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Radiographers' Journal

The official magazine of Society of Indian Radiographers (SIR)
Published by Radiographers' Association of Maharashtra (RAM)

January, 2023

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Editorial

Dear Radiographer Friends,

Wish you a very happy New Year.

It is with great pleasure that present you all with inaugural issue of the Radiographers 'Journal a monthly e-journal.

Due to increased cost of printing we did not publish the Radiographers' Journal for last few years. Since many days we are planning to bring out an e-journal for Radiographers that has become a reality today. The objective of this Journal is to communicate all Radiographers about the activities and achievements in our field and also to create awareness among them.
I am really amazed at the enthusiasm shown by the Radiographers in sending articles for publication

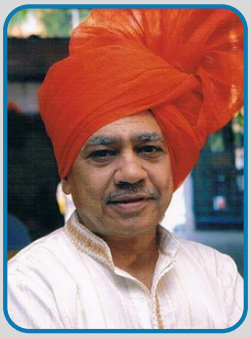
I am very much sure that soon Radiographers' Journal will be again recognized for its contributions to the profession.

Kindly go through it and convey your suggestions promptly so that corrections if any will be made in coming issues, also please share your experience and help in fostering friendship amongst the professionals.

Please be kind enough forward this issue to other Radiographers too.

With warm regards

Shankar Bhagat
Editor In-Chief



TRIBUTE

to the

First Editor In-Chief

Late Shri. Anil Chandolikar Sir

Message from Chairman, SIR

मुझे यह जानकर अत्यधिक प्रसन्नता हो रही है कि सोसाइटी ऑफ इंडियन रेडिओग्राफर्स के 22वें अधिवेशन के अवसर पर रेडिओग्राफर्स असोसीएशन ऑफ महाराष्ट्र अपनी ई – पत्रिका रेडिओग्राफर्स जर्नल का प्रकाशन करने जा रहा है.

बताया गया है कि इस पत्रिका में नियमित रूप से रेडिओग्राफर्स से संबन्धित गतिविधियों का प्रकाशन किया जाएगा एवं विषय से संबन्धित कई लेख भी पढ़ने को प्राप्त होंगे. पत्रिका के सृजन में रेडिओग्राफर्स की महत्वपूर्ण भूमिका है, इसका संकलन भी रेडिओग्राफर्स द्वारा ही किया जाना है, इससे निश्चित ही रेडिओग्राफर्स को लाभ होगा.

मैं इस जर्नल के लेखन एवं प्रकाशन कार्य से जुड़े सभी का विशेष रूप से धन्यवाद ज्ञापन करता हूँ एवं अपनी शुभकामनायें प्रेषित करता हूँ.

Trilokinath Mishra

Message from President, SIR

Damodara Naidu. Koti

I am very delighted to note that The Radiographers, Association of Maharashtra (RAM) is bringing out The e-Journal of Radiographers.

I feel proud to acknowledge the services rendered by the Maharashtra Radiographers in this aspect. I hope the articles published in the journal will reflect the scientific work done by the Indian Radiographers. Of course there is no bar for learning. I am confident that this journal will enlighten us in every manner that the Radiographer intended to be. Hope the journal will give us in-depth of Knowledge required for the Radiological technologists.

Once again I Congratulate the Radiographers, Association of Maharashtra (RAM) for their wonderful job of bringing out the e-Journal. I appeal the Radiographer fraternity in India in utilizing this opportunity in their capacity .

I wish all the success.

Messages from Vice Chairmans, SIR

K. Munirathinam

Dear friends,

Greetings from Society of Indian Radiographers.

I Congratulate Radiographers' Association of Maharashtra for publishing Radiographers Journal.

This journal will definitely helps all technologists to keep them updated.

I request all the radiographers to share their material and interesting cases for the publication.

Dear Friends,

It gives me immense pleasure in conveying my best wishes to Radiographers' Association of Maharashtra (RAM) for publishing a monthly e-journal "Radiographers Journal" at 22nd National Conference of SIR,on 10th Feb 2023 at Goa.

I Congratulate Radiographers' Association of Maharashtra once again. RAM had earlier launched "Radiographers Journal" for Maharashtra under the Chief Editorship of Late Shri Anil Chandolikar Sir on 8th August 2004, at Choksi Auditorium, Tata Memorial Hospital, Parel, Mumbai.

Sunil V. Chavan

As newer modalities are coming up, which has helped in unfolding the mystery of human body with this, many patients are benefited.

This journal will definitely helps all technologist to keep them updated.

Message from Sr. Advisory Member, SIR

S. A Wajid

I am extremely delighted to learn that, the Radiographers' Association of Maharashtra is publishing a monthly Radiographers' Journal on the occasion of 22nd National Conference of SIR at Goa on 10th February 2023.

Publishing above said journal will be an opportunity for the Radiographers community to share their professional experience through articles, Scientific papers etc and to update their knowledge in the field of radiology technology.

The Journal will be communication link for students to learn more and more. I congratulate Mr. Shankar Bhagat, General Secretary, RAM for his sincere efforts to publish the journal

Message from General Secretary, SIR

Jagdish Jagtap

Dear Radiographer friends,

Greetings from Radiographers' Association of Maharashtra and Society of Indian Radiographers.

Once again it's a great pleasure to announce a Radiographers journal design by the radiographers only. Friends we use to have this Radiographers journal earlier before this technology era in hard copy format. Mr Anil Chandolikar Chief Editor had taken lot of pain to collect data from all the radiographers get the sponsorships for printing, circulating and all other things. After his sad demise and due to this technology era we unfortunately discontinue our publications.

Now we are having everything on fingertip still some of the practical difficulties cannot sorted out by computer. So we thought we should start our journal again for the update of new technologies and practical difficulties. This is also our own platform to share our experiences or the students and during work and this will be helpful f the fresh radiographers.

Mr Shankar Bhagat National Coordinator SIR and General Secretary RAM is taking lot of efforts to start E Journal. I request all the radiographers to share their material and interesting cases for the publication.

Wish you all a safe radiological career.

Be updated and keep other updated by sharing your knowledge.

Best Wishes

Message from Working General Secretary, SIR

Srinivasulu Siramdas

I am very glad to know that the Radiographers' Association of Maharashtra is going to publish monthly e- journal Radiographers' Journal as the official journal of Society of Indian Radiographers.

The Science and technology is rapidly developing, the use computers and its software developed many sequences in all Imaging modalities. The diagnosis become easy and accurate. It is very much essential to update once knowledge and skills time to time to withstand in this competitive world.

The Society of Indian Radiographers is committed for the welfare of the radiographers and its members. SIR is conducting every year the state level and national level conferences, seminars to update the skills and knowledge. The publishing of digital magazine is another feather in the crown of SIR.

I appreciate Mr. Shankar K Bhagat for his initiation for publishing the same. e-Journal will be illustrated beautifully with all features, weblinks, animated sequences, pics related to anatomy, physics pertaining to Conventional Radiography to advance CT and MR which help the Radiographers and radiology students as a hand book.

I appeal the experts and faculty to contribute with articles to make more magnificent and useful to the radiographers and students.

Benefits of Recurring MRI Safety Training for non-MR Hospital Staff

Andrew Bulla, M.S., RT (MR), MRSO(MRSC) Advanced MRI Technologist, John Cochran VAMC, St. Louis, MO 63106 USA. email:andrew.bulla@va.gov

Michael David, RT(R)(MR), Advanced MRI Technologist, John Cochran VAMC, St. Louis, MO 63106 USA. Email michael.david@va.gov

In a hospital environment, patient care often necessitates the presence of non-MRI personnel in an MRI suite. Due to the acute risks to patient and staff safety inherent to the strong static magnetic field, accidents caused by negligence or ignorance of basic MRI safety principles can be harmful or fatal. MRI personnel are typically well-trained in MRI safety, but non-MRI staff may have no knowledge of the dangers posed by magnetic fields and the necessary precautions that must be taken before entering an MRI environment. Recurring, standardized training for all clinical and custodial hospital staff can potentially reduce MRI accidents and can easily be incorporated into hospital procedures.

MRI technologists that spend most or their entire shift in an MRI suite quickly become familiar with relevant safety procedures and practices, and good habits are formed (e.g., checking pockets for ferromagnetic objects, checking all equipment that enters scan room). Non-MRI hospital personnel, however, do not have this familiarity, and often do not know what can safely enter the scan room. This can lead to unsafe conditions in which ferromagnetic items are brought into the magnetic field, particularly in busy clinics with high throughput where staff may not take time to consider risks before entering the scan room. Technologists are typically appropriately vigilant in screening everyone before allowing access to the scan room; however, because MRI departments are commonly understaffed, a lone technologist positioning a patient may not notice a nurse approaching the magnetic field. Thus, scenarios can arise where a nurse, physician, assistant, or other hospital staff member inadvertently brings a ferromagnetic object near the scanner and causes a projectile incident.

To combat this, basic safety training can be regularly provided to non-MR staff. This training should primarily include information about risks associated with the static magnetic field, as these are the most important risks that non-MR staff will encounter. In particular, the projectile effect should be emphasized, and the potential consequences of bringing ferromagnetic objects into the scan room should be made clear. Training should also stress that the static magnetic field is always on (in the case of superconducting and permanent magnets). Visual aids, which can be very helpful for demonstrating these risks and often become the primary part that is remembered. In our facility, training includes a photograph of a patient bed that had been pulled into the magnet bore and folded; visiting non-MR staff regularly mention this picture, which helps them to respect the magnetic field and safety precautions.

Some non-MR personnel in a hospital environment are regular visitors to an MRI department, such as electrophysiology nurses or radiologists. Many hospitals focus on providing MRI safety training only to these frequent visitors. However, nearly anybody working in a hospital could feasibly need to enter an MRI suite, including information technologists, custodial staff, intensive care nurses, administrative staff, IV therapy nurses, and many others. Because there is no way to predict all of the staff that may be needed in an MRI department, there is a significant benefit to providing basic safety training to all staff. Since implementing hospital-wide training in our own facility, there has a marked increase in the awareness of the danger of the magnetic field among non-MR staff.

To maintain staff knowledge of MRI safety, training should be recurring at hospital-determined intervals. Our facility requires that staff complete the training once annually, but this can be adjusted to fit the needs of a specific facility. Many hospitals provide their general annual staff training in a web-based application, and MRI safety training can easily be added to these applications. This method also allows easy tracking of who has completed the training, so that MRI staff can check the training status of all visiting staff. Alternatively, many hospitals hold annual in-person safety meetings; in this format, a representative from the MRI department can provide safety training to all staff that attend the meeting.

It should be noted that basic MRI safety training cannot and should not replace MRI technologist instruction and vigilance when non-MR staff enters an MRI suite. MRI staff should not assume that anyone outside of their department is familiar with MRI safety, even if training is completed, and should always emphasize the risks associated with the magnet. However, by providing safety training to non-MR staff, accidents due to projectile incidents can be reduced.

In conclusion, recurring MRI safety training for non-MRI hospital personnel can be beneficial by providing familiarity with the acute risks of being in an MRI environment. Although MRI staff must remain the gatekeepers of the magnet room, accident reduction can be promoted by teaching everyone who may potentially visit an MRI department to respect the magnetic field and the safety policies associated with it.

Robotic Automation X-Rays: New Generation Imaging

Dinesh Kumar, PhD (Med Phy), RSO (Medical), PG-Dip Radiological Physics, MBAHAM, MSc (Physics)
Sr. Medical Physicist cum RSO & Faculty, Asian Institute of Medical Sciences, Faridabad, Delhi/NCR, India.

Introduction

In today's healthcare environment, excellent patient care and outstanding productivity often compromise each other. Now it is possible with one scanner that offers a multitude of X-rays – in just one room and at an expert level. With movements that create natural real 3D images even natural underweight bearing conditions. With an open design that reduces patient transfers, pain, and anxiety while offering more space to perform radiological interventional procedures. With robotics to simplify, standardize, and speed up operations. All with the goal of accelerating productivity and allowing humans to do what they do best care for patients.

Its Advanced Artificial Intelligent Robotic Automation X-ray (RAX) technology realizes a completely new movement and workflow concept. Two ceiling stands let the tube and the built-in RAX detector move simultaneously.

RAX track and RAX align provide perfect tube and detector tracking and alignment, resulting in distortion-free images and eliminating the need for retakes. Unique real 3D capabilities open up new clinical insights. With these and multiple other capabilities, RAX fits the widest range of clinical applications like conventional 2D radiography, fluoroscopy, interventional and angiography and patient requirements into just one room in a patient-centric and highly productive way.

Perform Multitude of X-ray

In clinical institutions or hospital, asset utilization often differs from one modality to the next. Underutilization Results in unjustified capital tie-up and costs, while over-utilization leads to a high workload with long patient wait times. Improve your asset utilization and save on room cost with RAX by integrating multiple X-ray capabilities in one room.

Reality with Real 3D images

The human anatomy looks different under natural weight - bearing conditions than in the horizontal position and certain cases require 3D images for diagnosis and treatment planning. Today's modalities have arrived at their limit which hampers the realistic assessment of mal positions. RAX allows exams and diagnoses under natural weight-bearing conditions in real 3D and yields new clinical potential.

RAX for Traumatic Patients

Every patient movement can cause pain, increase the risk of injuries and complaints, require physical effort from staff, and cost you time. With its RAX technology, the scanner revolves around the patients, RAX precisely positions and aligns itself – even in challenging situations like trauma treatment.

FDA approved Robotic Advanced X-ray machine

Be a Good Reader

Got the issue of the magazine, downloaded it, read it and deleted it. Only this does not prove you a good reader. You can agree with or add to the content published in the magazine, so in such cases please write us your comment or feedback. Similarly, debate openly on the issues rose in the magazine and the questions raised and send it to us in writing. With this act of yours, where other readers will be benefited; we will also get guidance in various forms. So, whenever the time demands, do not forget to pick up the pen.

And one more thing, we have conveyed this issue to you, as an enlightened Radiographer, now it is your responsibility to forward this issue to other Radiographers.

Thanks in advance,
Editor

India at 22nd International Society of Radiographers and Radiological Technologists (ISRRT) World Congress 15-17, 2022 at Bangkok, Thailand

A traditional welcome to
SIR President K. Damodara Naidu

A traditional welcome by Thai Society to
SIR WGS Srinivasulu Siramdas

SIR President Naidu &
WGS Srinivasulu with
ISRRT President Nopapang

SIR & ISRT officials at
ISRRT World Congress

SIR President Naidu &
WGS Srinivasulu with
ISRRT CEO Dimitris

SIR & ISRT officials with
ISRRT President Nopapang & Immediate
past President Mrs. Donna

SIR President & WGS at
ISRRT World Congress

SIR President Damodara Naidu at the
ISRRT council meeting at World Congress

SIR President Damodara Naidu with the
ISRRT council members at World Congress

Indian delegates at
ISRRT World Congress at Bangkok, Thailand

Letter to the Editor

"The impact of COVID 19 Pandemic upon the Radiography students in India"

Tamijeselvan S, Asst. Professor in Radiography, MTPGRIHS, Puducherry.

COVID -19, Corona virus disease is considered to be the largest pandemic of this centuary. Our India is currently experiencing the second wave. The peak of the second wave in India hits on on 6th may, 2021 when 4,12,262 new COVID-19 cases were reported as a single day infection. The massive second wave of Covid-19 in India is now in control due to the rapid measures taken by the Government. As on 17th June 2021 the single day infection in India has been reduced to 67,208 . With this, India's overall caseload reaches to 2.97 crore, and the death toll surged to 3.81 lakh.

This era of pandemic imposed novel challenges to the Indian health care system especially to the front line workers. The health worker particularly the radiographers in developing nation like India are suffering with exponential rise of infection particularly in the second wave. The department of Radiology and Imaging is playing a vital role in the diagnosis of COVID-19. The role of chest X ray and HRCT is not only used for the diagnosis of the disease but also in the recovery and follow up cases.

This impact the disruption of the services to the radiography students in teaching and clinical training. The classroom teaching is replaced by online teaching. The clinical training and posting are heavily affected due to the pandemic. In most of the radiology department ther is a lack of radiography investigation other than the chest X ray and HRCT of thorax. There is a marked reduction in the special investigation except the emergency one. The routine X ray examination is also reduced due to the lockdown situation. Many hospitals and training institutions in India have to cancel or postpone the clinical training and posting to the radiography students. The final year students and the students in internship are the most affected one. Being the pandemic situation is going on continuing we cannot completely stop the clinical training for the radiography students. The class room lectures may replaces by the online seminars and other online mode of education. When considering the practical training it is very tough to impart the practical/ clinical training to the radiography students through online mode. The simulation based lectures, video clips can satisfy only the fundamentals of the practical training but not as a whole. Posting in clinical environment, the first and second year radiography students leed to a possible increased infection as they are fully trained to handled infectious patient. Already the radiographers are in high pressure due to the imaging of COVID-19 positive patients since the commencement of the pandemic. So posting the students in the radiographic room makes some additional pressure to them.

In view of the final year students and internship students they have to get practical training within the stipulated time to complete their course in time. This is essential for them to move either to higher education or to search the employment. To keep all in mind most of the hospitals and training centres withdrew the majority of students from clinical placements apart from the final year and internship students. This makes the final year students to get more opportunities with proper protective measurement. Even with the final year students the accommodation and cohabiting risks were identified as challenging, as was isolation from family, travel to clinical placements. But most of the students are mentally coped with the situation, by understanding the radiographic principle benefit versus risk in their radiography programme. Many final year students and interns are happy that they had COVID-19 imaging experience stated being confident with personal protective equipment (PPE) use. The final year student radiographers are trained to ensure appropriate measures are in place to support their ongoing needs. Importantly PPE training is required before placement regardless of prior COVID-19 imaging experience.

This is a great challenge for the course coordinators of radiography course to impart the necessary training without affecting the student. The health of the student community and the education to them are considered as two eyes and to give importance for both of them. This can be achieved by giving proper training to student radiographers to handle the infectious patient, and about the using of PPE. Proper supervision can protect them from the unwanted infection. On the student side the have to be very cautious in their work to gain the practical knowledge without any health problem. The first and second year students may be scheduled for intensive clinical training once the pandemic condition improves.

Conclusion:

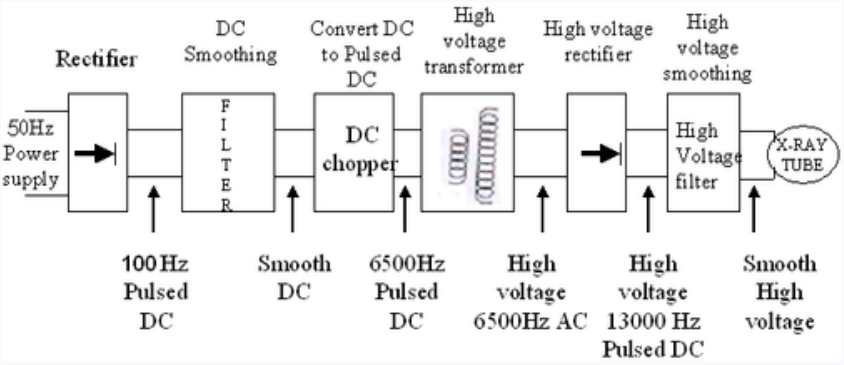
The aim of this letter is to expose the current situation of the radiography students in India to gain insight into how student radiographers, in clinical placements during the COVID-19 pandemic. The institutions are making their full effort to impart the theory and practical knowledge which is prescribed in the curriculum with taking utmost care for the student community with proper planning and implementation. Hoping the pandemic situation improves further with the intense vaccination programme and the radiographic students move further without affecting their academic activity.

High-frequency inverter generator

S. Panneerselvam, Asso. Prof. of Medical Physics, Dept. of Radiology and Imaging Sciences
Sri Ramachandra Institute of Higher Education & Research, Chennai

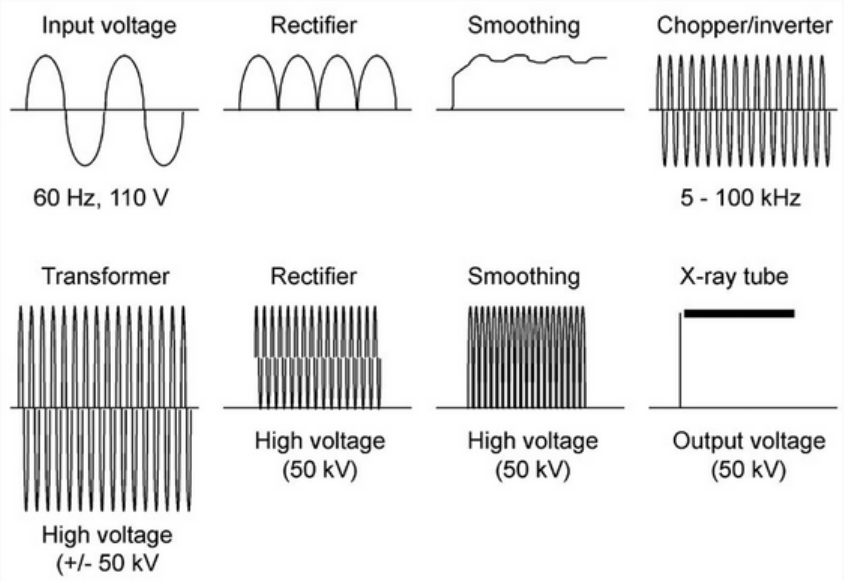
Introduction

The high-frequency inverter generator is the state of the art choice for the conventional diagnostic x-ray systems. A high frequency alternating waveform is used for efficient transformation of low to high voltage. This high voltage after rectification and smoothing produces a nearly constant output voltage to the X-ray tube with a transformer of much smaller size than found in ordinary X-ray generators.



Working Principle

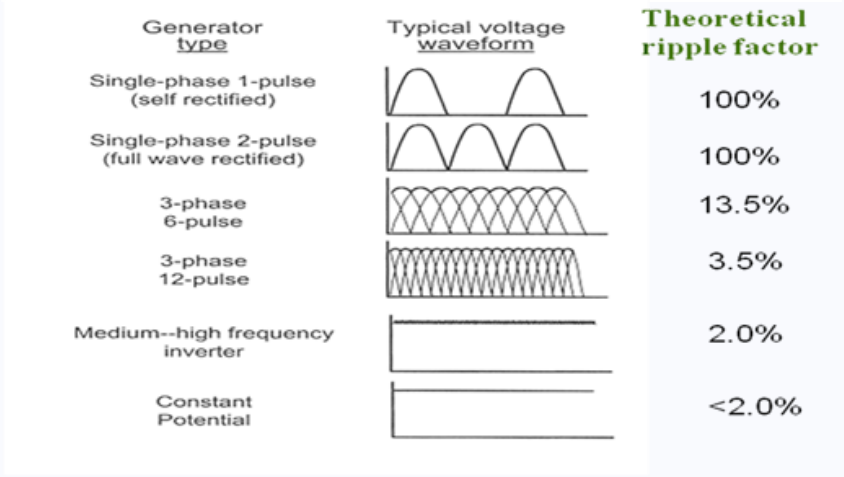
The DC power supply produces a constant voltage from a single-phase or three-phase input line source. Next the DC Chopper and Inverter circuit creates the high frequency AC waveform and this AC current supplies the high voltage transformer and creates a waveform of fixed high voltage and corresponding low current. After Rectification and smoothing the output voltage is given to the X-Ray tube.



Ripple Factor

The Voltage ripple of a DC waveform is defined as the difference between the peak voltage and the minimum voltage, divided by the peak voltage and multiplied by 100.

% Voltage Ripple =
Vmax – Vmin / VmaxX 100



Advantages.

- High Frequency Generator produces remarkably Better X-ray Quality
- Stable kV produces uniform stable X-ray energy
- Reduces X-ray exposure time substantially, improving image quality
- Reduces unwanted soft X-ray substantially, leading to lesser skin dose
- The Automatic Exposure Control is possible
- The Equipment Size Comes down Drastically

Dis-Advantages

- More expensive
- X-ray tube to cope with higher loading is required
- Greater complexity

Reference

Christensen's Physics of Radiology
Bushberg - The essential physics of Medical Imaging

Radiographers' Journal invites concerned articles. Publication should be in MS word format.

Mail your articles on shankar.bhagat@gmail.com

Breast Tomosynthesis

Nandita Mane, Senior Radiology Technologist, Lilavati Hospital And Research Centre, Mumbai
Dr Mona Mehta, Senior Breast Imaging Consultant, Lilavati Hospital And Research Centre, Mumbai

Why breast tomosynthesis?

Breast cancer is one of commonest cancer affecting woman breast cancer affects 1/ 22 women in India and 1/ 8 woman in USA in their lifetime.

Early detection of breast cancer significantly improves survival by reducing the morbidity and mortality associated with the disease.

History of breast tomosynthesis

The concept of tomosynthesis was derived from the work of Ziedses Des Plantes, who developed methods of reconstructing an arbitrary number of planes from a set of projections. Though this idea was displaced by the advent of computed tomography, tomosynthesis later gained interest as a low-dose tomographic alternative to CT

What is breast tomosynthesis?

Breast tomosynthesis, also called three-dimensional (3-D) mammography and digital breast tomosynthesis (DBT), is an advanced form of breast imaging, or mammography that uses a low-dose x-ray system and computer reconstructions to create three-dimensional images of the breasts. Breast tomosynthesis aids in the early detection and diagnosis of breast disease.

In breast tomosynthesis, the x-ray tube moves in an arc over the compressed breast capturing multiple images of each breast from different angles. These digital images are then reconstructed or "synthesized" into a set of three-dimensional images by a computer. These three dimensional image sets help minimize the tissue overlap that can hide cancers or make it difficult to distinguish normal overlapping breast tissue from tumor.

Standard acquisition parameters common to both Full field digital mammography(FFDM) and DBT are x-ray tube voltage, current exposure time, anode target or filter combinations, and degree of compression. Parameters that are specific to DBT include tube motion, sweep angle, and number of projections. Image resolution at DBT can be defined as in-plane or out-of-plane resolution.

The in-plane, or x-y axis resolution, of DBT is approximately 100–280 µm, which is comparable to that of Full field digital mammography (FFDM.)

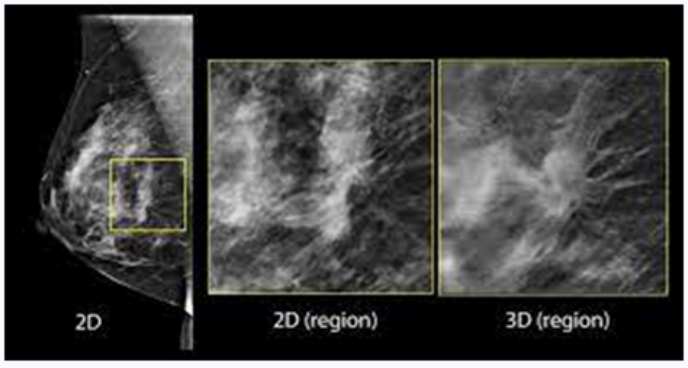
Higher in-plane resolution allows better visualization of small findings such as micro calcifications. Higher out-of-plane (z-axis) resolution increases depth separation, which improves visualization of findings with inherently low contrast to surrounding fibro glandular tissue such as masses and architectural distortion.

CONCLUSION:

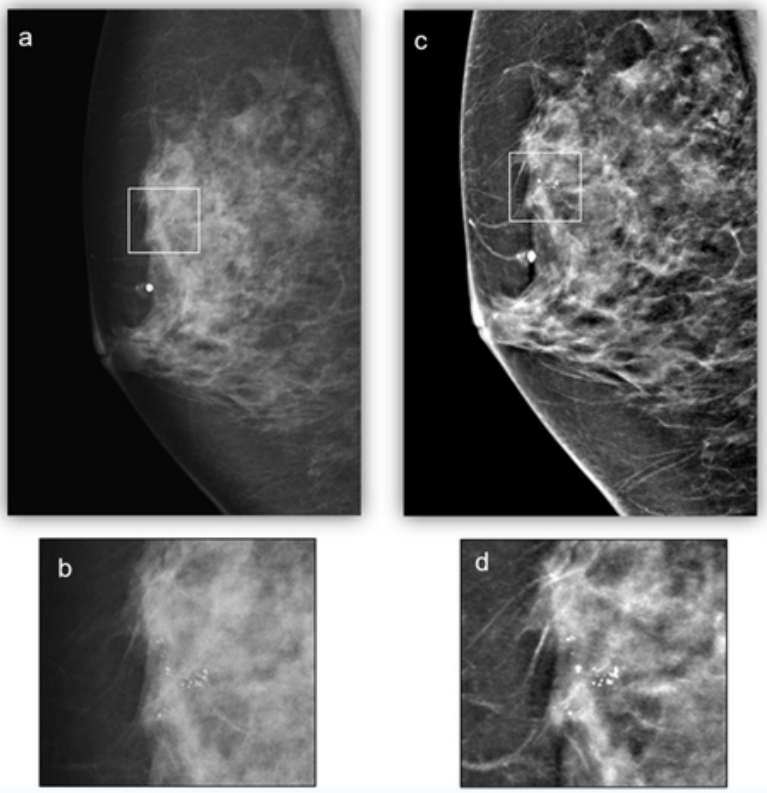
1) Digital Tomosynthesis is inevitable modality for early detection of small breast cancers that may be hidden on a conventional mammogram.

2) Greater accuracy in pinpointing the size, shape and location of breast abnormalities.

3) Clearer images of abnormalities within dense breast tissues.



On 2D Mammography Image VS Digital Breast Tomosynthesis



On 2D Mammography Calcification Image VSDigital Breast Tomosynthesis

Know the basics....

Tamijeselvan S, Asst. Professor in Radiography, MTPGRIHS, Puducherry.

This column is for knowing the fundamental principles of some of the basic concepts. The radiography and imaging technology field has been emerged as one of the rapid growing one. But knowing the fundamentals make the student to think innovatively which result in newer invention. For this purpose i am taking this opportunity to share some of the fundamentals.

Production of X Rays

The modalities of medical imaging is mostly depends upon the application of the ionizing radiation called X rays, invented by Sir Wilhelm Conrad Roentgen in the year 1895. The X rays are produced by the X ray tube which is the source of medical X-rays. In this topic we are going to see the basic principle of X ray production. The X-ray tube consists of two main functional elements called the filament and target. The filament (cathode) is negatively charges and the target (anode) is positively charged. When a high electrical potential is applied between the cathode and anode the following process occur.

1.Thermionic emission
2. Production of X ray

1. Thermionic emission

It is defined as the release of electrons from the surface of the conductor by the action of heat. Since the filament is made up of thin coil like structure, it will produce a high electrical resistance when the current flows through it. This electrical resistance produces the heat energy and that heat energy (20000 C) is utilized for thermionic emission.

2. Production of X rays

The electrons produced by thermionic emission process is getting accelerated towards the anode, because of its opposite charge nature and hits the anode to produce X rays.

This production of X rays is done by two methods namely

(i) Characteristic radiation
(ii) Bremsstrahlung radiation

(i) Characteristic radiation

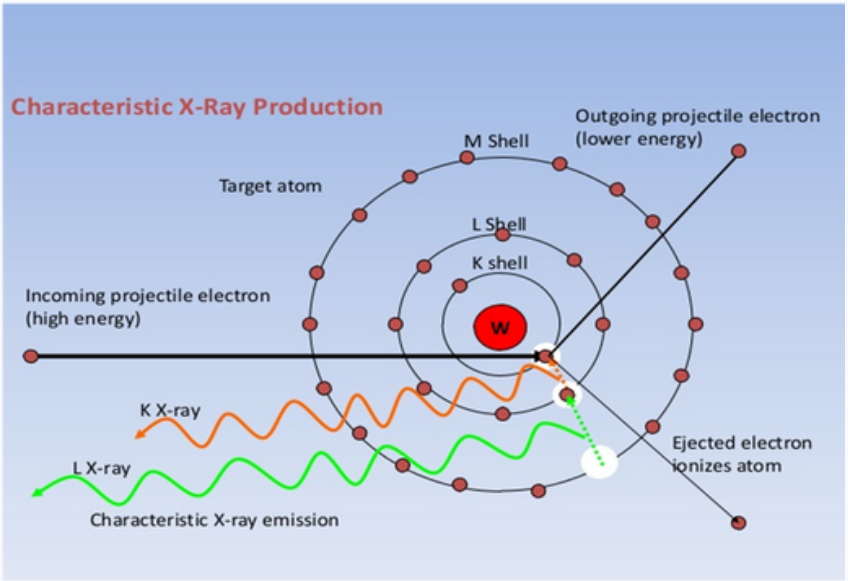
When a fast-moving electron collides with a K-shell electron, the electron in the K-shell is ejected (provided the energy of the incident electron is greater than the binding energy of K-shell electron) leaving behind a 'hole'. An outer shell electron fills this hole (from the L-shell, M-shell, etc.) with an emission of a single X-ray photon, called characteristic radiation, with an energy level equivalent to the energy level difference between the outer and inner shell electron involved in the transition.

The course of these electrons would be deflected, and a portion or all of their kinetic energy would be lost. The principle of the conservation of energy states that in producing the X-ray photon, the electron has lost some of its kinetic energy (KE):

Final KE of electron = initial KE of electron - energy of X-ray photon
The 'lost' energy is emitted as X-ray photons, called bremsstrahlung radiation

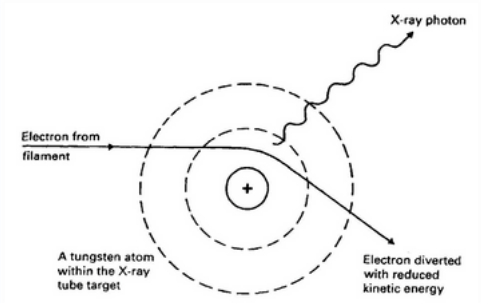
X-ray spectrum

The X Ray produced in the Xray tube consists of both characteristic and bremsstrahlung radiation, and this combination is called X ray spectrum. The composition percentage of the X ray spectrum depends on various factors viz. target material, filters, window, kVp and mAs



(ii) Bremsstrahlung radiation

It is also called braking radiation. X-Rays are produced by high-energy electrons bombarding a target, especially targets that have a high proton number (Z). When bombarding electrons penetrate into the target, some electrons travel close to the nucleus due to the attraction of its positive charge and are subsequently influenced by its electric field.



Roentgen Girl in Tribal Odisha

Soudamini Senapati, Bhima Bhoi MC & Hospital Balangir, Odisha

It's all about my personal experience during my services at Bhima Bhoi Medical College & Hospital (BBMCH) situated at Balangir in the state of Odisha. In my initial days in Balangir which is a third-tier town in a tribal populated underdeveloped Balangir district, I found it pretty difficult to survive, cope up with regional language (dialect), people and the mindset of general population with whom I interact daily during my duty hours. I spent my complete childhood and education life back in prosperous coastal parts of Odisha with early service in Bhubaneswar which made it more difficult to continue. Today after around 5 years of my service in Balangir, I have adopted to everything that's possible.

After the invention of X-Ray back in 1895 by great German scientist Roentgen, medical science has changed dramatically. Today imaging technologies, radiography has a major role in patient diagnosis and treatment. X- Ray has become part and partial of every human's life. Wait it is the general perception when you are sitting in an air-conditioned room and a Radiographer by profession but the ground reality among general masses in the backward areas of a poor state like Odisha is completely different.

Radiographer's bread and butter the 'Silver Bromide' film is still considered mere as a photo. Patient from deep interiors covered with dense forest consider X - Ray nothing more than a black & white photograph of earlier days. Radiation exposure, view film size nothing matters to them. Any pain, sprain or swelling in any part of body, I mean any part including nipples and gums, patient demands a X- Ray to be done as if a so-called photo can give them the best treatment. It has a psychological impact. As much you try to educate them regard these, you drag problems for yourself.

The scene is very worse when it comes to a government hospital where every film is free. The mindset is same for CT, USG and whichever radiography is available in the clumsy town of Balangir. Today with scientific advancements when the medical fraternity is developing devices, technologies such that the exposure is minimized, here in this part of world people can just demand for x ray is a pregnant lady with a physiological pedal edema.

After 5 years of service in MCH, I have come to some conclusions-

1. Radiology is a part of medical diagnosis and treatment but complete dependence on it is not good,
2. Radiological pollution should be made a part of course and curriculum of schools so that students also know the ill effects of ray,
3. Patient counselling, on when it's needed and when it's not, sorry if we go over doctor's advise because we are also ethically sound humans.

Picture Archiving and Communication Systems (PACS)

Ashok S Walmiki, Sr. Radiology Imaging Officer. Krishna Ullikashi, Radiology Imaging Officer,KIMS Hubballi. Karnataka

A new era of filmless radiography and the use of computers to replace traditional radiological films in a new era of filmless radiography. a picture archiving and communication system (PACS) that allows radiography images to be easily and digitally captured, saved, transmitted, and shown.

The Karnataka Institute of Medical Sciences, Hubballi (KIMS) hospital recently implemented a PACS system. The Department of Radiodiagnosis of KIMS Hubballi, Karnataka is now operating throughout the individual departments, OPDs, and wards in a filmless setting. Other benefits of PACS include an improvement in handling patient X-ray data that cannot be lost, stolen, or misplaced. Replacing conventional X-ray film is not the main function of PACS. PACS allows doctors of any department in the hospital to view the same image, whereas X-ray film can only be physically examined at any given place and moment. This saves time for doctors and other healthcare professionals. Doctors posted in Casualty or any respective wards can discuss a patient's images with the radiologist on an urgent basis. The same is with the patient, where time is saved and the patient will not wait for long hours to receive X-ray film as the images will be available on PACS for viewing by the referring doctor.

Although PACS issues are uncommon, they can be prevented by having adequate electric backup generators for the PACS power supply, handling and maintaining PACS systems by book, and limiting unauthorized personnel present at the PACS controls. Let's use Digital India for what it was intended for: the benefit of humanity. We advise all State and Union governments to make use of PACS's resources.

Activities of State chapters of SIR

SIR Teangana State Chapter organised Best Scientific paper award 2022
at Nizam's Institute of Medical Sciences, Hyderabad on 11, December 2022

Padmasri Prof Kakarala Subbarao Lifetime Achievement award presented to Dr. Subhash Chand Bansal
at Nizam's Institute of Medical Sciences, Hyderabad on 11, December 2022 by SIR Teangana State Chapter

2023 Calender released by
Karnataka State Government Radiology Imaging Officers' Association (State chapter of SIR

GOVERNMENT OF INDIA
MINISTRY OF HEALTH AND FAMILY WELFARE
DEPARTMENT OF HEALTH AND FAMILY WELFARE

LOK SABHA
UNSTARRED QUESTION NO. 1796
TO BE ANSWERED ON 16TH DECEMBER, 2022

NCAHP Act, 2021

1796. SHRI RAJMOHAN UNNITHAN:

Will the Minister of **HEALTH AND FAMILY WELFARE** be pleased to state:

(a) whether as per the National Commission for Allied & Healthcare Professions Act (NCAHP Act) 2021, operational since May 25, 2021 in every State shall constitute a State Council for Allied & Healthcare Professions within 6 months of the implementation of the Act and whether the same has been executed and if so, the details thereof;

(b) whether the majority of the States did not comply with the Act and are yet to form State Councils which is adversely affecting the professionals in the field;

(c) if so, the details thereof along with details of States/UTs yet to form State Councils under NCAHP Act as on date along with action being taken against the defaulters;

(d) the time by which registration of AHPs shall start under NCAHP; and

(e) whether the Government proposes to declare B.Sc. Paramedical and B.Voc. Paramedical complementary and thus having equal recognition and if so, the details thereof and if not, the reasons therefor?

ANSWER
THE MINISTER OF STATE IN THE MINISTRY OF HEALTH AND FAMILY WELFARE
(DR. BHARATI PRAVIN PAWAR)

(a) to (c): The last date for constitution of State Allied and Healthcare Councils has been extended till May 25, 2023 under clause 'removal of difficulties'.

As informed by States, State Allied and Healthcare Councils have been notified/ established in Andhra Pradesh, Arunachal Pradesh, Assam, Kerala, Odisha, Sikkim, Telangana, Tripura and Mizoram. The meetings with the States are held at various levels to monitor and encourage the States/UTs for constitutions of State Allied and Healthcare Councils.

(d): State Councils are mandated to regulatory process for recognition of allied and healthcare professions and their registration.

(e): The National Commission for Allied and Healthcare Professions is the regulatory body to make decisions on such matters along with the Professional Councils.

*****

Know Cancer Little! Knock Cancer Better!!

Mamta Bandekar, B. Sc., ADMIT, Radiological Technologist, Tata Memorial Hospital, Mumbai, Maharashtra, India

1)DMG-BREAST:

MBC- Metastatic breast cancer, also known as advanced or stage IV is breast cancer that has spread beyond the breast to other parts of the body.

LABC- Locally advanced breast cancer.

Phyllodes Tumor-Phyllodes tumors are fibroepithelial tumor composed of an epithelial tumor & a cellular component. Most are benign but 10% are malignant. Cancerous phyllodes tumors are unusual presentation of breast cancer. These tumors are a form of sarcoma because they grow in connective tissue of the breast, not in the ducts.

2)DMG-NEURO:

GBM- Glioblastoma , Glioblastoma multiforme A malignant tumor affecting the brain or spine. GBM is often referred to as a grade 4 astrocytomal.

GBS- Guillain –Barre syndrome (GBS) is a serious health problem that occurs when the body's defiance system mistakenly attacks part of the nervous system this leads to nerve inflammation that causes muscle weakness or paralysis & other symptoms.

Medulloblastoma - Medulloblastoma is a common type of primary brain cancer in children. It originates in the part of the brain that is towards the back and the bottom, on the floor of the skull, in the cerebellum, or posterior fossa. Medulloblastomas are invasive, rapidly growing tumors that, unlike most brain tumors, spread through the cerebrospinal fluid and frequently metastasize to different locations along the surface of the brain and spinal cord.

Multicentric glioma– Is a case of widely separated brain tumor masses in different lobes or different hemisphere, is not spread via pathways along commissural or cerebrospinal fluid channels or local metastases via satellite formation

3)DMG –THORACIC:

NSCLC- Non-small cell lung cancer. Is any type of epithelial lung cancer other than small cell lung carcinoma (SCLC).

Ca Esophagus- Esophageal carcinoma Cancer of the tube that runs from the throat to the stomach.

Chylothorax– Is an accumulation of lymphatic fluid in the space surrounding the space surrounding the lung (pleural space). Lymph formed in the digestive system is called chyle & accumulates in the pleural space due to either disruption or obstruction of the thoracic duct.

4)DMG –GASTROINTESTINE:

Ca stomach- Gastric cancer. Cancer that occurs in the stomach.

GIST- Gastrointestinal stromal tumors, may be malignant (cancer) or benign (not cancer). They are most common in the stomach & small intestine but may be found any where in or near the GI tract.

Ca Ampulla- Ampullary cancer. Is a malignant tumor that arises from the Ampulla of Vater, the last centimeter of common bile duct as it passes through the duodenum, the first section of the intestine .all pancreatic and Biliary secretions enter the duodenum through the ampulla of vater.

HCC-Hepatocellular carcinoma also called malignant hepatoma . the most common form of liver cancer. Occurs most often in people with chronic liver disease such as cirrhosis caused by hepatitis B or hepatitis C infection.

RPS- Retroperitoneal Sarcomas/Retroperitoneal Soft Tissue Sarcomas RPS occurs in the retroperitoneal exam, this is an area behind the peritoneum, the lining of the abdominal space that causes the abdominal organs.

IHCC- Intrahepatic cholangiocarcinoma is the second most common primary liver cancer.

Ca PANCREASE-

Ca HOP (HEAD OF PANCREASE) Case of Head of pancreas cancer.

Ca rectum– case of cancer of rectum region.

M CRC-metastatic colorectal cancer.

Ca GB(GALL BLADDER) -Cancer of gallbladder.

NET/ NEC– A Neuroendocrine tumor / Neuroendocrine carcinoma is tumor that develops from cells of the neuroendocrine system. Neuroendocrine cells are found through the body, in organs such as stomach, bowel & lungs.

5)DMG –UROLOGY:

RCC- Renal cell carcinoma also called hypernephroma, renal adenocarcinoma.

MRCC- Metastatic renal cell carcinoma.

Wilms tumor– It is a solid cancerous tumor of the kidney that arises from immature kidney cells. Also known as nephroblastoma.

Ca Bladder - bladder carcinoma Cancer that begins in the bladder.

GCT- Germ cell tumor.

NSGCT- Nonseminomatous germ cell tumors. The most common type of testis cancer is Germ cell tumor

a) seminoma

b) non seminomatous germ cell tumor.

Ca TESTIS /TESTICULRCANCER- Malignant neoplasm of testis - cancer in the male organs that make male harmones and sperms (testicles).The testicles are located inside the loose bag of skin (scrotum)underneath the penis.

Ca prostate– case of prostate cancer.

HSPC- hormone sensitive prostate cancer. It is a metastatic prostate cancer.

Ca penis– case of cancer of the penis region.

6) DMG –GYNACOLOGY:

MMMT- A malignant mixed Mullerian tumor ,also called a carcinosarcomas a type of cancer that contains two types of cancer cells-carcinoma and sarcoma cells.

The majority of these tumors arise in the uterus ,through they can also occurs in the ovaries, fallopian tubes, and cervix.

Ca CERVIX- CERVICAL CANCER. A malignant tumor of the uterus. A malignant tumor of the lower part of the uterus (womb) that can prevented by PAP smear screening and a HPV vaccine.

ADNEXAL MASS- It is a lump in tissue of the adnexa of uterus (structures closely related structurally and functionally to the uterus such as the ovaries, fallopian tube or any of the surrounding connective tissue). adnexal masses include ovarian cysts, ectopic (tubal) pregnancies, and benign or malignant tumors.

Ca Endometrium (uterian cancer) - Endometrial cancer is a type of cancer that begins in uterus. The uterus is a hollow organ, pear shaped pelvic organ where fetal development occurs. Endometrial cancer begins in the layer of cells that form the lining (endometrium) of uterus.

ESS-ENDOMETRIAL STROMALSARCOMAS

ESS are very rare malignant tumors that make around 0.2% of all uterian malignancies.

7) DMG – HEAD & NECK:

Ca RMT– Retromolar trigone, cancer of the small area behind the wisdom teeth.

Ca glottis / Ca epiglottis– case of glottis /epiglottis.

Ca SGL– Supraglottic larynx. Laryngeal cancer are common in our population & commonly at the supraglottic larynx (SGL).

BSC– Basaloid squamous carcinoma , is rare aggressive variant of squamous carcinoma with a predilection of the head & neck region.

Ca BM– Cancer of Buccal mucosa. Inner cheek cancer is a type of head & neck cancer that begins when the cells that make up the inner cheek grow out of control & form lesions or tumors. Buccal mucosa is another name for the inside lining of the cheeks. Cancer on the outer cheeks is considered skin cancer.

Ca thyroid– Cancer of thyroid gland.

Medullary thyroid cancer– Is a form of thyroid carcinoma which originates from the parafollicular cells (C cells), which produce the hormone calcitonin. Medullary tumors are 3rdmost common of all thyroid cancers & together make up about 3% of all thyroid cancer cases.

Ca hypopharynx– case of hypopharynx.

Ca larynx– case of larynx.

Ca PFS– case of pyriform sinuses.

Ca tongue– case of tongue cancer.

Ca lip– case of lip cancer.

Upper / Lower alveolar carcinoma- The malignant upper alveolus tumors present in advanced stages.

Ca GBS– case gingivobuccal sulcus carcinoma.

Ca mandible- case of mandible cancer.

Ca maxilla– case of maxillary cancer.

Ca OC– case of oral cavity cancer.

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8)DMG –BST:

OGS– Osteosarcoma , also called osteogenic sarcoma. A type of bone cancer that form bones.

STS– Soft–tissue sarcoma. Is a group of cancers that begin in the connective tissues that support & connect the body. Including blood vessels , fat cells, lining of joints, lymph vessels, muscle, nerves, tendons.

Melanoma– skin cancer. Melanoma occurs when the pigment producing cells that give color to skin become cancerous.

Malignant mesothelioma– A tumors of the tissue that lines the lungs , stomach , heart, & other organs.

GCT– Giant cell tumor. It is a rare aggressive non-cancerous tumor. It usually develops near a joint at the end of the bone. Most occur in long bones of the legs & arms.

Chondrosarcoma– It is a cancer composed of cells derived from transformed cells that produce cartilage. *About 30% of skeletal system cancer are chondrosarcomas.

Osteoid Osteoma– an osteoid osteoma is benign bone tumor that arises from osteoblasts & some components of osteoclasts & was originally thought to be a smaller version of an osteoblastoma.

DFSP– Dermatofibrosarcoma protuberans is rare tumor of dermis of the skin, & is classified as sarcoma.

Ewing sarcoma- Ewing sarcoma is the second most common primary malignant bone tumor, mostly affecting adolescents in the second

decade of their life, and it is a highly metastatic class of sarcoma. It usually affects people from the ages of 10 to 20 and has a high rate of being cured.

9)DMG –HAEMATOLOGY:

AML– Acute myeloid leukemia. A type of cancer of the blood & bone marrow with excess immature white blood cells.

CLL– Chronic lymphocytic leukemia. B-cell chronic lymphocytic leukemia (CLL) develops from a type of white blood cells.

ALL– Acute lymphocytic leukemia. Is a type of blood cancer.

ALL invades the blood & can spread throughout the body to other organs, such as the liver, spleen, & lymph nodes.

DLBCL– Diffused large B-cells lymphoma or DLBCL is a cancer that starts in white blood cells called lymphocytes. It usually grows in lymph nodes in neck, groin, armpits & elsewhere that are part of immune system.

NHL– Non-Hodgkin lymphoma. Cancer that starts in the lymphatic system. The condition occurs when the body produce too many abnormal lymphocytes, a type of WBC's.

GTN – Gestational trophoblastic neoplasia(GTN) is a cancer that has come back after it has been treated .The cancer may come back in uterus or in other part of the body.

Gestational trophoblastic neoplasia that does not respond to treatment is called Resistant GTN.

PACEMAN - a basic techniques for radiographers

M. Saleem Batcha, CRA, DRDT.RSO., Chief Radiographer (Ret.) Tamil Nadu.

ACEMAN is a technique for radiographers to use to determine if a plain film radiograph is of diagnostic quality

Position
Area
Collimation
Exposure
Markers
Aesthetics
Name

(P) - Position:

Is the patient in the correct position?

Is the patient rotated?

Does the image correctly show any needed joint spaces?

(A) - Area:

Is enough of the area being filmed covered? eg: In an abdominal film is pubic symphysis to diaphragms covered?

Have you exposed an area that is not required?

(C) - Collimation:

Is the image properly collimated? eg is four way collimation seen on an extremities film?

(E) - Exposure:

Were the exposure factors set correctly?

Does the image show the correct contrast and density?

Are there any factors that need to be changed to produce a better image?

(M) - Markers:

Have markers been placed on the image?

Are they correctly identifying left and right?

(A) - Aesthetics:

Is the image nice to look at?

Is it centered on the film?

Is there four way collimation?

(N) - Name:

Does the image correctly identify the patient?

Does it have any other relevant identification details? eg episode number or department labels?

आप भी अपना पाठक धर्म निभाएँ

पत्रिका का अंक मिला, डाउन लोड किया, पढा और डिलीट कर दिया. केवल इससे पाठक धर्म नहीं निभ जाता. पत्रिका में प्रकाशित सामग्री से आप सहमत हो सकते हैं या उसमें आप कुछ और जोड़ सकते हैं, तो ऐसे मामलों में अपनी टिप्पणी अथवा प्रतिक्रिया हमें अवश्य लिख भेंजे. इसी प्रकार पत्रिका में जो मुद्दे उठाए गए हों, जो प्रश्न खड़े किए गए हों, उन पर भी खुल कर बहस करें और हमें लिख भेंजे. तात्पर्य यह है कि आप केवल पाठक ही न बने रहें, पाठक धर्म भी साथ में निभाते रहें इससे जहां अन्य पाठक बंधु लाभान्वित होंगे वहीं हमें भी विभिन्न रूपों से मार्गदर्शन मिलेगा. हाँ तो, जब भी समय की मांग हो, कलम उठाना न भूलें.

और एक बात, ये अंक हमने आप तक पहुंचाया, एक प्रबुद्ध रेडियोग्राफर के नाते अब ये आप की ज़िम्मेदारी बनती है कि इस अंक को आप भी और रडीओग्राफेर्स तक पहुंचाए यानि फॉरवर्ड करें.

अग्रिम धन्यवाद.
संपादक

Activities of Radiographers' Association of Maharashtra

11th State Conference of Radiographers' Association of Maharashtra, Organised by RAM Jalna unit at Mahesh Bhavan, Jalna on 10, April 2022

32nd CME of Radiographers' Association of Maharashtra, Organised by RAM Mumbai Unit at LTMG Sion Hospital, Mumbai on 13, November 2022

Blood Donation Camp on account of World Radiography Day Organised by RAM Mumbai Unit at LTMG Sion Hospital, Mumbai on 13, November 2022

Organising Committee of 22nd NCSIR InvitedHon. Chief Minister of Goa State Dr. Pramod Sawant as a chief guest for the Inaugural function

Lead apron

S. Panneerselvam, Asso. Prof. of Medical Physics, Dept. of Radiology and Imaging Sciences
Sri Ramachandra Institute of Higher Education & Research, Chennai

A lead apron is a popular garment technologists use for protection. All staff in a fluoroscopy suite should wear a lead apron. It can sufficiently protect the areas it covers from radiation, but the degree of protection depends on the lead's thickness and a beam's intensity.

Conventional aprons are primarily composed of lead impregnated vinyl material.

The required attenuation equivalent of light protective aprons shall be not less than 0.25mm Pb over entire area. For heavy protective aprons, not less than 0.35mm Pb for the front section and 0.25mm Pb for remaining parts.

Lead is well suited for protection from radiation since it is an extremely dense element.

It greatly reduces the number of gamma and X-rays that come into direct contact with the body, although a lead apron cannot, of course, stop all such rays.

Aprons should be tested for integrity on initial receipt and then every 12 months.

Testing for imperfections in an apron can be achieved by fluoroscopy on a floating top table, or by radiography. Any cracks or holes found should be marked and recorded.

Light Weight Aprons

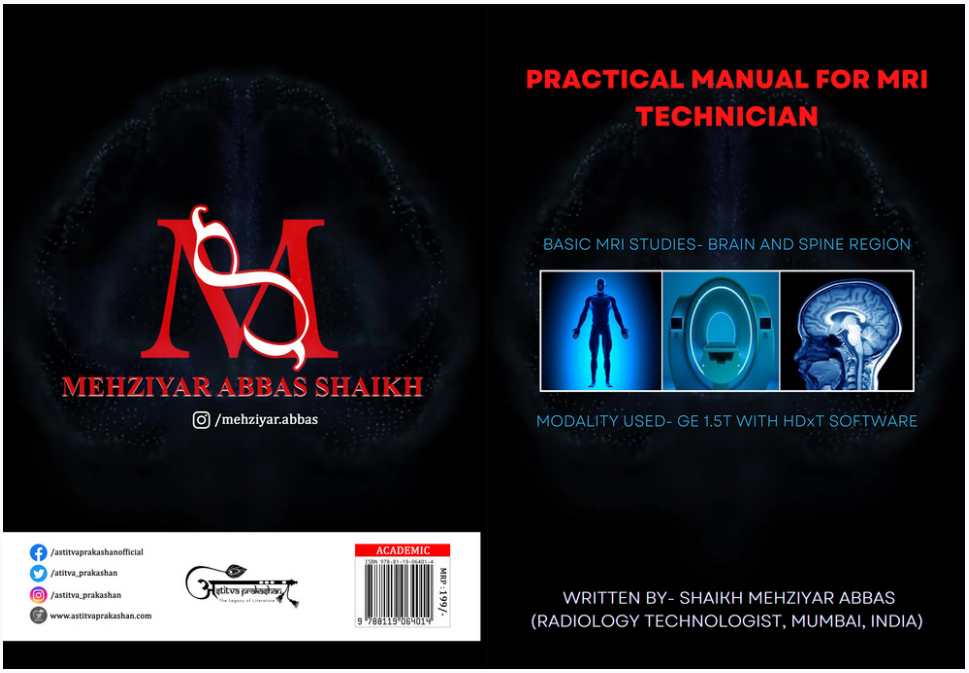
Although lead is effective in reducing primary and secondary x-radiation, it has the drawback of being heavy. Worn occupationally over a number of years, the weight can have a detrimental effect on the health of the wearer, particularly spinal problems. If not addressed, this can become an occupational health and safety issue. There are now a number of lead apron manufacturers making aprons lighter in weight. These aprons are manufactured from composite materials such as barium, tin and lead. Manufacturers quote weight reductions of around 20 - 30% with one stating close to 50%.

Zero Lead Aprons

Zero Lead, an eco-friendly apparel that replaces lead with a combination of tungsten, bismuth, and antimony.
This sheeting provides the same protection as leaded sheeting and is also significantly lighter.

Practical Manual for MRI Technician

Shaikh Mehziyar Abbas



Shaikh Mehziyar Abbas, graduated Radiology technologist from Grant Government Medical College and sir JJj Groups of Hospital (2018) and author of Practical Manual for MRI Technician

The purpose of this book was to give a helping hand to the students who are pursuing MRI training and for technician who finds difficulty in mri scanning. The modality used for this manual is GE 1.5T with HDxT software. As I noticed during my career there are maximum number of students and technician who are scared of working on GE modality, so I made it easier for them to understand using simple and easiest language. I hope this will give them a best help during their training. The book includes all basic scans of head and spine region with best planning explained.

One basic rule for mri-

Always grab the plannings that are being used during scans because it doesn't change in any modality.

Are Radiographer's Safe against Radiation ?

Harpreet Singh, Bachelor In Radiation Technology, Rajasthan

X-rays are used in the medical sector like a miracle. – These days, hospitals and research facilities frequently use X-rays for diagnostic purposes in the form of modalities like general radiography, C.T. Scan, mammography, fluoroscopy, dental radiography, DEXA, etc. – After the discovery of X-rays many years ago, it appears that they have a detrimental effect on the human body as well. – Only scientists and researchers have historically been affected negatively by X-rays, but in recent years, patient-level research has revealed some extremely dramatic impacts. – After that study on the cell level, it is associated with study on the embryo level.

Since entering this profession, I've gathered information from numerous hospitals and diagnostic centres run by both public and commercial organisations. – There are still several government hospitals that have X-ray units as of the year 2022.

1. X-ray machines without AERB registration or licencing.
2. The X-ray room layout does not meet AERB requirements.
3. Radiologists do not use personal monitoring devices.
4. not wearing proper lead aprons and lead barriers.
5. Radiographers who have not been registered onE-Lora.
6. lacked accurate unit QA data.

Then, I discovered the issues that radiographers had to deal with at the time. They claimed to be knowledgeable about the effects of radiation on the body, but: The government or institute head refused to pay for

1. X-ray unit registration.
2.Charges for personal monitoring devices,
3. Purchasing protective gear
4. Repositioning X-ray units to suggest layout rooms
5. layout improvement

After that, someone revealed that one radiographer (age 60) left their job again without any personal monitoring gadgets, which is really disheartening.

Important information gathered from website
1. How to challenge radiation exposure to any authorities if a radiographer experiences any chronic radiation effects.
2. How to find out how much radiation she or he was exposed to
3. The lowest RSO numbers are found in hospitals.
4. The government took no action against illegal X-ray machines.

Here., I want to draw attention to AERB because, according to it, it contains information on all vendors and units.

- Here, the question of how these unauthorised X-ray devices were installed arises.
- If there are any registered or licenced units under AERB, why don't they undertake QA on a regular basis?
- Where are the qualified radiographer registration data (e-lora)?
who runs these machines?

Following are the evaluation of all outcomes, AERB must implement the some modifications and strengthen its relationship with the direct radiographer.

Should be-

1. There ought to be more RSOs.
2. At least two RSOs will be appointed in each district.
3. All X-ray unit data, including workload, QA, and other information, are stored on RSO, and RSO sends direct reports to AERB.
4. Each technologist's information must be on e-Lora.
5. RSO-recommended layouts should be used for registration of X-ray units, and reports should be made to Aerb.
6. It is made sure that no one should operate units or carry out this work by RSO without using personal monitoring devices.
7. These RSO gather all data from each X-ray unit once every three months.
8. RSO is empowered to take immediate action against the institute's head if any negligence is discovered.

My opinion is that efforts should be made to safeguard our radiologists against radiation's negative effects, and I believe the AERB plays a crucial role in this.
Radiographers must stand for every critical circumstance that occurs in hospitals.
I hope that the AERB will modify the system and take these things into account.
I agree with the radiographer associations that we must fight for our right to limit radiation's consequences.

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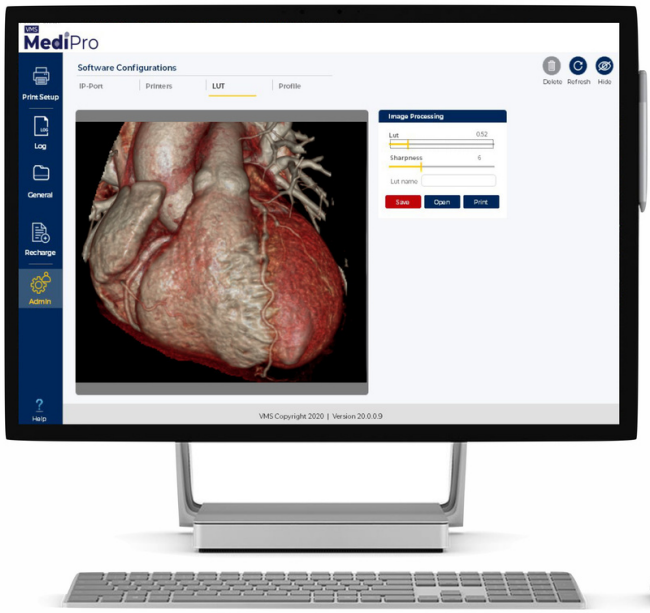

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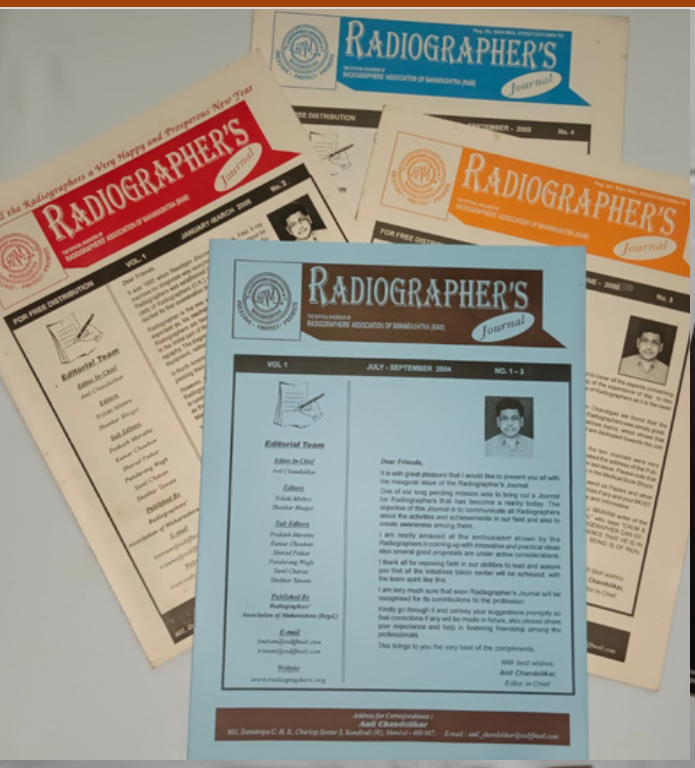

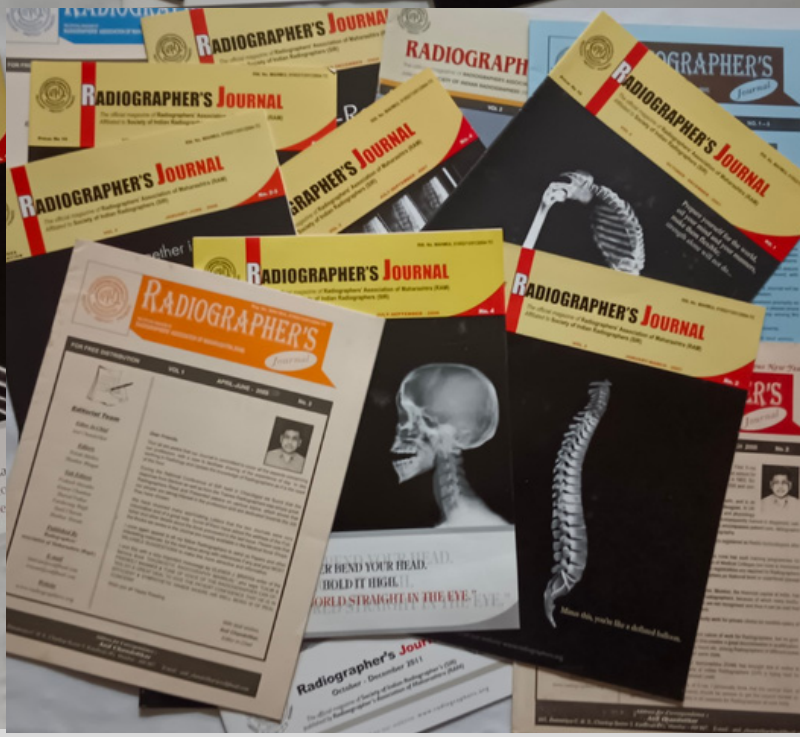

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