (BTCG) trials done in 1970's established the role of whole brain radiation therapy in high grade glioma following resection, with or without the use of chemotherapy in improving the overall survival. They all showed an improved survival with dose escalation from 0-60 Gy. This was confirmed by a Medical Research Council (MRC) phase III trial, following which, 60 Gy became a standard of care. There was an attempt at dose escalation with a 10 Gy focal boost using 2D technology by RTOG that showed no survival benefit.

Use of IMRT was first studied in a phase II trial at MSKCC without dose escalation beyond 60 Gy. The median survival was reported at 12 months with no improvement in either local control or survival. 85% freedom from Gr III neurotoxicity was seen. The hope was that with better localization with perfusion imaging, MR spectroscopy, PET and functional imaging, dose intensification could improve the survival and preserve the neurological function. Unfortunately, all the advances in neuro-imaging techniques still remain experimental while incorporating in treatment planning and so far have not resulted in improved outcomes. A recently reported dose escalation trial by NRG to 75 Gy using IMRT or protons failed to show an improved survival compared to 60 Gy alone.

The EORTC (Stupp) trial of adding Temozolomide to 60 Gy partial brain radiation therapy remains the biggest improvement in the treatment of glioblastoma over the last 3 decades. However, the improvement in median overall survival remains moderate (12.1 Vs 14.6 months) and was noted primarily in MGMT methylated patients. Long term follow-up of RTOG 9802 trial showed an improvement in overall survival of low grade glioma with addition of PCV chemotherapy to 54 Gy of partial brain radiation therapy (7.8 Vs 13.3 years), again primarily in IDH1 Mutated patients. Both RTOG and EORTC trials in anaplastic oligodendroglioma patients showed the significance of 1p/19q co-deletion in dictating the improved outcome with the addition of chemotherapy.

Angiogenesis as a possible target in glioma had held promise for a long time. Use of Bevacizumab in recurrent high-grade glioma did show impressive radiological response as well as improved quality of life in early phase II trials. However, incorporating it in upfront management of glioblastoma along with radiation therapy and Temozolomide did not improve overall survival and resulted in modest increase in acute toxicity, decreased QOL and neuro-cognitive changes in a phase III RTOG trial.

Similar lack of overall survival benefit was also seen in a phase III EORTC trial. Use of Bevacizumab along with re-irradiation in recurrent glioma resulted in a modest improvement in progression free survival, but not overall survival in a recently concluded NRG trial.

In summary, the treatment outcomes have not changed significantly in decades for glioma. It primarily stems from underestimating its complex heterotypic biology and designing clinical trials on simplistic models. The relationship of a glial cell with micro-environment that includes extracellular matrix, vascular endothelium, fibroblasts and immune cells is only being understood now. The work done by the cancer genome atlas research (TCGA) network has resulted in subtyping of glioblastoma into 4 sub-groups with each having a different biology. A similar comprehensive integrative genomic analysis of diffuse low grade glioma by TCGA has resulted in three robust groups, correlating with IDH1 mutation and 1p/19q co-deletion status. The challenges in curing glioma include better understanding of the glial stem cell and the nature of the blood brain barrier. Identification of signaling pathways and the driver mutations give us an opportunity to drug the appropriate target. There is a need to develop good pre-clinical models including both genetically engineered mouse models (GEMMs) and patient derived xenografts (PDXs). Unifying brain tumor research pipeline and increased use of adaptive trials will help speed up the process. Innovative radiation strategies that include targeting micro-environment, selective disruption of blood brain barrier and enhancing immune response may hold promise in coming years

Brain metastases:

Whole brain radiation therapy (WBRT) has been the standard of care for management multiple symptomatic metastases. RTOG tried various fractionation schedules ranging from 2000cGy in 5 fractions to 4000ccGy in 20 fractions in 1980's. The outcomes were similar with an improved neurological function in 50% and an overall survival of 15-18wk, irrespective of the fractionation. As a result, 30000 cGy in 10 fractions has been the most used fractionation regimen. However, diffuse white matter injury resulting in personality changes, dementia, gait disturbances, urinary incontinence and intellectual decline occurred in at least 10% of the patients, worsening with time.

RTOG 0614 was a landmark trial that tried to address the quality of life in patients receiving WBRT by using concomitant and adjuvant Memantine, a drug developed for the treatment of dementia. This study showed a 17% reduction in relative risk of cognitive decline. An alternative approach to preserve memory was to use hippocampal avoidance during WBRT using IMRT technology. A phase II RTOG trial showed a 7 % memory score decline at 4 months using this technique as compared to a 30% decline with a historical control group of WBRT alone. A recently published NRG trial combining Memantine with hippocampal sparing showed additive/synergistic benefit in preventing cognitive failure as compared to memantine alone.

An alternative approach to WBRT is to use Stereotactic radiosurgery (SRS) in selected patients with stable systemic disease, good performance status, no mass effect, four or fewer lesions and <2cm of the biggest lesion. Local control is achieved in 90-95% of lesions with median overall survival of 1 year. While the risk of neurocognitive decline remains low, it does carry a risk of steroid dependence and radiation necrosis of the brain of 4% per lesion treated. A Japanese observational trial since then has shown that up to 10 lesions could be treated with similar outcome. A recent phase III trial at MD Anderson cancer center that randomized patients to WBRT with Memantine or SRS alone found better preservation of memory and improved local control with SRS alone arm. There are ongoing trials comparing SRS alone to WBRT with memantine and hippocampal sparing in patients up to 15 brain metastases.

Targeted agents and immunotherapy have come a long way in the management of brain metastases. There is evidence that many of these agents can cross the blood brain barrier and control small asymptomatic metastases for a long time and also help in preventing new brain metastases. The potential is to avoid WBRT for many of these patients who otherwise have significant systemic disease. Tucatinib, a small molecule Her2 inhibitor, has shown a 50% risk reduction in both disease free and overall survival, even in patients with previously treated and progressive brain lesions as well as leptomeningeal disease.

Combining immunotherapy with SRS/SBRT for brain metastases is an evolving area of active research. The optimal dose and fractionation, timing and choice of immunotherapy and optimal patient selection is still not clear at this time. A recently published multi-institutional retrospective trial of using single fraction SRS with concomitant immunotherapy has shown a median overall survival of 24 months with a radiation necrosis of 9.8%.

In summary, for brain metastases, Local control, survival and QOL have all improved over the last three decades. There is a need to customize the therapy. The role of WBRT needs to be defined in the present era. Selective patients may benefit from omission of radiation therapy. Certainly, better systemic control is the way to improve the CNS disease.

Medulloblastoma:

Craniospinal irradiation (CSI) to a dose of 36 Gy with a boost to posterior fossa to 54 Gy had been the standard for medulloblastoma for a long time. Retrospective data coming from University of Lund, University of Toronto and Strong memorial hospital established the role of craniospinal (CSI) radiation therapy as the standard of care in 1960's. with a 5 year survival of 50% . Attempts to do posterior fossa/WBRT alone had a survival of 5-20% at these institutions. An attempt to reduce the CSI dose from 36 Gy to 23.4 Gy without chemo by Children's cancer group (CCG) resulted in an inferior survival (67% Vs 52%) and was quickly abandoned. However, a subsequent single arm prospective trial by CCG using 23.4 Gy CSI with boost to posterior fossa to 54 Gy along with chemotherapy showed a 80% 5 year survival and became the new standard of care for standard risk medulloblastoma. An attempt to further reduce the CSI from 23.4 Gy to 18 Gy by Children's Oncology group (COG) resulted in inferior survival (83% Vs 72%).

The entire posterior fossa had been the standard volume which needed to receive the boost for a long time. In the era of conformal RT and better imaging, it was felt that tumor bed boost might alone suffice that could reduce ototoxicity. A phase III COG randomized trial confirmed similar local control, but with reduced morbidity using tumor bed boost with 3D technology and became the new standard of care. Use of IMRT further reduced the dose to brain stem and cochlea without compromising local control.

Use of protons with its better dosimetry has shown a marked decrease in acute toxicity including weight loss, nausea, esophagitis and anemia as compared to photons. A mature phase II data from Massachusetts General Hospital has shown a 5yr survival of 81%, similar to photons. The cumulative incidence of grade 3/4 hearing loss was 12% at 3 years and 16% at 5 years. The Full Scale Intelligence Quotient decreased 1.5 points (95% CI, 0.9-2.1) per year. No significant changes were seen in perceptual reasoning and working memory. The cumulative incidence of any hormone deficit was 63% at 7 years.

A major advance in the management of medulloblastoma has been in moving away from designing treatment strategy based on conventional pathology (classic, desmoplastic and anaplastic) to risk stratification based on molecular profile. Four distinctive groups have been identified based on expression signature. Identification of WNT signaling pathway has shown tumors lacking blood brain barrier, making them exclusively sensitive to chemotherapy with a 95% overall survival. This is allowing careful dose de-escalation including CSI dose to 15-18 Gy in clinical trials and selective dose escalation for high risk MYC/Neuronal signature pathway tumors on ongoing clinical trials.

In summary, the evolution of treatment in medulloblastoma has been a true success story. We have seen a steady improvement in survival and a decrease in treatment related morbidity over the decades. There has been integration of basic sciences with modern technology. The enrollment in novel clinical trials remains high and we have seen cooperation across continents resulting in improved outcomes.

Conclusion:

We have come a long way in the management of brain tumors. The advances are incremental and certainly less dramatic as compared to hematological, lung or breast cancer. We are still trying to understand biology of these tumors. In Indian subcontinent, we have seen investment in new equipment and infrastructure. We have also seen the ability to start new programs and invest in clinical research. The financial toxicity associated with the management are real and needs to be addressed hand in hand.

Acknowledgement:

I would like to take the opportunity to thank my mentors and friends, both in India and USA for initiating and guiding in the field of neuro-oncology. I would also like to express my gratitude to Dr. Rajesh Vashistha as well as Dr. Manoj Gupta, the president of AROI for inviting me to give the Dr. Rangi Prasad oration lecture at the New Delhi AROICON meeting.

INVITATION TO FARO&KOSRO 2023

2023. 10. 11 | Wed | – 13 | Fri |

The-K Hotel, Seoul, Korea





INVITATION TO FARO & KOSRO 2023

Dear Colleagues and Friends,

As the Chair of the local organizing committee, it is the greatest pleasure and honor of mine to invite you to the 6th Meeting of the Federation of Asian Organizations for Radiation Oncology (FARO) to be held during October 11-13, 2023, at The K Hotel, Seoul, Korea.

FARO was founded on November 3, 2014. We already had five successful meetings from 2016 through 2021. At first, it was an annual meeting, but now it is a biennial meeting. The last meeting organized by the Philippine Radiation Oncology Society (PROS) was a virtual online meeting due to the COVID-19 pandemic. I would like to thank the founders, former presidents, former officers, and all related personnel for their devotion to FARO.

The theme of this year's meeting is "FARO together toward tomorrow". This will be a very meaningful event, because we are able to meet in person after the 4th meeting in Shenzhen, China back in 2019. The FARO meeting will be held in conjunction with the 41st Annual Meeting of the Korean Society for Radiation Oncology (KOSRO) and of course, the participants of FARO meeting can attend the KOSRO program.

I dare to say that Seoul is one of the most dynamic and smart city in the world, but Seoul has also always been an important strategic point in the history of Korea. Everything is vital and energetic in Seoul. October is a pleasant fall season filled with bright colors. You will never forget and always cherish the amazing experiences in Seoul.

I look forward to meeting every one of you in Seoul this October.

Hong-Gyun Wu, MD, PhD

President, KOSRO

Chair, 2023 FARO Local Organizing Committee



3rd INDIAN CANCER CONGRESS 2023

2nd - 5th November 2023 | Jio World Convention Centre, Mumbai



CONTINUUM OF CARE IN CANCER

Dear All

Greetings from the 3rd Indian Cancer Congress 2023, Mumbai!!!!

On behalf of the organizing committee of the 3rd Indian Cancer Congress 2023 (ICC), We take pride in inviting all stakeholders in oncology in India and abroad to actively participate in the ICC Conference to be organized from 2nd to 5th November 2023 at the Jio World Convention Centre, Mumbai. - The City of Dreams.

We have worked out special registration rates which will be applicable till 31st March 2023.

Scan QR Code to register yourself for the conference in special discount registration category



The Special offer rate is given in the below registration table:

Cctegory	Special Rate	Regular Rates	
	Extended offer Available up to 31-Mar-23	From 01-Mar-23 to Upto 31-Mar-23	From 01-Apr-23 to Upto 30-Jun-23
Member of IASO, ISMPO, ISO & AROI	INR 11000	INR 13500	INR 15000
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To avail of this special offer (Highlighted in White), please get in touch with Mr. Narayan Sharma at 9377724324 or Mail to registration@icc2023.in, We will be happy to assist you.



ABSTRACT SUBMISSION IS NOW OPEN!
(Registration is Mandatory to Submit your Abstract)

BLOCK YOUR CALENDAR

for 3rd Indian Cancer Congress 2023



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Congrats



Dr. Pooja Nandwani Patel
President
Gujarat Chapter



Dr. Samir Batham
Secretary
Gujarat Chapter



Prof. James Francis
President
Kerala Chapter



Dr. Sabarinath PS
Secretary
Kerala Chapter



Dr. Rajiv Ranjan Prasad
President
Bihar Chapter



Dr. Rajesh Singh
Secretary
Bihar Chapter

New AROI state chapter office bearers

AROI MEMBERS



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2. In the Home page please find the link for **Members Login**, click on the button.
3. You will be redirected to a page named **AROI Member's Login**
4. In this page use your **registered e-mail id as Username** and **Password** to access Members Login.
5. In case if you **don't have the Password**, please go to **Seek/Forget Password?** displayed under the Log In button.
6. In this page you need to provide your **Registered e-mail id** and then
7. click on **Seek Password** button. *(After that please click on OK button under delivered message to move on to Log In window)*
8. Your **dedicated Password** will be sent to your **registered email**.
9. Please check your registered e-mail (Inbox/Spam) for **Password**.
10. Use the given **Password** for login with your registered email id as username.
11. **NB: If you found this message "You email id does not match our records" while seeking the password, please contact AROI officials**

- After Log in you can view your profile details, and can modify/edit if needed. Just click on **Edit** button given on the page.
- You can edit your profile except your Name & LM Number.
- Here you can **download** the total membership details also. For that click on **Download Member Roaster**.



ACADEMIC CALENDAR, 2023

ASSOCIATION OF RADIATION ONCOLOGISTS OF INDIA INDIAN COLLEGE OF RADIATION ONCOLOGY

ICRO/ SUN PG

1.TMH,Varanasi	6-7 May, 2023	Dr. S. Pradhan	94152 28261	Gynecological Malignancies
2.SGRD,Amritsar	19-20 Aug,2023	Dr. Neeraj Jain	98142 99045	Adult & Pediatric Sarcomas
3.GMC, Thiruvananthapuram	16-17 Sep,2023	Dr. Bindhu	94470 09238	Hypofractionation

ICRO/ SUN PRODVANCE

Targeted Therapy/ Immunotherapy Concurrent with Radiation

1. (EZ) IGIMS, Patna	1-2 Apr, 2023	Dr. Rajesh Singh	99390 88899	-
2. (SZ) HCG, Bengaluru	10-11 Jun, 2023	Dr. Sridhar P.S.	98865 54972	-
3. (NZ) Royal Cancer Institute, Kanpur	5-6 Aug, 2023	Dr. Anu Tiwari	94500 93066	-
4. (WZ) Aruni Hospital, Rajkot	7-8 Oct, 2023	Dr. Hemendra Mod	97263 60025	-

ICRO/ INTAS RADIOBIOLOGY (Prof Manoj Gupta)

1. (WZ) Sterling Hospital, Ahmedabad	18 Feb, 2023	Dr. Pooja N Patel	98257 39897	-
2. (NZ) SRMSIMS, Bareilly	15 Apr, 2023,	Dr. Piyush Kumar	98976 93669	-
3. (EZ) JLNMMC, Raipur	1 Jul, 2023	Dr. P Chandrakar	99079 80612	-
4. (SZ) SVIMS, Thirupati	3 Sep, 2023	Dr. Pranabandhu	94935 47731	-

AROI-ESTRO				
1. Gynae	16-19 Mar,2023	Dr. Harjot Bajwa	94935 47731	Indo American, Hyderabad
2. Head &Neck	25-27 May,2023	Dr. Sarbani Ghosh Laskar	98208 34386	TMH, Mumbai
3. Advanced Tech	30 Nov-3 Dec, 2023	Dr. Vijay Karan Reddy	99123 20002	Apollo, Hyderabad

Best of ASTRO				
Ruby Hall Clinic, Pune	29-30 Jul, 2023	Dr Bhooshan Zade	99678 35653	-

ICC				
Mumbai, 2-5 Nov, 2023				

ICRO PROADVANCE 2023 (EAST ZONE, PATNA)

PRODVANCE 2023 East Zone Course was held on 1st and 2nd April at State Cancer Institute , Indira Gandhi Institute of Medical Sciences, Patna under the aegis of Indian College of Radiation Oncology (ICRO) and Association of Radiation Oncology of India (AROI). The theme of the conference was **“Overview of Targeted Therapy/ Immunotherapy Concurrent with Radiation”**.

It was a grand academic extravaganza in which 36 participants from all over state were participated. This scientific program was organized under leadership of President Elect AROI Prof Dr S N Senapati and Secretary ICRO Dr Gautam K Sharan .

Esteemed faculties of this program were Dr Rajiv Ranjan Prasad, Dr Swarupa Mitra, Dr Cessal T Kainickal , Dr Gautam Sharan , Dr Vikas Jagtap , Dr Pritanjali Singh ,Dr Manisha Singh, Dr Vinita Trivedi, Dr Avinash Pandey Dr Abhishek Anand ,Dr Ridu Kumar, Dr Prem Kumar, Dr Dheeraj Kumar,Dr Sambit Nanda and Dr Bhawana Dubey.

From SCI, IGIMS Program Director was Dr Rajesh kumar Singh and Program Coordinators were Dr Dinesh Kumar Sinha and Dr Richa Madhawi.

The ICRO has designed the program in such a way that participants could understand the basic topics of Targeted therapy and Immunotherapy . Sessions on Cancer cell biology and genetics, Proteins involved in Cell Communication as Target in cancer treatment, Drugs that target Angiogenesis, fusion proteins, PARP and CDKs were well discussed.

Targeted treatment of Head and Neck cancer and Brain Tumors were very informative. The topics also covered Imaging, Patterns of response and progression and Toxicity management of immunotherapy.

Rationale of combining Radiotherapy with Immunotherapy and Role of radiation combined with targeted /immunotherapy in various cancers like genito urinary malignancies were also delivered.

This ICRO PROADVANCE teaching program is well structured with relevant and emerging topic so it was very much appreciated by everyone and delegates had a great learning time.



AROI Gujarat Chapter's Annual Conference 7- 8 January. 2023



Dr. Samir Batham

Secretary AROI-(Gujarat state Chapter)
Senior Consultant, Department of Radiation Oncology
HCG Cancer Centre

The 4th AROI Gujarat Chapter's Annual Conference was held at Daman on 7th and 8th January 2023. Dr Nilesh Mahale was the Organising Chairman and Dr Siddharth Nagshet was the Organising Secretary.

On day 1 there were sessions on Gastro-intestinal malignancies and Prostate cancers. The scientific program included debates on controversial topics, interesting panel discussions and insightful lectures on latest advances in cancer management. The first day of scientific program was quite exhaustive and interesting which was then followed by the General Body meeting of state AROI chapter which was attended by 65 members.

Dr Pooja Nandwani Patel started the GBM, with declaration of increase in AROI Gujarat Chapter membership number increasing from 136 to 155. Dr Pooja congratulated the Organising committee(Dr Nilesh Mahale, Dr Siddharth Nagshet, Dr Dimpal Gadhesariya) for the successful meeting attended by over 65 delegates and faculties mostly from Gujarat.

The next important topic discussed was finance. It was proposed by Dr Pooja to revise the state membership charges(one time only) from existing Rupees 2000 to Rupees 3000 for junior residents/MD/DNB students and Rupees 5000 for post MD/DNB residents/Consultants. This was seconded by Dr Rushi Panchal, Dr. Nilesh Mahale and Dr. Kinjal Jani and the proposal was ratified by the general body. Next point raised by Dr Pooja was regarding the state chapter newsletter. Dr Maitrik Mehta and Dr Satyajee Rath both from GCRI given their kind consent to take the responsibility for the same.



Dr Pooja Nandwani Patel invited bids for the next state chapter annual conference and she herself was willing too, since there was no other bidder she was given the responsibility to host next annual meeting during January-March 2024. It was seconded by Dr Sanjay Nandeshwar, Dr Samir Batham and Dr Pramod Patil. It was proposed by her to organise a SBRT workshop along with next annual conference the responsibility of which was given to Dr Rushi Panchal and he agreed for the same.

Dr Pooja declared the tenure of the office bearers to be complete and reannounced the elections to be held again so officially Dr Kinjal Jani, Dr Pooja Nandwani Patel and Dr Samir Batham left the posts.

Dr Pooja then started the elections with inviting names for the post of President. Dr Samir Batham proposed Dr Pooja Nandwani Patel's name which was seconded by Dr S P Shrivastava, Dr Nilesh Mahale, Dr Rushi Panchal, Dr Pramod Patil and Dr Neha Patel. Dr Pooja then invited names for the post of Secretary and Dr Kinjal Jani suggested Dr Samir Batham's name which was seconded by Dr Sanjay Nandeshwar, Dr Sarthak Mohanti and Dr Maitrik Mehta. Dr Samir asked the former President to present the medal to the present President Dr Pooja Nandwani Patel.

The GBM ended with Dr Pooja's promising speech for her vision as President and vote of thanks by Secretary Dr Samir Batham.

Day 2 started with Head and neck cancers session followed by session on Breast cancers and session on best paper awards for residents. The event concluded with valedictory function and vote of thanks by the Organising committee.



RAJAROICON-2022 Udaipur (6-8 January, 2023)

The annual conference of Rajasthan chapter of Association of Radiation Oncologists of India (AROI-Rajasthan Chapter) was organized on 6th, 7th and 8th January, 2023 at Udaipur. This event was hosted by Geetanjali Medical College and Hospital (GMCH), Udaipur along with RNT Medical College, Udaipur as the co-host. Dr Ramesh Purohit was the organizing secretary and assisted by Joint Organizing secretaries Dr Ashish Jakhetiya and Dr Ankit Agarwal. The organizing team was headed by Dr AR Gupta (Organizing Chairman). This academic event was planned under the able guidance of Dr Rajesh Vashistha (Chair, AROI), Dr Manoj Gupta (President, AROI), Dr RK Tanwar (President, AROI-Raj) and Dr Ravindra Gothwal (Secretary, AROI-Raj). The theme of this event was “Oncology in Modern Era: Current Practice and Challenges”. This annual conference was held after a gap of two years due to COVID restrictions. Thus, the scientific program was focussed on the recent advances over the last three years. As suggested by the senior faculties, the scientific sessions were finalized to keep a balance of senior speakers as well as new budding speakers. The organizing team also tried to encourage participation of the post-graduate students and senior residents in the academic activities. Scientific advisors Dr Narendra Rathore and Dr Kiran Chigurupalli were instrumental for including all relevant topics in the scientific program yet keeping it interesting for the delegates.

Two pre-conference workshops were organized on 6th January, 2023. Interstitial Brachytherapy workshop was coordinated by Dr Ramesh Purohit and attended by 45 delegates. This live workshop was planned as per the able guidance of Dr (Prof) DN Sharma (AIIMS, New Delhi). Speakers included Dr Bharti Devnani (AIIMS, Jodhpur) and Dr Kiran Chigurupalli (Udaipur). Dr DN Sharma shared in his presentations about the nuances and his vast experience in the field of brachytherapy and inspired the participants to pursue this modality in their oncology career. A case of interstitial brachytherapy for cervical carcinoma was live demonstrated as direct feed from the operation theatre by Dr Ramesh Purohit. Brachytherapy instruments demonstrated by Dr Bharti Devnani. The making of implant for surface mould brachytherapy for carcinoma soft palate was demonstrated by Dr Nikhil Verma. A successfully treated patient of carcinoma angle of mouth shared his experience and journey with the participants. Surgeon's perspective was shared by Dr Ashish Jakhetiya. Advanced Research Methodology workshop was attended by 30 delegates and coordinated by Dr Ashish Sharma. Various aspects of writing of research paper were discussed by eminent speakers. The purpose of this interactive workshop was to demonstrate to the budding researchers “how to write and publish a scientific paper”.

Conference held on 7th and 8th January 2023 was attended by more than 250 doctors from various fields including radiation, medical and surgical oncology. During the inaugural ceremony, life time achievement awards in the field of Radiation Oncology were received by Dr OP Sharma (Jaipur), Dr HS Kumar (Bikaner) and Dr Rohitashwa Dana (Jaipur). The scientific program included six sessions on Head & Neck Cancer, Breast cancer, Gastrointestinal cancers, Thoracic cancers Brain & Spine tumours, and Genitourinary Cancers. Keynote lectures on recent advances in the field of radiation oncology were delivered by Dr RK Vyas (AIIMS, Jodhpur), Dr Shankar Vangipuram (Apollo, Chennai) and Dr Sridhar PS (HCG, Jaipur). The academic content was enriched with 16 faculty lectures, 3 debates and 4 panel discussions. More than 50 research articles were presented as poster and oral paper by postgraduate students from across India. Best oral paper was awarded to Dr Sharmistha Roy and best poster was awarded to Dr Madhumitha Choudhary. An interesting radiotherapy quiz was conducted by quiz master Dr Manish Chomal. Eight teams participated in multiple rounds of the quiz. Each team consisted of four postgraduate students including one senior resident. Winner, runner up and second runner up teams were awarded with cash prizes.

Dr Ramesh Purohit,
Organizing Secretary

Glimpses of RAJAROICON-2022

Udaipur (6-8 January, 2023)



AROI WB Chapter Annual State Conference 2023

The Association of Radiation Oncologists of India (West Bengal chapter) organised the Annual State Conference on 25th and 26th of March, 2023 at Taj City Center New Town, Kolkata. The conference was attended by more than 250 Delegates all across India and eminent International (including Drs. Peter Hoskin and Sushil Beriwal who joined virtually) and National Faculty (including Drs. J.P. Agarwal, Sushmita Ghoshal, Sapna Nangia, Saikat Das, Pritanjali Singh and Susovan Banerjee).

The Conference was inaugurated in the virtual presence of AROI President Dr. Manoj Gupta and distinguished Faculty. Dr. Kalyan Bhattacharya gave the Dr. Saroj Gupta Memorial Oration while Dr. Phalguni Gupta received the AROI WB Lifetime Achievement Award.

There were focussed sessions on Head and Neck, Breast, Lung cancers as well as Palliative Care, Medical Ethics and topics important to Young Rad Oncs including AI, Big data and importance of ethical publishing. There was a target volume delineation session on rectal cancers as well as Best Paper session (more than 50 abstracts submitted by Residents, all of which shall be published in the upcoming issue of the Bengal Journal of Cancer) and a electrifying quiz (initially 55 Residents, finally 8 teams). It was an academic extravaganza as well as a great opportunity to socialize, meet friends and exchange views over the weekend.



19th AROI ICRO Radiobiology Teaching Program Sterling Hospital, Ahmadabad, Gujarat



Dr Pooja Nandwani Patel
Sr. Consultant and Head

Department of Radiation Oncology
Sterling Cancer Hospital
Ahmedabad Gujarat

19th AROI ICRO Radiobiology Teaching Program was held on 18th February 2023 at Sterling Gurukul Hospital, Ahmedabad on Gujarat conducted by Dr Pooja Nandwani Patel, Sr. Consultant & Head, Dept of Radiation Oncology at Sterling Cancer Hospital Ahmedabad, Gujarat. The teaching program was attended by 57 radiation oncology students from Gujarat, Maharashtra and Madhya Pradesh.

The teaching program was a full day academic program with detailed discussion covering 5 detailed modules of Radiobiology by Dr Manoj Gupta, President AROI, Head, Department of Radiation Oncology, Former Dean, AIIMS Rishikesh. It was a great discussion and one to one interaction of students with Dr Manoj Gupta. The inauguration program was kept in afternoon and attended by other AROI Gujarat members including Dr Anil Goel, Dr Hemendra Mod, Dr Divyesh Rana, Dr Kinjal Jani, Dr Neha Patel, Dr Samir Batham and Dr Simmardeep Gill - MD and CEO, Sterling Hospitals. The program ended with vote of thanks by Dr Pooja Nandwani Patel - President, AROI Gujarat Chapter.



9th YROC Conference Report

The Department of Radiation Oncology at the Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow organized the 9th Young Radiation Oncologists Conference (YROC) on 25th and 26th February 2023 with the theme of “**Innovations in Oncology: Spanning new Horizons**” under the dynamic leadership of Organizing chairman Prof. Madhup Rastogi and the Organizing secretary being Dr. Ajeet Kr Gandhi.

With the immense support of the patron Prof. Soniya Nityanand (Director Dr. RMLIMS), Dr. Rajesh Vasishtha (AROI Chair), Prof. Manoj Gupta (President AROI), Dr. V Srinivasan (Secretary General AROI), Dr. Neeraj Jain (Senior Vice President AROI), Dr. Rakesh Kapoor (Chairman ICRO) and more than 100 distinguished faculty from across the country, the conference was well appreciated by all.

The conference's major highlights include a record-breaking 300 registrations, a rich academic diaspora and a 2-day format with the first day devoted to site-specific sessions on breast cancer, CNS malignancies, head and neck cancer, and gynecological malignancies, as well as panel discussions and poster sessions which included 105 posters from all over India. One of the major attractions of the YROC 2023 was an open house quiz held in the evening having no barrier of team, age, and designation and was an innovative idea of the organizing chairman of the conference Prof. Madhup Rastogi.

The inaugural event, which was presided over by AROI office bearers after the academic session, was followed by a gala dinner. Director of Dr. RMLIMS, Prof. Soniya Nityanand, served as the event's chief guest. Eminent faculties shared their opinions on how advances in oncology might benefit cancer patients in India in an open discussion. At the opening ceremony, the souvenir, which contained various articles as well as messages from the Indian Prime Minister and other dignitaries, was released.

The oral presentations and sessions on thoracic oncology, gastric cancer, and genito-urinary oncology that were specifically focused on educating the audience about the fast-evolving field of radiation oncology were the key highlights of the second day's session.

With the hope that the conference would have been beneficial to its participants and that subsequent annual conferences will help us provide our patients with the true benefit of this knowledge, the valedictory function concluded with awarding of prizes to winners of poster and oral presentation. Dr Raunaq Puri (Dr RMLIMS), Dr Vanshika Rastogi (SGPGI), Dr Sharief K Sidhique (CMC Vellore) and Dr Akansha Manral (Dr RMLIMS) were awarded first, second, third and third position respectively for oral paper presentation. Dr Vachaspati Mishra (Dr RMLIMS), Dr Anil Kumar Jaiswal (AIIMS Patna) and Dr Aishan (SNMC, Agra) bagged the first, second and third position respectively for the poster presentation.

The conference ended with vote of thanks to all participants and the organizing committee by Dr. Ajeet K. Gandhi, Organizing Secretary, YROC 2023. The 9th YROC 2023 was a mix of intense academics, flashbacks to the past, handshakes abounding, sharing of personal data never possible over the call or chat, and pledges that we would meet again the following year.

Glimpses of 9th YROC Conference



Radiation Induced Dysphagia in Head And Neck Cancer: What we know So Far

Deepak Gupta, Richa Arunendu, Tejinder Kataria, Shyam Bisht
Division of Radiation Oncology, Medanta TheMedicity



Dr Deepak Gupta.
MBBS, MD

Senior Residency :- TMH Mumbai

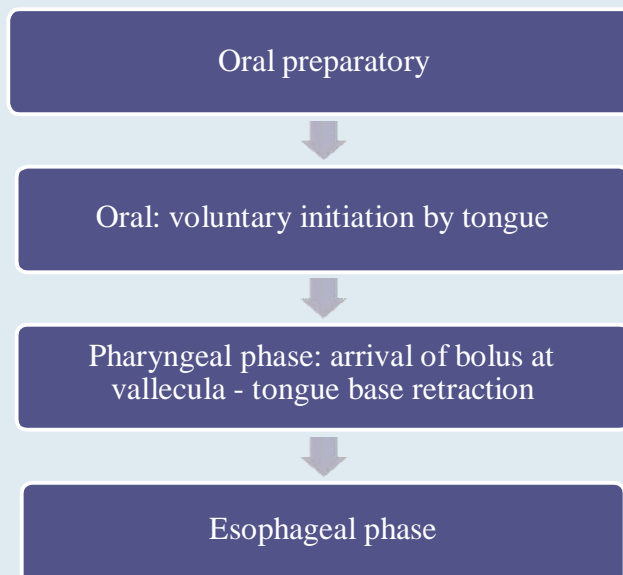
Senior Consultant, Medanta Cancer Institute, Medanta The Medicity, Gurugram

Award :-ESTRO Accuray award. ESTRO 33 conference.Vienna 2014

Introduction

Head and neck cancers are the second most common cancers in India, accounting for approximately 30% of all cancer sites¹. About 66.6% patients are diagnosed as in locally advanced stage as per the National Cancer Registry Program, India². Multidisciplinary care including chemoradiotherapy is the mainstay of treatment for patients with locally advanced head and neck cancers, specially pharyngeal cancers. Treatment has an inevitable adverse consequence on quality of life. Patients frequently suffer from swallowing dysfunction caused both by primary cancer (baseline dysphagia) and cancer therapies (treatment-related dysphagia), amongst other side effects like dysgeusia or taste disturbance, mucositis, candidiasis, radiation caries, osteoradionecrosis, soft tissue necrosis, progressive periodontal attachment loss, trismus and xerostomia or dry mouth.

Treatment related dysphagia can be seen across all stages of swallowing³, which may persist later in life and increases the risk of aspiration in upto 10% patients.



Aspiration is typically under-reported in most head and neck cancer trials, where objective assessments are undertaken only at the onset of clinical symptoms thereby failing to identify asymptomatic cases who aspirate silently. Other consequences of swallowing dysfunction include prolonged feeding tube dependence, malnutritional, psychological disturbances and worsened health-related quality of life (HR-QoL) 4.

In 2016, Swedish multicenter randomized study, ARTSCAN, clinical factors and dose–volume descriptors for organs at risk (OARs) and late dysphagia were evaluated in a prospective cohort of 124 survivors in whom aspiration was found in 47% of the eligible patients. Mean dose to the middle pharyngeal constrictor (MPC), neck dissection post RT and age at randomization were associated with late aspiration whereas Mean dose to the superior pharyngeal constrictor (SPC) and swallowing complaints at baseline were associated with choking⁵.

The dysphagia/aspiration related structures (DARS) consist of pharyngeal constrictor muscles (PCMs), the upper oesophageal sphincter, cricopharyngeal muscle, oesophagus inlet muscle, tongue base, larynx with vocal cords, arytenoids, velopharyngeal structures, and the posterior pharyngeal wall.

These structures, if preserved as organ at risk during planning and treatment, can lead to significant reduction in the early and late dysphagia. Radiation therapy for head and neck cancers has undergone major changes in the last few decades with the upcoming techniques like Volumetric Modulated Arc Technique (VMAT) and Helical Tomotherapy with their sharp dose gradient and precise dose delivery. These developments have the potential to reduce radiation induced toxicities and improve quality of life.

How To Minimize Dysphagia:

In the pioneer study conducted by Avraham Eisburch et al in 2011, observed that mean doses to each of the swallowing structures correlated with all dysphagia measures, with superior pharyngeal constrictors (PCs) demonstrating highest correlations⁷. Meanwhile Servagi-Vernat et al published a review article in 2015, with the objective to describe the various strategies which can be employed to prevent radiation-induced dysphagia⁸ which are elaborated below.

1. Assessment to prevent the of the consequences of radiation injuries

It is important to assess dysphagia during before starting treatment and during follow-ups of patients in remission in order to implement appropriate dietary measures and rehabilitation depending on the severity of dysphagia. This can be done using clinical assessment also video-fluoroscopic and endoscopic studies by a trained Speech Language Pathologist. Subjective assessment can be done using questionnaire like MD Anderson Dysphagia Inventory and QLQ HN-35, UW QOL etc.

2. The use of new external beam radiotherapy techniques

Advanced treatment delivery technique like IMRT, VMAT and Helical Tomotherapy can help us in conforming our doses to the target volume while significantly reducing the high dose splash to the nearby healthy tissues through a sharp gradient dose.

Christianen et al.⁹ defined CT-image-based guideline for the proper delineation of DARS which can aid in dose reduction to these normal structures in conjunction with RT optimization resulting in better swallowing functional outcomes.

3. Dose constraints to DARS structures

This is still an active area of research and new literature is coming up suggesting dosimetric relation of DARS with radiation related dysphagia. The dosimetric analysis performed by Eisbruch et al. reported a 50% and 25% risk of VF-based aspiration for a doses of 63Gy and 56 Gy to the pharyngeal constrictor muscles and for doses of 56Gy and 39 Gy to the supraglottic and glottic larynx.

It is inevitable to mention the landmark phase III multicentric randomized controlled trial, DARS trial (CRUK/14/014) by Imran Petkar, Nutting et al, with blinded assessments of key outcome measures, in patients undergoing radical primary chemoradiotherapy or radiotherapy alone for pharyngeal tumors. They enrolled 112 patients, 56 in dysphagia-optimised IMRT (Do-IMRT) and 56 in standard IMRT (S-IMRT) from 22 UK centers from June 2016 to April 2018. In Do – IMRT for Oropharyngeal primaries, mandatory mean dose constraints of <50 Gy to the volume of superior and middle constrictors (SMPCM) lying outside CTV_6500 together with an optimal mean dose constraint of <20 Gy to the volume of inferior PCM (IPCM) lying outside CTV_6500. Likewise, for hypopharyngeal tumors, mandatory and optimal mean dose constraints of <50 Gy and <40 Gy have been set for Plan IPCM and Plan SMPCM The interim results were presented in ASCO 2020, Do-IMRT had significantly higher MD Anderson Dysphagia Inventory scores as compared to S-IMRT (S-IMRT 70.3 (SD 17.3) vs. Do-IMRT 77.7 (16.1), $p = 0.016$). They concluded that dysphagia-optimised IMRT (Do-IMRT) reduced RT dose to the DARS and improved patient reported swallowing function compared with S-IMRT¹⁰.

4. Functional rehabilitation

Prophylactic swallowing exercises (i.e., before, concomitantly, and immediately following treatment) might improve functional swallowing outcomes. Rehabilitation swallowing exercises in irradiated patients mainly consist of interventions aimed to reinforce supra-hyoid musculature (Mendelsohn maneuver), airway closure capability (supraglottic and super-supraglottic maneuver), base of tongue retraction (effortful swallow and Masako maneuver), and cricopharyngeus muscle opening (Shaker maneuver). A summary of the swallowing maneuver is presented in Table 1.

Table 1. Summary of swallowing exercises

Manoeuvre	Indications	Technique
Supraglottic Swallow	Reduced airway closure Aspiration during swallow	Swallow and push hard with the tongue against the hard palate
Mendelson manoeuvre	Decreased range/duration of hyolaryngeal elevation, cricopharyngeal opening, pharyngeal swallow coordination	Hold the larynx in an elevated position at the peak of hyopharyngeal elevation
Effortful swallow	Vallecular residue Reduced base of tongue retraction	Swallow and push hard with the tongue against the hard palate
Masako Technique	Reduced base of tongue strength, reduced pharyngeal constriction	Protrude tongue between teeth and swallow; strengthens pharyngeal constrictors to improve contraction
Shaker Manoeuvre	Upper esophageal sphincter dysfunction, reduced anterior and superior movement of the hyopharyngeal complex	Lie supine, raise chin to chest and maintain for 60 seconds, improves opening of upper esophageal sphincter, reduces pyriform sinus residue and strengthens the suprahyoid muscles

Literature Review:

In a randomized study conducted by Upadhyay et al from November 2018 to March 2020 in India, with 50 patients in two groups of 1:1, one group was planned by three-dimensional conformal radiotherapy (3D-CRT) technique and other by IMRT technique and They evaluated the dosimetric parameters of DARS and clinical swallowing status. They found that the mean dose delivered to DARS was significantly lower in IMRT compared to 3D- CRT (66.15 Gy vs. 70.09 Gy, $p<0.001$) and the clinical worsening of dysphagia was less common in IMRT group (48% vs. 80%, $p=0.039$)¹².

Ashour et al, randomized, 146 patients with head neck cancers who needed whole neck irradiation using the simultaneous integrated boost (SIB) IMRT technique, into ST-IMRT group where parotids only were spared and SW-IMRT group where organs at risk related to swallowing dysfunction (SWOARs) were also spared in addition to the parotids. Assessment of dysphagia was done using clinical and instrumental evaluation. It was observed that SW-IMRT was associated with a lower occurrence of dysphagia at 1, 3, 6 and 12 months with a statistically significant difference ($p < 0.001$, < 0.001 , < 0.001 , and 0.006 , respectively). No difference was seen between the two groups regarding acute dysphagia ($p < 0.262$), overall survival ($p < 0.811$), and disease-free survival ($p < 0.876$)¹³.

Recently Adnan Calcuttawala et al, at Tata Memorial Hospital, India, conducted a prospective study to assess feasibility of DARS optimized intensity modulated radiation therapy (IMRT) and concurrent chemotherapy in 35 patients with head and neck squamous cell carcinoma. They applied volume based dose constraints to DARS outside the planning target volume (PTV) and an IMRT plan was then generated to limit doses to DARS without compromising PTV dose coverage. It was observed that DARS mean dose of ≤ 45 Gy could be achieved in a significantly lesser number of patients with oropharyngeal primaries ($p < 0.02$). With respect to neck nodes, mean dose to DARS was 42.25Gy, 49.6Gy and 55Gy in patients with N0 disease, ipsilateral involved nodes, and bilateral nodal disease, respectively. Authors suggested that sparing of DARS was feasible when the volume of PTV was ≤ 150 cc ($p < 0.025$) and in patients with negative or unilateral nodal disease¹⁴.

Table 2. Summary of Trials

Year	Study	Patients	Treatment modality	Dysphagia outcome	Timing	Outcome parameters
2016	ARTSCAN	124	IMRT	Video fluoroscopy-Aspiration Patient reported choking	25 months 12 months 60 months	47% patients 25% at 1 year 28.6% at 5 years
2016-2018	DARS (CRUK/14/014)	112	S-IMRT vs Do- IMRT	MD ADI	25 months	70.3 (SD 17.3) vs 77.7 (16.1), $p = 0.016$.
2020	Prachi Upadhyay Sr. et al	50	IMRT vs 3D CRT	Dosimetric benefit Clinical swallowing status	18 months	66.15 Gy vs. 70.09 Gy, $p < 0.001$; 48% vs. 80%, $p = 0.039$
2022	May GamalAshour et al	146	SW- IMRT vs ST-IMRT	Clinical and instrumental evaluation	1 month, 3 months, 6 months, 1 year	P value < 0.001 , < 0.001 , < 0.001 , 0.006

Conclusion

Positive trend is emerging in the upcoming literature reporting an overall lower pattern of aspiration after IMRT compared with 3DCRT. This endpoint will further improve as the radiation oncologist will be encouraged to optimize plans to incorporate DARS sparing in their clinical practice along with functional swallowing rehabilitation strategies

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Meeting with Election Process & Results (AROI Bihar Chapter)

Before the deadline given by AROI Head Office Delhi for completing the Election of Bihar State Chapter, a meeting was held & I sent the details of the Election result on 31/03/23, and same day I got satisfactory reply from the National Secretary AROI.

The minutes of the meeting – which was discussed at Scada Centre Patna– from 8:00pm on 30/03/23. was also sent to them in details.

- ✓ Sixty four radiation oncologist of Bihar participated in the meeting & agenda of the meeting was discussed one by one with them.
- ✓ Welcome address was given by Dr. J.K Singh & he also explained in details about the various agenda, one by one.
- ✓ The account parts was discussed by Dr. Pritanjali Singh , She told that the exact amount was not been finalized because she was still waiting some vendor to pay the money, hence audited account of last year could not be completed she assumed to us that final audited report will be sent to office very shortly .
- ✓ Last item in the agenda was election of the chapter President Dr. J.K Singh dissolved the entire team of the state chapter with a request to continue till the new elected team take over the charge.
- ✓ Election process was started Dr. B. Sanyal, one of the senior most– Radiation Oncologist of the country & right now is the director of MCS Patna, He was requested to conduct the election process and be as returning office also, It was approved by all the participants.
- ✓ Election process started. There were only two posts, (Secretary / Joint– Secretary) where the contestants were more than the exact numbers of seats. It was decided by the majority of the participants to do the voting on these seats. On other posts bidding candidate are the same in number as per vacancy, Hence voting not needed on these other posts Voting was done on these posts Only.

The Final list prepared as follow:-

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3. Hon. Secretary

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4. Joint Secretary

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9. Editorial Board

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Dr. Shradha Raj

Dr. Kanchan

The Entire minutes of the meeting along with the result of new team with the signature of President / Returning officer on 31/03/23 is being sent to Central Committee of AROI. This is for information to all the new elected members also.

Dr. J. K Singh (Padma Shri Awardee)

Past President AROI (Bihar Chapter)

Director S S Hospital And Research Centre, Patna

Email Id- Drjksingh.Onco@gmail.Com Mobile No. - 9431021001



FELLOWSHIP INDIAN COLLEGE OF RADIATION ONCOLOGY

- DR. Gautam K. Sharan (SECRETARY – ICRO)

Guidelines and Instructions for nomination of candidates

An individual elected as a Fellow of the Indian College of Radiation Oncology is expected to:

- a) Stand out among peers in the profession as a person of distinction at the national/international level.
- b) Have distinguished himself/herself in the profession:
 - i. as a physician in his / her specialty; and/or
 - ii. in service to Medicine in patient care, teaching, public health work and/or health administration.

The Eligibility Criteria for the Fellowship of Indian College of Radiation Oncology:

1. Founder Members of the ICRO
OR
2. Membership of the ICRO for at least 5 years and possessing more than 15 years of experience after post-graduation.
- A. Founder members are automatically eligible for award of the Fellowship, subject to submission of Application and the payment of the Admission Fees for the Fellowship. (Fellowship Fees-Rs 7800/- Includes the GST)
- B. For other than Founder Members, Application needs to be submitted and after Election as a Fellow, a communication will be sent to the Elected Fellows for depositing the Admission Fees for the Fellowship, by the due date as per the communication.
- C. Fellowships will be awarded after the receipt of the Admission Fees.

Format of the Application Form and the Instructions can be downloaded from the AROI Website. A soft

copy of the application is to reach Dr. Gautam K. Sharan, Secretary ICRO through e.mail (secretaryicro@gmail.com, dr.gautamsharan@gmail.com) so as to reach him not later than 12 midnight of 30 June, 2023. A hard copy of the application along with all supporting documents is to reach the Secretary, ICRO (Address given in the application form) at the earliest but not later than 10th July, 2023. The applications will be valid for a period of 2 years (The current year, if received by deadline, and for the subsequent year). Late applications will be considered only for the Election of Fellows for the subsequent year.

Admission Fees for ICRO Fellows:

Rs 7800/-(Rupees Seven Thousand and Eight hundred only. This includes GST), through DD / Online Bank Transfer to "AROI-ICRO",
Name of A/C: AROI-ICRO
Bank: State Bank of India
Bank Address: Millerganj, Ludhiana, Punjab-141001
Account No: 39535445525
IFSC: SBIN0000731

Type of Account: Current

The Nominees are to be Proposed and Seconded by Members of AROI of GOOD STANDING of FIFTEEN YEARS duration. The PROPOSERS AND SECONDS MUST BE ICRO MEMBERS.

Soft copy of the Application must reach the Secretary, ICRO by midnight of 30 June of the year of Election, with a copy to the Chairman, ICRO. Documentary evidence of all Statements/Experience/Awards must be attached to the HARD COPY of the Application and is to be sent to the Secretary, ICRO so as reach him/her on or before 10th July of the year of Election.

The attention of the Proposer and Seconder making the nomination is invited to the Guidelines and Instructions laid down for the purpose.



FELLOWSHIP INDIAN COLLEGE OF RADIATION ONCOLOGY

- DR. Gautam K. Sharan (SECRETARY – ICRO)

1. The Proposer and Secunder nominating the candidate should certify from personal knowledge the professional and scientific standing/achievements of the candidate
2. Every candidate shall be proposed and seconded by a statement in writing signed by at least two Life Members of AROI of GOOD STANDING of FIFTEEN YEARS duration. The PROPOSERS AND SECONDEES MUST BE ICRO MEMBERS.

INSTRUCTIONS

1. Five copies each and a CD/DVD of the following documents must accompany the application for nomination.
 - i. A precise statement limited to 120 words on nominee's professional and scientific standing/ achievements which form the basis for nomination signed by proposer/secunder.
 - ii. Information as per format prescribed, duly completed. Follow the same section numbers in their submission as in the nomination form avoiding reference to enclosed appendices.
 - iii. List of publications:
 - a) Two separate lists of publications i.e. one in Journals included in Medical Databases, Medical Literature analysis and retrieval system (Medlar) etc. and other one in Journals, not included in medical database but published in Journals of National Societies/Professional Associations.
 - b) Be written in chronological order and should include (1)

Names and initials of all authors, (2) Title of article, (3) Title of publication abbreviated, (4) Volume number, (5) First and last page number, (6) Years of publication.

- c) Reference to books should include: (1) City of publication (2) Name of Publisher (3) Year of Publications.
- d) Abstracts and Proceedings of Conferences etc. should not be included in the list of publications.

2. Five copies each of six published papers considered to be best by the proposer. The Citation Index of six best published papers of the nominee and Average Impact Factor of the Journals in which the six best papers have been published may also be provided along with nomination for Fellowship. (Impact factor of the Journal in the year of publication of the concerned article).

The under-mentioned guidelines may also please be noted in this connection:

1. Only Life Members of AROI of GOOD STANDING of FIFTEEN YEARS duration and who are ICRO Members can Propose or Second the Nominee.
2. A Member may not propose more than three names for Fellowship in a year. He/ She may, however, second any number of proposals.
3. The candidate shall be Indian citizen. Exceptionally a foreign national who may have done outstanding work in India or for India in his/her own country may be considered.

Note: Nominations which are either incomplete or not according to the prescribed format will not be processed.



FELLOWSHIP

INDIAN COLLEGE OF RADIATION ONCOLOGY

-DR. Gautam K. Sharan (SECRETARY – ICRO)

<u>Chairman, ICRO</u>	<u>Secretary, ICRO</u>
Dr. RAKESH KAPOOR Prof & Unit Head Deptt. of Radiotherapy & Oncology. Tertiary Cancer Centre, PGIMER, Chandigarh. Professor In-charge Procurement Equipment Purchase, PGIMER. Chairman Indian College Of Radiation Oncology. Founder Director Homi Bhabha Cancer Hospital & Research Centers Punjab (Unit of T.M.C, Mumbai) D.A.E. (Govt of India) Email: : drkapoor.r@gmail.com , Inst. Email : kapoor.rakesh@pgimer.edu.in	Dr. Gautam K. Sharan Medical Director HOD & DNB Coordinator, Radiation Oncology Jawaharlal Nehru Cancer Hospital & Research Centre, Idgah Hills, Bhopal- 462 001, MP, INDIA E.mail: secretaryicro@gmail.com dr.gautamsharan@gmail.com

FOR ELECTION OF ICRO FELLOW, AN OVERALL ASSESSMENT IN ALL SPHERES WILL BE DONE AND VARIOUS CRITERIA WILL BE CONSIDERED AND NOT ONLY EXCELLENCE IN ONE PARTICULAR SPHERE ALONE.



Secretary – ICRO
Dr. Gautam K. Sharan



Vice Chairman– ICRO
Dr. Madhup Rastogi



Chairman- ICRO
Dr. Rakesh Kapoor

AROI

Fellowships/Grants



APPLICATIONS INVITED FOR: FELLOWSHIPS/ GRANTS/ BEST PAPERS

S.No	Name of Fellowship	No's	For	Age Group	Fellowship Grant (in Rs)	Basis	Member of AROI For #/yrs.	Min Papers	Regularly Attending AROI conferences	Already availed fellowship in the past
1. Overseas										
1.1	AROI Fellowship	1	Radiation Oncologist	>50	1.5 Lakhs	MD/DNB	20	5	Yes	Then weight to be given To those who have not Availed any Fellowship (or Any other Candidate is not available)
1.2	AROI Fellowship	2	Radiation Oncologist	41-50	1.5 Lakhs	MD/DNB	10	5	Yes	
1.3	AROI Fellowship	3	Radiation Oncologist	35-40	1 Lakh	MD/DNB	5	3	Yes	
1.4	AROI Fellowship	3	Radiation Oncologist	30-35	1,00,000	MD/DNB		3	Yes	
2. Within India										
2.1	AROI Fellowship	1	Medical Physicist	<40	30,000	DRP/MSc(MP)	2	BASED ON THERESUME AND INTERVIEW AT THE CONFERENCE & PREFERENCE GIVEN TO PAPER PRESENTERS	Yes	
2.2	AROI Fellowship	1	Radiation Oncologist	< 35	30,000	MD/DNB	3			
2.3	AROI Fellowship	1	RT Technologist	<45	15,000	AERB Certified	Yes			No
2.4	Neil Joseph Fellowship	6	Radiation Oncologist		20,000	Student MD/DNB	Yes		RESUME AND INTERVIEW	

3.1	Best Proffered Paper for Senior Members	1	Radiation Oncologist	>40 - ≤50		Post MD/DNB >10 Yr.	10-15 years	
3.2	Best Proffered Paper for Senior Members	1	Radiation Oncologist	35-≤40		Post MD/DNB 5-10 yr.	5-10 years	
3.3	Dr. G.C. Pant Young Doctor Award	1	Radiation Oncologist Post MD/DNB	<40	30,000 For fellowship	Post MD/DNB 3 yrs.	3 years	
3.4	Dr. M S Gujral Gold Medal	1	Doing MD/DNB		15,000+Medal		Yes	
3.5	Dr. M C Pant Gold Medal	1			10,000+Medal		Yes	
3.6	Gold Medal Medical Physics	1	Physicist/Radiation oncologist with physicist	<30	10,000	DRP/MSc in Med. Physics	Yes	

AROI

Fellowships/Grants



APPLICATIONS INVITED FOR: FELLOWSHIPS/ GRANTS/ BEST PAPERS

Procedure for Application:

1. Applicants have to send a copies of date of birth certificate, the publications mentioned under each Fellowship and Self-certified proclamation that they are working full time in radiotherapy (soft and hard copy both)
2. Fellowship amount will be given to candidates after 15% tax deduction.
3. All the applications for fellowship/ best paper awards be sent along with the full paper and the letter from head of department/ institute to the office of Secretary General AROI by 5 PM, 30 June 2023.
4. No Objection certificate from their head of Department if selected to go for 4weeks fellowship. Fellowship must be completed before August 2024.
5. PG Students shall send recommendation for presenting best paper through Head of the Department.
6. For best paper NOC for publication in JCRT (if selected). PG students should approach for best paper through their HOD/guide.
7. For fellowship more than 35 years age category should be ICRO member.
8. Mailing address and details -
 - a) Dr. V. Srinivasan Email : secretaryaroi@gmail.com , vsrinivasan09@gmail.com
 - b) Dr. Manoj Gupta Email: presidentaroi.manoj@gmail.com
 - c)

**Postal address: Dr. V. Srinivasan, Secretary General, Head Radiation Oncology ,
MIOT International Hospital , Chennai 600089**

Mob : 9841022366, E-mail: secretaryaroi@gmail.com , vsrinivasan09@gmail.com

Obituary



Dr Bhowmik
5-7-1957 to 9-1-2023

Gone from our sight, but never from our hearts. There are examples of some great men who are kind, noble and who touched the lives of many. Dr Bhowmik was one of them.

Dr Bhowmik was born on 5th July 1957 in the city of Kanpur, Uttar Pradesh. His father was in the air force and instilled in him the values and principles of discipline and hard work since the beginning. Dr Bhowmik studied in different cities of India like New Delhi, Coimbatore and Sullur. An extremely bright and hard-working student Dr Bhowmik had always dreamt to be a doctor. His efforts paid off as he studied in the most prestigious institutions of the country. He completed his under graduation from JIPMER, Pondicherry in 1978 which was followed by MD in Radiation Oncology from AIIMS Delhi, completed in 1983.

He did his senior residency from the same institute after that. He also did Diploma in Radiation Medicine from BARC, Mumbai in 1989.

His professional journey started as Lecturer in BHU, Varanasi and he then came to Safdarjung Hospital, New Delhi in 1991. He was responsible for making the department as one of the most reputed, high volume centres and one of the best teaching institutes in the country. Dr Bhowmik was known by one and all as one of the pioneers in the field of radiation oncology in the country. He served as Additional Medical Superintendent and also Medical Superintendent in the same hospital during his tenure.

In 2019, he became the Additional Director General of Health Services, Government of India and was posted to the ministry.

Till his retirement, he served as the Principal Consultant, Department of Radiation Oncology at Safdarjung Hospital, New Delhi.

He has contributed a lot to the Association of Radiation Oncologists of India (AROI). He had served as General Secretary of AROI as well. He was also the Chief election commissioner of AROI for many years. He conducted several elections without any dispute. If any constitution related matter was there, Dr Bhowmik solved the problem easily.

He was rightly known as the “Constitution man of AROI”

His hobbies were reading and sports particularly tennis and hockey. He was the recent AFI Medical Committee Chairman. He was a very rare combination of medical expertise and an interest in sport. An avid sports fan, his contribution to athletics was immense. Dr Bhowmik had umpired in both tennis and hockey. He umpired in many Davis Cup tournaments held in India. Going to the Tokyo Olympics was a dream come true for him where he was the Chief Medical Officer for the Indian contingent. He played a key role in ensuring the medical safety of the athletes and support staff during the challenging times of the Covid-19 pandemic.

Unfortunately, on 9th January 2023, Dr Bhowmik left for his heavenly abode at the age of 65 years. Dr Bhowmik was a compassionate soul and an inspiration to us all. The void he has left behind can never be filled however his legacy lives on.

Obituary



Prof. R Mahadevan
(4.5.1961- 27.2.2023)

Dr Mahadevan Rajagopal was born on May 4th, 1961 in Trivandrum, Kerala. He passed his MBBS in 1988. He finished DMRT in 2002 from Medical College Trivandrum and RCC and DNB in Radiation Oncology in 2005.

He joined Kerala Medical Education Department in 1991 as Lecturer in Radiotherapy and worked in Government Medical Colleges of Thrissur and Trivandrum for about a decade. In 2003, he was promoted as Assistant Professor of Radiotherapy in Government Medical College Kottayam and in 2009 as Associate Professor. He was the head of the Department of Radiation Oncology in Government Medical College Thrissur and later in Trivandrum. In 2011, he became Professor of Radiation Oncology and was continuing till his departure to heavenly abode on February 27th, 2023.

Dr Mahadevan was elected as Secretary, Kerala Chapter of Association of Radiation Oncologists of India in 2018 and continued till 2023. His organizing capacity was incredible and was actively involved in organizing numerous national and international academic conferences and meetings in Kerala. He gave Dr F Joseph Memorial Oration in the Annual State AROI conference.

Dr Mahadevan, as his every colleague would testify, was a brilliant academician. He believed in hard work for acquiring knowledge and imparted the same to his students by setting his life as an example. He encouraged his colleagues and students to achieve academic excellence and motivated them to aspire for super specialty courses and clinical fellowships in Radiation Oncology. His trainees pursuing higher education all over the world would assert this. He was examiner for MD and DNB courses in Radiation Oncology all over India and inspired students to attain higher levels of success in their lives.

Dr Mahadevan had proved to be an excellent clinician. He was famous in his realm for his clinical judgement and timely treatment decisions. His empathy and humanitarian approach to patients had won the hearts of millions during his clinical practice. His gentle and affectionate attitude had welcomed patients to approach him at any time. His care for the poor and needy patients is still remembered by his colleagues. He even motivated his colleagues to extend their hands for the poor patients at all times.

In the administrative side, he had held positions of Deputy Superintendent and Superintendent of Government Medical College, Thrissur and played an important role in leading Hospital development societies. Dr Mahadevan enacted a key role in acquiring state of the art linear accelerator radiotherapy machines in two government medical colleges in Kerala; Thrissur and Trivandrum. During his period, Day care chemotherapy for oncology patients was first initiated in Government infrastructure in Thrissur Medical College. He also set up palliative care wards for the first time in Government in Thrissur. He even extended his helping hand to his colleagues working in government health services department to set up independent oncology centers in all districts and motivated them to procure radiotherapy machines in their centres. His untimely demise is surely a huge loss to the oncology community and to the health services in Kerala.

Dr Mahadevan was a visionary who dreamt about revolutionizing government medical college oncology departments to the state-of-the-art tertiary regional oncology centres. Dr Mahadevan had unfulfilled dreams and visions about the future of radiation oncology which he had shared with his colleagues and students. His untimely departure has indeed left a vacuum in the hearts of his dear and near ones and they would carry his visions forward.

He was nearing his retirement from Government service in May 2023, when he succumbed to the ailment and left us suddenly. He fought valiantly in his life till his last breath with immense confidence and courage but could not make through. He is survived by his wife Dr Mini Mahadevan, Consultant Pulmonologist and his daughter, Parvathy Mahadevan and her family. He would be fondly remembered forever by everyone acquainted with him and would live in our memories.

Imaging In Neuro-Oncology

Dr. Kanhu Charan Patro¹, Dr. Ajitesh Avinash²



Dr. Kanhu Charan Patro
Prof. and HOD, Dept. of
Radiation Oncology
Mahatma Gandhi
Cancer Hospital and
Research Institute,
Vishakhapatnam,
Andhra Pradesh



Dr. Ajitesh Avinash
Registrar,
Dept. of Radiation
Oncology
SUM Ultimate Medicare,
Bhubaneswar, Odisha

**Imaging in neuro-oncological practice,
We will tell you here, CT, MR, and PET tactics.**

**CT is electron density-based imaging,
MR is proton-based imaging.**

**In CT, the image is either hypo, iso or hyper dense,
In MRI the same is called hypo, iso or hyper intense.**

**CT has only two sequences - plain and contrast,
MR has many sequences including contrast.**

**CT is best for imaging bone and skull base,
MRI is useful for studying brain parenchymal space.**

**You can view the brain, bone, or subdural window,
By changing the level and width window.**

**Structural imaging helps to analyse anatomical properties,
Functional imaging guides in brain tissue activities.**

**Series of events in MRI machine are called sequences,
T1, T2 and FLAIR are the important sequences.**

**T1 is best to study anatomical definition,
It is better for Gray and white matter differentiation.**

**Identification of sequences is based on CSF colour,
Which is black in T1, white in T2 and oozing in FLAIR.**

**Ghost sequence is called diffusion weighted image,
T2 diffusion is known as ADC image.**

**More the restriction, more is the malignancy,
More brightness points towards more malignancy.**

**To measure the restriction,
ADC mapping is the solution.**

**Perfusion image is a special sequence,
It is based on blood flow within the substance.**

**Spectroscopy measures the chemical nature,
Low choline and high NAA are normal in nature.**

**To study ventricles, cisternas and nerves,
Cisternography is best for cranial nerves.**

**Micro-hemorrhages, cysts, and calcification,
Susceptibility or Gradient ECHO is the solution.**

**To study the cranial nerve,
Keep VISTA or FIESTA sequence in reserve.**

**To study the anatomy, select GE-FSPGR sequence,
or CE-FFE in Phillips and MPRAGE in Siemens.**

**To study post op pituitary fossa substance,
Select FATSAT or STIR sequence.**

**To study vascular malformation,
Take the help of MR Angio information.**

**Tractography helps to locate white matter tracts,
It guides the surgeons as it has anatomical impacts.**

**To study brain secondaries at last,
Double the dose and take the delayed contrast.**

**FDG-PET has a limited value in brain,
PSMA and DOTA PET have some gain.**

**DOTA PET has a value in meningioma,
PSMA has a role in recurrent glioma.**

**These are all basics of imaging in brain,
You can call me to explain**



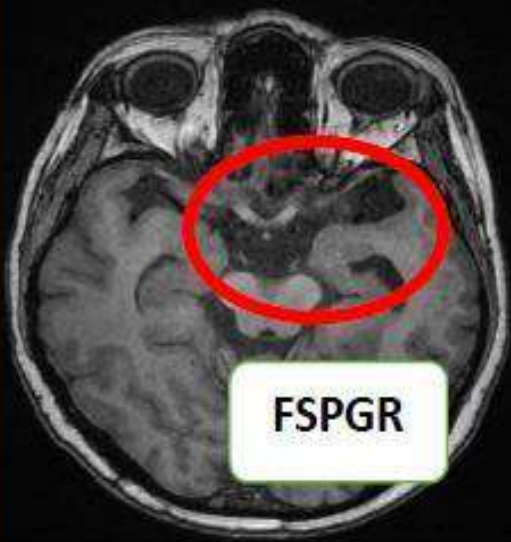
T1-weighted



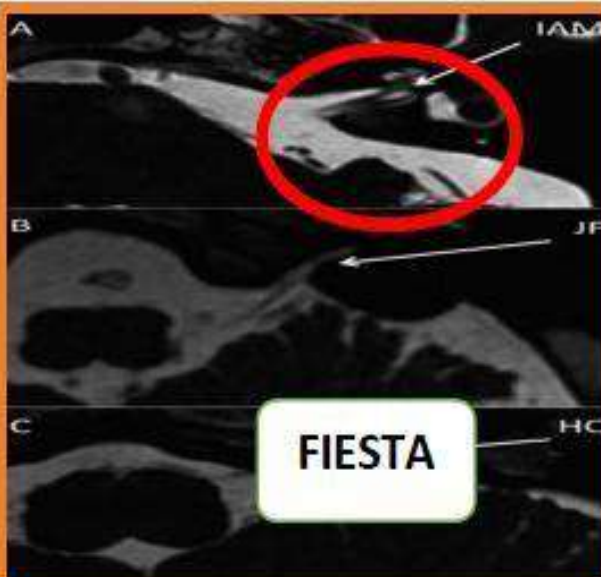
T2-weighted



Flair

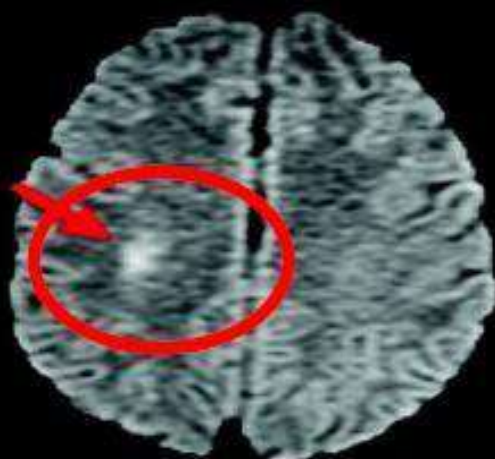


FSPGR

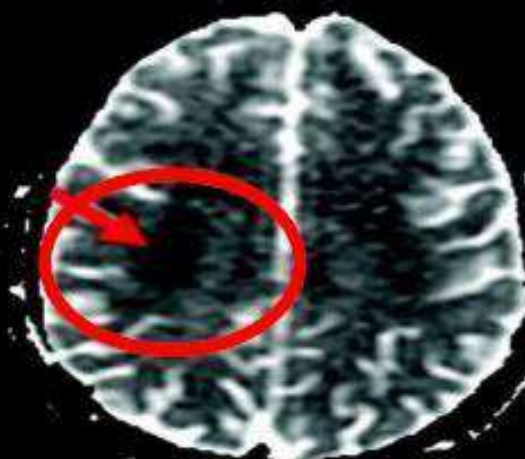


FIESTA

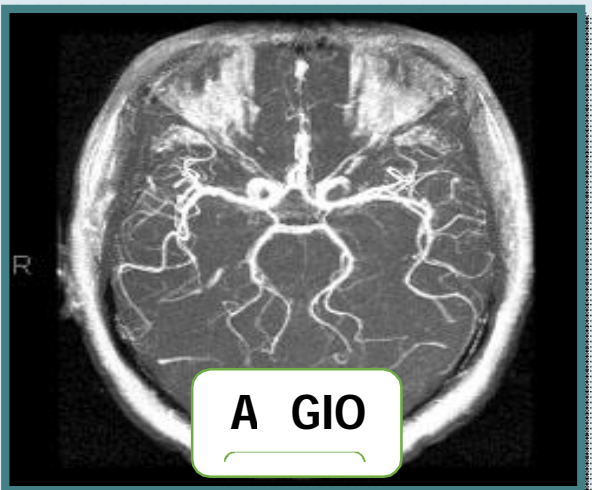
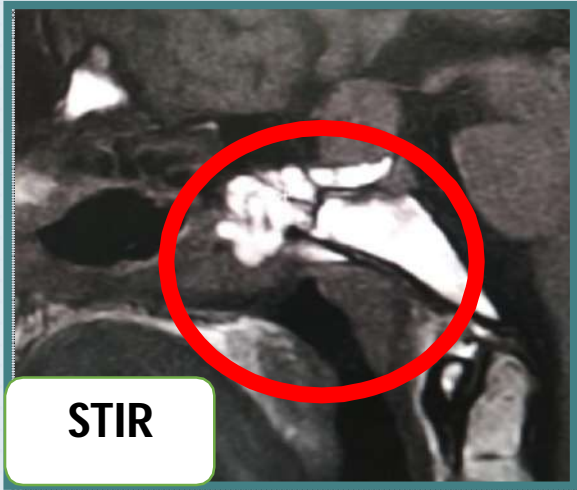
DWI



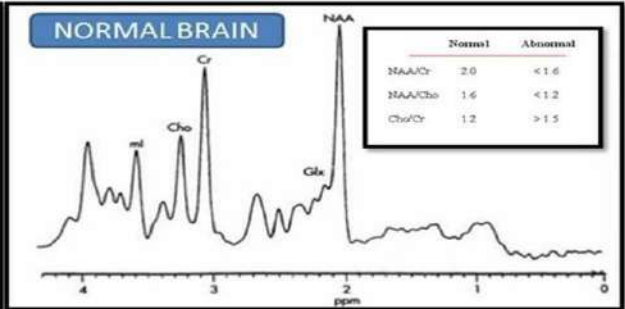
ADC



Procedure	Like brain	Less than brain-Darker	More than brain-Whiter
CT SCAN	Isodense	Hypodense	Hyperdense
MRI	Isointense	Hypointense	Hyperintense

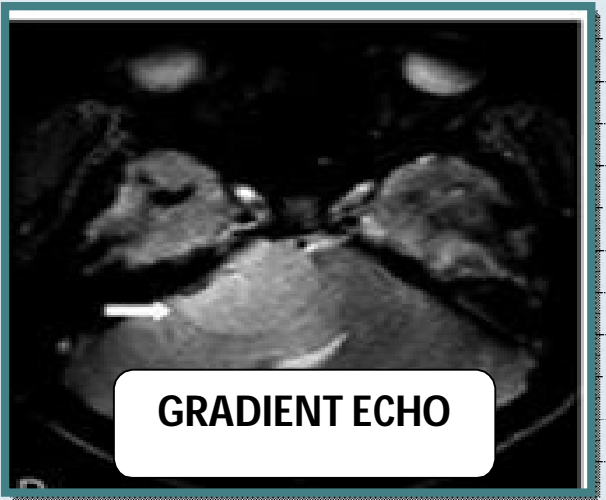
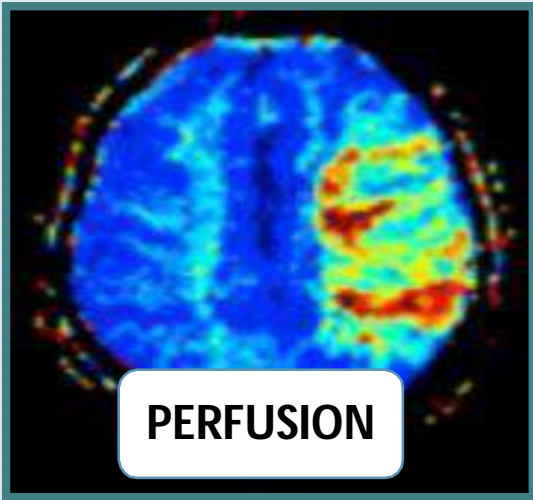


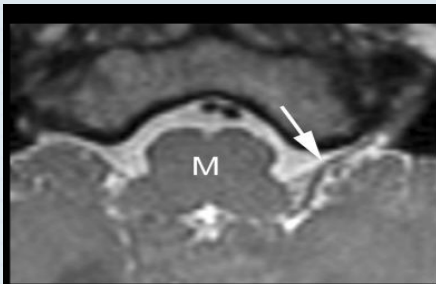
- So in MR spectroscopy (MRS) :-
 - NAA is considered as a **good** metabolite (as it represents neuronal health)
 - Choline is considered as a **bad** metabolite (as it is seen in tumors) and
 - Lipid lactate doublet as an **ugly** metabolite (as it is seen in necrotic tumors).



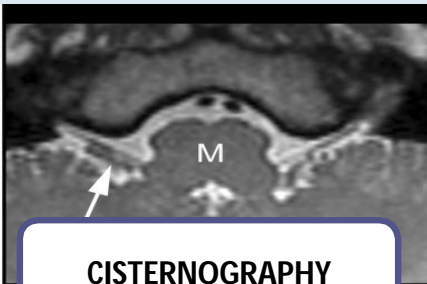
ppm	Metabolite	Properties
0.9-1.4	Lipids	Products of brain destruction
1.3	Lactate	Product of anaerobic glycolysis
2.0	NAA	Neuronal marker
2.2-2.4	Glutamine/GABA	Neurotransmitters
3.0	Creatine	Energy metabolism
3.2	Choline	Cell membrane marker
3.5	myo-inositol	Glial cell marker, osmolyte hormone receptor mechanisms

- Contrast - Vascularity
- Diffusion - Microarchitecture
- Perfusion - Neo angiogenesis
- Spectroscopy - Chemical environment

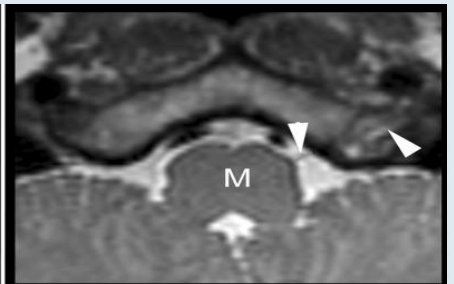




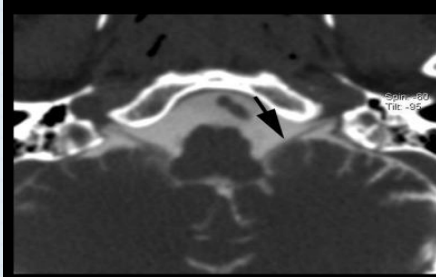
(a)



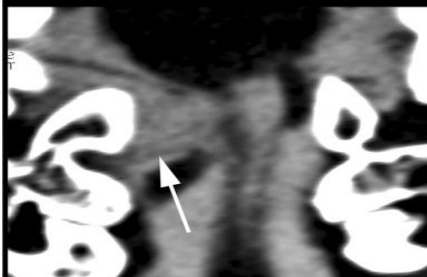
CISTERNOGRAPHY



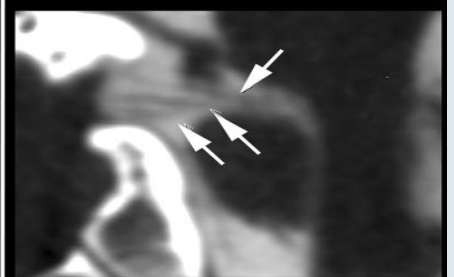
(c)



(d)



(e)

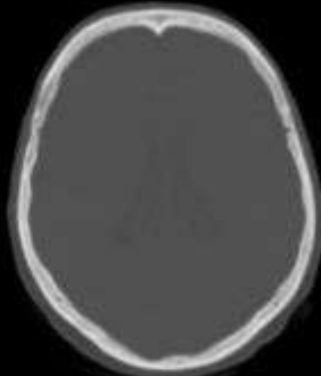


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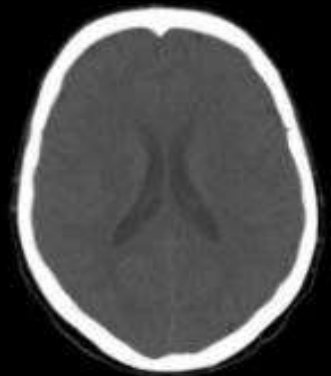
BRAIN window

W:80 L:40



BONE window

W:2500 L:480



SUBDURAL window

W:350 L:90

Padmashri Dr K. A. Dinshaw Memorial Oration



Howard M. Sandler, MD, MS, FASTRO, FASCO
Professor & Chair, Radiation Oncology
Ronald H. Bloom Family Chair in Cancer Therapeutics

Howard M. Sandler, MD, MS, FASTRO, FASCO is the Chair of Radiation Oncology at Cedars-Sinai. He also holds the Ronald H. Bloom Family Chair in Cancer Therapeutics. Prior to joining Cedars-Sinai Medical Center Dr. Sandler served as a professor of radiation oncology and urology at the University of Michigan.

Dr. Sandler's research interests include prostate and genitourinary tumors as well as a broad range of subjects related to radiation oncology. He has been involved in a number of research projects funded by the National Institutes of Health and other agencies to conduct research in these areas.

Dr. Sandler currently is President-Elect of ASTRO, the largest radiation oncology professional society. He held an important leadership position within the Radiation Therapy Oncology Group/NRG Oncology and help direct or lead practice changing clinical trials.

In addition to presenting and speaking at more than 100 symposiums, workshops and meetings, He has written more than 300 articles on prostate cancer and radiation therapy in peer-reviewed publications such as JNCI, Journal of Clinical Oncology, Lancet Oncology, JAMA Oncology, JAMA, and the New England Journal of Medicine.

The recipient of numerous awards, Dr. Sandler was named Teacher-of-the-Year in the Department of Radiation Oncology at the University of Michigan and Cedars-Sinai Medical Center.

Dr. Sandler received his bachelor of science (summa cum laude), medical degree and masters of science in physics from the University of Connecticut. He completed a residency in radiation oncology in the Department of Radiation Oncology at the Hospital of the University of Pennsylvania.

BEST OF ASTRO 2023
29-30th July 2023

Ruby Hall Clinic, Pune

Contact: Dr Bhooshan Zade M: 99678 35653

Dr B. D. Gupta Memorial Oration



Dr. Rajesh Vashistha
Director, Radiation Oncology & Medical Advisor
Max Superspeciality Hospital, Bathinda

Chair, AROI
Vice President, Federation of Asian Radiation Oncologist

- ✓ MBBS, MD (SMS Medical College, Jaipur)
- ✓ Former Senior Consultant, M D Oswal Cancer Hospital, Ludhiana
- ✓ Former Secretary, AROI (2004-2016)
- ✓ Former President Elect, AROI (2016-2018)
- ✓ Former President, AROI (2018-2022)
- ✓ More than 100 publications in peer reviewed and indexed journals

Dr Rangi Prasad Memorial Lecture



Dr. Kishore Singh

Director & CEO, Delhi State Cancer Institute
Member Secretary of the Governing Council of DSCI
Director-Professor, Dept. of Radiation Oncology,
Maulana Azad Medical College and associated Lok Nayak Hospital,
New Delhi

- ✓ MBBS, MD (Bikaner)
- ✓ Former Director GB Pant Institute of PG Medical Education and Research, Delhi
- ✓ Former Dean, Maulana Azad Medical College, Delhi
- ✓ Former Editor, Journal of Clinical Research and Therapeutics
- ✓ WHO Fellowship 2008 - 2009
- ✓ Fellowship at M D Anderson Cancer Center, Houston, Texas, USA in 2013
- ✓ AROI Kirloskar Therapeutics Fellowship 2014-2015
- ✓ More than 100 publications in peer reviewed and indexed journals



Indian College of Radiation Oncology (ICRO)

Academic Wing of

Association of Radiation Oncologists of India (AROI)

43RD ICRO PG Teaching Program

6th & 7th May 2023

On

Gynecological Cancer

Organised by,

**Mahamana Pandit Madan Mohan Malviya Cancer Centre &
Homi Bhabha Cancer Hospital,
Varanasi**



Patron

Dev Murti
Chairman - SRMS Trust



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Aditya Murti
Director Administration
SRMS-IMS, Bareilly



Co-Patron

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Principal
SRMS-IMS, Bareilly



Course Director

Prof. Manoj Gupta
President - AROI
Ex. Dean AIIMS, Rishikesh
Head - Radiation Oncology



Course Coordinator

Prof. Piyush Kumar
Head - Radiation Oncology
SRMS-IMS
Bareilly

AROII

Chair

Dr. Rajesh Vashistha
Director - Department of Radiation Oncology and
Medical Advisor - Max Super Speciality Hospital, Bathinda, Punjab
Mobile No: 9316909701; Email: drvashistha@gmail.com

President

Prof. Dr. Manoj Gupta
Ex. Dean - AIIMS, Rishikesh
Head - Department of Radiation Oncology
Mobile No: 9816137344; Email: presidentaroi.manoj@gmail.com

President Elect

Prof. Dr. Surendra Nath Senapati
Professor & Head - Department of Radiation Oncology
A.J.H. Postgraduate Institute of Cancer, Cuttack,
Mobile No: 943793718; Email: snsenapati2007@gmail.com

Secretary General

Dr. V. Srinivasan
Head - Department of Radiation Oncology,
MIOT International Institute of Cancer Care, Chennai,
Mobile No: 984122366; Email: secretaryaroi@gmail.com

ICRO

Chairman

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Professor & Head, Unit - II
Department of Radiotherapy & Oncology Tertiary Cancer Centre
PGIMER, Chandigarh
Mobile No: 9808009306; Email: drkapoor.r@gmail.com

Vice Chairman

Dr. Madhup Rastogi
Professor & Head - Department of Radiation Oncology
Dr. RMLIMS, Vibhuti Khan, Gontli Nagar, Lucknow
Mobile No: 9418959955; Email: drmadhupr@gmail.com

Secretary

Dr. Gautam K. Sharan
Medical Director - HOD & DNB Coordinator, Radiation Oncology
Jawahar Lal Nehru Cancer Hospital & Research Centre, Bhopal (M.P.)
Mobile No: 9826323100; Email: secretaryicr@gmail.com

Joint Secretary (North)

Dr. Piyush Kumar
Professor & Head - Department of Radiation Oncology
SRMS-IMS, Bareilly
Mobile : 9897693669; E-mail : piyushkumar@gmail.com



SRMS



**Indian College of Radiation Oncology
(ICRO)**

**Academic Wing of
Association of**

**Radiation Oncologists of India
(AROII)**

**20th AROI ICRO Radiobiology 2023
(Intas)**

**TEACHING COURSE
(North Zone)**

**Clinical Radiobiology for
Radiation Oncologists
on
Saturday 15th April 2023
9.00 am to 5.30 pm**

VENUE

**Examination Hall-2, II Floor,
Medical College, Shri Ram Murti Smarak
Institute of Medical Sciences,
Bareilly (U.P.)**

Application

I would like to participate in the
"Clinical Radiobiology for
Radiation Oncologist"
on 15th April 2023

Name

Designation : Consultant / Student

Qualification

DMRT MD DNB

Year

AROII Membership

Mobile No.

E-mail

Name & Address of Institute

.....

City State

Pin Code

.....

.....

.....

Signature

Course Aim

- 1) To understand radio-biological Principles.
- 2) To know its clinical applications and implications

Course Eligibility

- 1st, 2nd, 3rd year MD / DNB / DMRT (Radiation Oncology) Post Graduate, Senior Resident and Consultants.
- Travel & Accommodation to be borne by participants.
- The course is Free without any registration fee.



For online registration please scan
this QR Code or click the link
mention below-



<https://forms.gle/5ixPL1V9N7NH8gvq7>

For any other information kindly contact
Dr. Piyush Kumar : 9897693669

Program Schedule

09:00 - 09:30 am **Registration**

09:30 - 11:45 am **Module 1 & 2** Interaction with matter & Radiation Injury to Cells, Mechanism of action Cell Survival Curve, Exponential relationship, D₁₀ & D₀, Multi Model, L-Q Model)

11:45 - 11:30 am **Tea-Break**

11:30 - 01:15 pm **Module 3** (Clinical Applications of Q Models, Normal Tissue injury with emphasis to spinal cord BED and its clinical applications, Altered fraction and its radiobiological basis)

01:15 - 01:30 pm **Inauguration**

01:30 - 02:30 pm **Lunch**

02:30 - 03:45 pm **Module 4** (Radiobiology of Hypofractionation, SRS & SBRT, factors affecting cell survival curve, HRS & IRR, Dose Rate Effect, Oxygen Effect, Radiobiology of fractionated RT, Intrinsic Sensitivity and Sft)

03:45 - 04:00 pm **Tea-Break**

04:00 - 05:15 pm **Module 5** (4Rs of Radiobiology, Role of 4 rs in SRS & SRT, TCP, NTCP Therapeutic ratio LET and RBE)

05:15 - 05:30 pm **Valedictory**



SRI AUROBINDO UNIVERSITY
Sri Aurobindo Medical College & P.G Institute, Indore
Indore - Ujjain State Highway, MR - 10 Crossing, Sanwer Road, Indore (M.P.)



SRI AUROBINDO UNIVERSITY
Sri Aurobindo Medical College & P.G Institute, Indore
Indore - Ujjain State Highway, MR - 10 Crossing, Sanwer Road, Indore (M.P.)



SIXTH TEACHING COURSE MEDICAL PHYSICS & RADIOBIOLOGY

22nd - 23rd April 2023



How to reach: 10.8 kms from Indore Airport, 11.2 kms from Indore Railway Station, 45 kms from Ujjain Railway Station
For Contact: 0731 423 1728/1897, 9893115337, 9452363314 | Email : mahee813@gmail.com

Teaching Schedule Medical Physics & Radiobiology

Speakers: Dr. Virendra Bhandari, Dr. OP Gurjar, Mr. Mahendran, C, Ms. Priyusha Bagdare

22 nd April 2023		
10:00 AM - 12:00 NOON	Basics of Radiation Physics-	Mr. Mahendran, C
12:00 AM - 1:15 AM	Beam Modifying Devices-	Dr. Virendra Bhandari
1:15 PM - 2:00 PM Lunch		
2:00 PM - 4:00 PM	Radiobiology-I (cell survival curve, OAR, RBE, LET, LQ Model)-	Dr. Virendra Bhandari
4:00 PM - 5:00 PM	Conventional Radiotherapy Planning and Electron Therapy (cobalt machine, immobilization, Isodose curve)-	Dr. OP Gurjar
5:00 PM - 6:00 PM	Physics in Brachytherapy-	Mr. Mahendran, C



SRI AUROBINDO UNIVERSITY
Sri Aurobindo Medical College & P.G Institute, Indore
Indore - Ujjain State Highway, MR - 10 Crossing, Sanwer Road, Indore (M.P.)



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Speakers: Dr. Virendra Bhandari, Dr. OP Gurjar, Mr. Mahendran, C, Ms. Priyusha Bagdare

23 rd April 2023		
9:00 AM - 11:00 AM	Radiobiology-II- (Fractionation, Acute and Late syndrome)-	Dr. Virendra Bhandari
11:00 - 11:40 Noon	Particle Therapy-	Mr. Mahendran, C
11:40 AM - 11:50 AM Tea Break		
11:50 AM - 1:00 PM	Radiation Safety & Protection-I-	Ms. Priyusha Bagdare
1:00 PM - 2:00 PM Lunch		
2:00 PM - 3:00 PM	Radiation Safety & Protection-II-	Ms. Priyusha Bagdare
3:00 PM - 4:00 PM	Advance Radiotherapy Techniques-	Mr. Mahendran, C
4:00 PM - 5:00 PM	QUESTIONS and Conclusion-	Dr. Virendra Bhandari

Course Coordinator & Speakers 1

Dr. Virendra Bhandari,
Professor and HOD,
Sri Aurobindo Institute of Medical Sciences,
Indore.



Speakers 2

Mr. Mahendran, C
Asst. Prof of Medical Physicist & RSO
Sri Aurobindo Institute of Medical Sciences,
Indore.



Speaker 3

Dr. OP Gurjar,
Associate Professor (Medical Physics),
Government Cancer Hospital,
M.G.M Medical College,
Indore.



Speaker 4

Ms. Priyusha Bagdare,
Chief Medical Physicist cum RSO,
CHL 114 Hospital,
Indore.

