Since 2004 For free Circulation

# Radiographers' Journal

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

June, 2023



Mobile:
+91 93220 35920
Email:
shankar.bhagat@gmail.com
Website:
www.radiographers.org

# Six of the best plants to fight radiation at home

**Ashish A Raut,** Chief Radiology Technologist, National Cancer Institute, Nagpur

Radiation can have several negative impacts on your body and health, especially with prolonged and constant exposure. It only makes sense to try and find ways to combat the radiation exposure.

It is known to cause frequent headaches and can heighten your stress level. Keeping these plants around your home can combat these symptoms and also make your home look nicer – a bonus!

**1. Cactus**
In a list of the best plants that can absorb radiation, cactus emerged as one of the best in absorbing EMF radiation. For most plants to be effective in absorbing radiation, it must be physically situated between you and the device that is emitting radiation. But this is not the case with cactus.

As long as you place a cactus inside the room, it can still be effective in absorbing radiation. It does this by absorbing ambient radiation inside the room – whether it is in your bedroom or office. It can even absorb radiation from nearby cell towers!

If you are looking to invest in just one plant for your home that can absorb radiation, there is no better choice than cactus!

**2. Snake Plant**
If you cannot find cactus, another great option for radiation absorption is the snake plant. This plant is known to be very effective in converting carbon dioxide into oxygen. If you want to promote cleaner air and boost lung healthy within your home, the snake plant would be a great addition to your home.

The long and thin appearance of the leaves on a snake plant provides aesthetic enhancement when used on your interior décor. It is also very versatile because you can plant in different types of pots. It does not require a lot of maintenance or watering, which is another great reason to bring it into your interior space.

This plant is best placed somewhere that is not directly in contact with sunlight. For maximum results in terms of absorbing radiation, place it near your computer, Wi-Fi device, or other electronics that emit radiation. This is a great way to keep your room and home healthy!

**3. Stone Lotus Flower**
The stone lotus flower is a type of succulent that is very pleasing to look at. Even if this plant did not have radiation-absorbing properties, it would be easy to convince homeowners to decorate their home interior with this.

Despite its size, this plant has excellent radiation absorbing properties. But the fact that this succulent is small in size makes it the perfect choice of plant to put on your work desk. When you place it next to your computer, it can eliminate radiation and also provide a functional decoration to your workspace.

Aside from being effective in protecting against radiation, the stone lotus flower requires low maintenance. It needs very little light and water to be able to survive. You can also plant it in stones so it can hold its moisture for up to 2-3 days. If you need to buy one for your home, you can get them at an affordable price.

**4. Aloe Vera**
Another type of succulent plant that also offers protection against harmful radiation is Aloe vera. This type of plant is known historically for its medicinal benefits. You can also use aloe vera on your skin and hair.

But what you probably did not know until now is that aloe vera can also absorb radiation in your home. It can also clean the air inside your home by converting carbon dioxide into oxygen.

When caring for aloe vera, remember that it can burn if it receives too much direct sunlight. Choose a spot that receives around 6 hours of sunlight a day. Make sure it has proper drainage, too, as too much water can cause damage to the plant.

The best part of all is that the aloe vera plant is capable of absorbing even high levels of radiation. If you want a plant that is powerful enough to deal with high radiation levels, make sure you get one for your home or office.

**Decor and anti-rad in one. (Image Source: Pexels)**

**5. Asparagus Fern**
If you prefer decorating your home with a fern plant, the asparagus fern is a great choice! It is a lovely indoor decorative item because it is lush and vibrant. You can place them in hanging pots to showcase their aesthetic qualities and to provide a beautiful accent to your home.

But unlike the other plants on this list, the asparagus fern requires maintenance. It loves water so make sure you keep it hydrated at all times. It is also a good idea to fertilize the plant to provide it with nutrients to keep it healthier for longer.

Asparagus fern is a strong plant known for its radiation-absorbing qualities. It is rich in antioxidant properties that enable it to fight against the damage that could result from the emission of radiation.

**6. Mustard Greens**
The mustard green plant is one of the best types of plants you can add to your home to boost its decorative appeal and to fight radiation. It is also a nutritional food item and is a great ingredient for cooking as it can enhance the taste of your food. Indeed, you won't find another plant as multi-functional as this!

Ideally, you need to plant mustard greens in your outdoor vegetable garden. Once you have enough, you can place some in a pot to put in your indoor space. They are very useful when used indoors as they can protect against oxidative stress resulting from radiation exposure. It also promotes cleaner air inside your home as it greatly reduces the radiation levels.

The benefits of plants in absorbing and eliminating radiation have been tested and proven by NASA. This only goes to show that this is an effective step that you can take if you are concerned about the impact of radiation on your family.

By adding these plants to your home, you hit two birds at once. You can fight the negative impacts of radiation and you can also boost the aesthetic value of your home interior. What other reason do you need to start adding plants to your interior décor?

# Professional & Legal Responsibilities

**Hemant Prakash Joshi,** Radiographer, ESIC MC & Hospital, Gulbarga, Karnataka.

Anyone employed in health care is required to adhere to certain standards of professional conduct and to provide appropriate care for each patient. A health care provider who steps outside of the established standards of care makes himself/herself vulnerable to legal action.

- More people die each year from medical mistakes than from automobile accidents or breast cancer.
- Medical errors occur in every phase of health care, from hospitals and pharmacies to nursing homes and home health care.

**Scope of practice**

Scope of practice identifies your responsibilities and your expected actions for various situations you face, based on all of your training, education, knowledge and expectations of your profession. Scope of practice defines your responsibilities and determines what is expected of you. For example, a first responder/basic EMT(emergency medical technician) has been trained to perform certain limited medical procedures. If the patient is harmed, the EMT would be legally liable for damages.

Another example comes from an actual case that occurred in Utah in 1987. A radiologic technologist was asked to perform an enhanced CT scan of the liver using iodinated contrast. Department protocol required that a radiologist or other physician be present during the contrast injection. The well intentioned technologist (she did not want to bother the radiologist at 3:00 in the morning) failed to follow the protocol because the patient had no history of contrast reaction, allergies, or other warning signs. Immediately upon completing the injection, the patient complained of tightness in the airway and chest. The technologist opened the crash cart and injected several drugs used to treat contrast reactions. However, she injected the wrong concentration and volume of both drugs. Within minutes, the patient died- not from anaphylactic reaction, but from a massive epinephrine overdose. In court the technologist stated that she "thought she was giving the right amount, but was not sure".

Standard of care is the level of expertise, skills and training generally possessed by a reputable member of the profession. This is used to determine if the actions of the health care provider were in accordance with established standard of care, or if the provider acted contrary to the standard. Duty defines what should have been done in any given circumstance. Court decisions against a health care provider may be centered on what another provider in your profession would have done under the same circumstance to determine if your actions were appropriate or inappropriate (negligent).

**Negligence of duty is malpractice**

In the case of a radiologic technologist, examples of malpractice may include such mistakes as taking x-rays of the wrong side or wrong body part, mislabeling films, inaccurate patient name and ID information on the film, unnecessary exams (too many repeat films), or causing the patient avoidable injury.

**Areas of litigation against radiologic technologists include, but are not limited to, the following:**

**1. Patient falls or "positioning" injuries:** Examples include leaving a sedated patient unattended or improperly moving a patient with suspected cervical neck injury, resulting in serious injury.

**2. Pregnancy related issues:** When x-ray personnel fail to inquire about pregnancy status of a patient before performing a procedure, and sometime later, the fetus or infant is found to have a medical problem, the patient may attempt to seek retribution against the technologist.

**3. Delays in treatment or errors in diagnosis:** An x-ray technologist obtains images in an outpatient after hours clinic, notices an obvious problem, but allows the patient to leave prior to notifying a physician of the findings.

**4. Making diagnosis:** A patient asked an experienced technologist if he/she could see any abnormalities on a chest x-ray. The technologist told the patient that "it looks normal to me". The patient left on vacation that same afternoon, only to become seriously ill two days later hundreds of miles from home. In retrospect, the film clearly revealed a spontaneous pneumothorax.

The patient's doctor had told the patient that "we will give you the radiologists report as soon as it is ready". The patient thought that the technologist's comments to him were his instructions, and left before the doctor could contact the patient with the real report.

If a patient is obviously injured because of a health care provider's actions, most courts apply "res ipsa loquitur" (translation- "the thing speaks for itself"). In such cases, it becomes the health care provider's burden to disprove negligence, not the patient's burden to prove it!

Radiography is performed by health care providers who are responsible for the administration of ionizing radiation, ultrasonic waves, and magnetic fields for diagnostic, therapeutic or research purposes. The scope of practice of radiography includes, but is not limited to the following:

1. Procedures or examinations performed as directed by a licensed practitioner.
2. Using established, accepted protocols for providing optimal care to patients.
3. Continual evaluation of established methods with recommendations for expansion of the profession.

**Patient Rights**

1. Patients must have the assurance that all of their medical and personal information is kept strictly confidential and that privacy is maintained.

2. Every patient has the right to informed consent and to refuse treatment. Except in emergencies when the patient may lack the ability to make decisions and the need for medical treatment is urgent, the patient must have an opportunity to discuss and request information pertinent to the specific procedures(s). Risks associated with the procedure, length of recuperation, medically reasonable alternatives for treatment, and benefits of the treatment must be clearly communicated to the patient.

Consent is generally granted in writing, but in some situations, it may be verbal or implied. An example of implied consent might be an unconscious patient involved in a serious accident that is brought in by ambulance. He/she cannot give written or verbal consent for emergency treatment. An example of verbal consent may involve

explaining a basic radiographic procedure to the patient, such as a chest x-ray, and having the patient verbally agree to undergo the procedure. A patient may withdraw previously granted (or presumed) consent at any time.

For a patient to give informed consent, all of the following conditions must be met:

- the patient must be of sound mind.
- the patient must be of legal age.
- the patient must give consent freely.
- the patient must be adequately informed about the exam or procedure being performed.

A health care professional can avoid legal liability by taking the time to thoroughly explain every procedure to each patient. Clarify questions and listen to the patient's concerns. Avoid giving rehearsed, canned explanations.

**Legal Liability**

There are two kinds of law: public law and civil law.

**Public Law:** Violations of local, state or Federal laws are in this category (such as police).

**Civil (private) Law:** These are laws that regulate relationships between individual citizens. This is the type of law that most often governs health care professionals in respect to professional actions and conduct. Court decisions are based on interpretation of statutes, and court rulings are referred to as "common law rulings". A private injustice or injury claim made by one citizen against another is called a tort. There are two types of tort claims: intentional and negligent.

**Intentional:**

- Defamation, invasion of privacy, breach of confidentiality: Patients prevail in court when a health care worker is charged with disclosing confidential information. Slander is when defamation is spoken; written defamation is libel.

- Physical acts of aggression, assault (threaten to harm), battery (carry out the threat): There have been cases where patients filed assault charges against health care workers who threatened to cause pain or withhold medication if the patients didn't do what the provider wanted. Battery charges have been filed against health care providers who performed procedures on patients without consent, treated the patient roughly, or performed examinations on the wrong patient.

- False imprisonment: False imprisonment is defined as the illegal restraint of any person against his/her will. The courts recently ruled that restraining a patient without consent in some circumstances is false imprisonment.

**Negligent:**

A patient has been injured or damaged in some way due to the negligence of the health care provider (a patient falls when an x-ray technologist leaves a disoriented patient unattended on a trolley without the side rails up).

**Requisitions / orders for radiologic procedures**

When physicians or other authorized personnel order an x-ray procedure, the order is similar to a pharmacist filling a drug prescription. The x-ray procedure ordered is deemed necessary by the physician in his treatment plan for the patient. Altering a doctor's order, refusing to perform an exam, or unintentionally performing the wrong exam may place the x-ray technologist in libellous position.

Physicians, nurses, clerks and others that generate x-ray orders can and do make mistakes. If the x-ray request appears to have been incorrectly ordered, it is prudent and professional for the x-ray technologist to clarify the order before proceeding with the exam. For example, the patient had a left total hip replacement one month ago and comes in today for a scheduled follow-up visit. The x-ray order states "R hip to f/u surgery". The patient informs you that they have never had surgery on their right hip. Under these circumstances, the technologist should clarify the order with the person who ordered the exam rather that proceed imaging the wrong hip. If there is ever any doubt about the accuracy of a request, or the request does not corroborate with the patient's clinical history, you should clarify the order before proceeding.

Clarification of the x-ray order reduces unnecessary repeat exams, resulting in less radiation exposure to the patient, wasted resources (film and time), and more efficient operation of the department.

There are times when an x-ray procedure must be modified to accommodate limitations of the patient, unexpected events during the procedure, or other situation. When the exam performed differs from the exam ordered, the reasons for the changes should be documented on the request or in the medical record. For example, an x-ray order is sent for a PA and lateral chest x-ray on a patient who is not able to tolerate upright views; therefore, portable AP and lateral decubitus chest views were obtained.

**Patient identification & verification**

Before proceeding with any x-ray procedure, verify that you have the right patient! Some patients are hard of hearing, have language or communication barriers. In one example at a Hospital, a technologist called out the name of a patient scheduled for a barium enema. A patient stood up and followed the technologist back to the exam room. The exam was performed without any problems. Moments later, a patient came up to the radiology receptionist and asked if she could tell him how much longer it would be before he was called back for his barium enema. The technologist had performed the exam on the wrong patient because his name sounded similar to the scheduled patient. There were 35 years difference in the two patient's ages. Instead of a chest x-ray, the elderly patient underwent an unnecessary barium exam.

For facilities that still utilize x-ray film, another important factor of patient verification is the name and other identifying information recorded on the x-ray film. The technologist is ultimately responsible to ensure that the information of each x-ray is accurate. Films flashed with the wrong patient ID or any incorrect information may have legal consequences for the technologist. Many technologists read the ID information from the flash card to the patient for confirmation that everything is correct. There have been cases where a technologist flashed the wrong ID onto a film, and consequently, the wrong patient ends up in surgery to repair a medical condition they do not have, while the ailing patient receives delayed care! Although each clinic and hospital has their own method of labeling x-ray films, the following information (from a medical-legal standpoint) should be included:

- patient name
- unique identifying number for the patient (medical record number)
- date of birth or age (remember the barium enema story from above? There were 35 years difference between the two patients).
- date of the procedure
- hospital or clinic name

**Lead markers**

Lead markers are used by x-ray technologists to clearly distinguish right from left, supine from upright, etc. Proper placement of these important markers aids the physician as he/she studies the x-ray images. Inadvertent mislabeling is a common, but serious mistake in radiology. It is one of the leading reasons for tort claims against radiologic technologists. Lead markers should be placed in a position so they do not obscure the area of clinical interest.


## Equal Distribution Matrix in Workforce Management: A Diagnostic Center Case Study

**Amritpal Kaur,** Front Desk Executive, Krshnna Diagnostic's Pvt. Ltd.

**Introduction:** Effective workforce management is a key factor for the success of any organization. One of the challenges faced by organizations is the equitable distribution of work among employees. To address this challenge, many organizations, including diagnostic centers, are adopting the Equal Distribution Matrix (EDM) approach. In this paper, we will provide a case study of a diagnostic center that has successfully implemented the EDM approach in workforce management.

**Case Study:** XYZ Diagnostic Center is a large medical facility that provides a wide range of diagnostic services, including laboratory tests, medical imaging, and diagnostic consultations. The center has over 100 employees, including doctors, laboratory technicians, radiologists, administrative staff, and support staff.

To implement the EDM approach, XYZ Diagnostic Center first identified the skills and abilities of each employee. This involved conducting a skills assessment and evaluating the performance of each employee in their current role. The skills assessment helped to identify the strengths and weaknesses of each employee and determine their level of expertise in specific areas.

Based on the results of the skills assessment, XYZ Diagnostic Center developed an EDM matrix that assigned tasks and responsibilities to employees based on their skills and abilities. For example, doctors were assigned to specific clinics or departments based on their areas of specialization. Laboratory technicians were assigned to specific tests based on their knowledge and experience. Radiologists were assigned to specific imaging modalities based on their expertise.

The EDM matrix was regularly reviewed and updated to ensure that workload distribution remained equitable. The matrix was also used to identify areas where additional training or support was required to ensure that all employees had the necessary skills and knowledge to perform their tasks effectively.

**Results:** The implementation of the EDM approach had a significant impact on XYZ Diagnostic Center's workforce management. By ensuring an equitable distribution of workload, employees were more motivated and engaged, leading to improved productivity and output. Additionally, the use of data-driven approaches in workforce management led to improved decision-making and a more efficient allocation of resources.

Moreover, the EDM approach helped to identify areas where additional training or support was required. This led to improved employee development and retention, as employees felt valued and supported in their roles. The EDM approach also led to improved communication and collaboration among employees, as they worked together to achieve common goals.

**Conclusion:** In conclusion, the EDM approach is a promising approach to workforce management in diagnostic centers. The case study of XYZ Diagnostic Center demonstrates the benefits of this approach, including improved productivity, employee engagement, and resource allocation. It is essential for organizations to carefully evaluate the costs and benefits of this approach before implementing it and to communicate effectively with employees to address any concerns or resistance to change.

**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**


SEQUOIA HEALTHCARE
Diagnostic Imaging - REACH for All
Radiology
Equipment
Accessibility for
Cost Effective
Healthcare
Clarity 1.5T MRI scanner
16 Ch MRI scanner with MUSIC 66 X 16 and all applications.
Inspiration 64
Smart Large bore 64-slice CT Scanner
MRI High - Pressure - Injector
DSA High - Pressure Injector
SPECT Gamma Camera
Cloud Magnet Ferro Detector
Digital Tomosynthesis Mammography System
Mammo - Navigator
Contrast Media Injector
Sequoia Healthcare Pvt. Ltd. Plot No.27, Survey No.125, KIADB Industrial Area, Chikkaballapur - 562101, Karnataka
+91 84319 20843
sales@sqhpl.com
www.sqhpl.com
Building No.1, District No.7, URANUS Avenue, AMTZ Campus, Near Pragati Maidan, VM Steel Projects, S.O Visakhapatnam - 530031

**Instalation of Gujarat Chapter of Society of Indian Radiographers**


# Artificial intelligence in Medical Imaging: Opportunities and Challenges

**Sahid Afriddi, Sooki Daemi Khramawplang, & Vilezonu Neikha,** PG Medical Imaging Technology, Department of Allied Health Sciences, Martin Luther Christian University, Shillong, Meghalaya.

**Artificial intelligence (AI)** is heralded as the most disruptive technology to health services in the 21st century. AI or Machine intelligence is the internal power of the machine, where humans program the machine brain through different computing, capable of performing complex tasks normally requiring human intelligence and bring out the best performance of the machine to deliver different task. The concept of AI in medical imaging was envisaged in the 1960s, however, inadequate technological advancements during the period prevented any rapid progress. AI in medical imaging gained more widespread recognition with the introduction of complex computer systems and development of artificial neural network systems as well as machine learning technologies in the 1980s. Medical Imaging Industry have accepted automated technologies within their practice for many years. Particularly, AI tools are being used as clinical decision support enhancers and supportive systems for improving imaging workflow, image acquisition, disease identification, research efficiency, radiation exposures and delivering high-quality care. A positive consequence of increased digitization and automation has increase efficiency and throughput within imaging departments improving patient care and diagnostic accuracy. In 2011, the computer giant's question answering system Watson won the quiz show Jeopardy, and this marked the newest wave of AI booming. Recent exponential increase in Imaging data has increased the burden to physicians to process the images. They need to read images with higher efficiency while maintain the same or better accuracy, fortunately computational power has also grown exponentially. These challenges and opportunities have formed the perfect foundation for the AI to be blossomed in the medical imaging research. Within medical imaging, we are seeing implementation of AI tools introduced at a local level to reduce labour intensive and repetitive tasks such as analysis of medical images. As our information systems grow in their capacity to harvest big data, so has the scope to build AIs in areas such as natural language processing (NLP). Machine learning (ML) refers to a system that has the capacity to 'improve' and 'learn' to recognise patterns of disease features. Many AI-aided diagnostic tools for cancer detection applied in recent years have demonstrated excellent progress, especially in areas such as screening mammography, lung cancer screening and histopathological breast images. Studies on the implementation of AI for lung pathology and breast cancer detection have documented comparable sensitivity and specificity scores for AI tools, either as stand-alone readers or when combined with radiologists' scores. Many commentary articles published in the public and health domains recognise that medical imaging is at the forefront of these changes due to our large digital data footprint. Radiomics is transforming medical images into mineable high-dimensional data to optimise clinical decision-making.

**Opportunities:**
Two areas of opportunity that can help provide a framework for approaching AI in imaging deserve discussion:The Desirability of establishing standards &infrastructure,and categorical model of AI application in clinical and research.

**Infrastructure&Standards:** The in fractional cost to established and apply the idea of AI in radiology itself is costly and therefore low resource healthcare systems may not fit in to frame. As the cost to acquire this complex framework will come at the cost to benefit. AI imaging research would benefit from establishment of national and international image sharing networks, reference datasets of proven cases against which AI programs can be tested and compared, criteria for standardization and optimization of imaging protocols for use in AI applications, and a common space for describing and reporting AI applications.Large access to numbers of proven cases is necessary to test and validate AI programs and, many applications,to train them. This may apply to even relatively common conditions. Robust methods are needed for QA of shared images and ensuring the integrity of image data. If image data are corrupted in transmission or storage or during processing, it will be difficult to duplicate work or confirm its validity. Although several scientific informatics systems to support data transfer, storage,quality control, and query have been applied across institutions, the complete needs of such system are not yet defined for radiology.An image sharing network would support and facilitate use of reference datasets of proven cases on which to test and compare new AI programs for accuracy and other measures of performance.The high variability in imaging protocols between institutions and even variability in the execution of a given protocol within an institution are potential impediments to development and use of AI applications in imaging.

**Categories of AI Applications:** Several encouraging results have been reported in AI-enabled computer-aided diagnosis. Initially the focus of AI in Imaging was on improving diagnostic accuracy. Beyond better diagnostic accuracy, AI applications could be used to address several practical issues:
(1) optimization of workflow,
(2) pre analysis of cases in high


SAMSUNG
Accelerating intelligence
Fully automated premium ceiling digital radiography system.
Provides advance low dose imaging and help in streamlining workflow.
S-Vue™
Full Auto System
AccE Detector
S-Guide
Low Dose
Soft Handling™
A.I
On-Device CAD
SimGrid™
Bone Suppression
Remote Software Update
GC85A
Product images are for representational purposes only, actual product may vary.

volume applications: observer fatigue may be a factor,
(3) extracting information from images that is not apparent to the eye, and
(4) improving the quality of reconstructed images. Long unread case queues in busy departments and departments where no radiologist are available to interpret can delay diagnosis and are particularly problematic if clinical presentation is not typical. These conditions are often encountered in low resource settings. One can imagine a suite of AI programs optimized for sensitivity, rather than overall accuracy.Observer fatigue is an unavoidable aspect of radiology practice and a particular issue in screening examinations. AI applications can extra ct unavailable information from medical images and contribute to precision medicine.

**Challenges:**
The challenges of AI in medicine may be thought of as circumstantial, relating to human behaviors, and intrinsic, relating to the capabilities of the underlying science and technology.

**Circumstantial Challenges:** Radiology has had to deal with rapid technological change as much as any other discipline in medicine. Radiologists have benefited greatly from working with digital systems, but concerns exist about machines taking jobs away from humans, reflecting a possible, even likely, cultural barrier to adoption of AI in radiology. Stoking these concerns, Obermeyer and Emanuel, writing in the New England Journal of Medicine, have already predicted that "machine learning will displace much of the work of radiologists and anatomic pathologists" and "machine accuracy will soon exceed that of humans." Medical images are highly heterogeneous at both an individualand a population level.

**Intrinsic Challenges:** How best to establish the source of truth for validating results, whether processing speeds will be fast enough for relevance to clinical practice, whether protocol tolerant AI programs can be developed, and whether criteria can be established for determining in what patient population or populations a given program is valid.At present, computing systems fast enough to supply results in a clinically relevant time frame for emergency or urgent diagnoses are not generally available in medical institutions. However, this is not likely to be a practical problem going forward because of rapid development of lower-cost graphics processing unit–based computing systems and easy access to cloud computing solutions.It is not clear how this will play out in imaging applications of AI, but the issue of patient population must be considered with careful definition of population being studied.

**Pitfalls:**
AI programs typically require substantial numbers of cases for training. Institutional xenophobia, data protection and other proprietary interests may restrict access to image data between institutions. Failure to assemble a sufficiently large enough training set is a potential pitfall that could have the effect of making the results less accurate or generalize. The risk of over fitting was noted previously. The tolerance of using AI programs in imaging between different patient populations is not yet known.The biggest limitation for AI in imaging may be inherent limitations in defining normal versus abnormal in continuously variable biologic data.

**Future of AI &Radiology:**
The future of AI in Radiology is good and promising, while various challenges exist, such as opaque nature, the cost and small-scale training datasets, they will likely be surmountable in time. AI have already inevitably entered the diagnostic radiologists, Radiology Technologist workflow. Although AI will not replace them in the future, it is likely that radiologists, Radiology Technologist who use AI will eventually replace radiologists, Radiology Technologist who do not.

The use of AI will lead to more efficient image diagnosis, in combination with optimized decision support algorithms, which will benefit patient care.

**Conclusion:**
The full and final role of AI is not yet clear, or their impact on medical imaging services. What is clear is that AI provides a promising new set of tools for interrogating image data that should be explored with vigor. The growing interest and already implementation and adoption of AI in the imaging community bodes well for its potential leadership role.

**References:**

1.The Dartmouth Artificial Intelligence Conference. The next fifty years.Available at:https//www.dartmouth.edu/wai50/homepage.html.Accessed June 13, 2017.
2.McAfee A, Brynolfsson E. Where computers can defeat humans andwhere they can't. Available at https://www.nytimes.com/2016/03/16/opinion/where-computers-defeat-humans-and-where-they-cant.html.Accessed June 12, 2107.
3.Clark K, Vendt B, Smith K, et al. The Cancer Imaging Archive(TCIA): maintaining and operating a public information repository.J Digit Imaging 2016;26:1045-57.
4.Russakovsky O, Deng J, Su H, et al. 2015. ImageNet large scale visualrecognition challenge. Int J Comput Vis 2015;115:211-52.
5.Ravi D, Wong C, Deligianni F, et al. Deep learning for healthinformatics. IEEE J Biomed Health Inform 2017;21:4-21.
6. Balogh EP, Miller BT, Ball Jr eds. Improving diagnosis in health care.Washington DC, USA: National Academies Press; 2015.
7.Anthimopoulos M, Christodoulidis S, Ebner L, Christe A,Mougiakakou S. Lung pattern classification for interstitial lung diseasesusing a deep convolutional neural network. IEEE Trans Med Imaging2016;35:1207-16.
8.https://arrsinpractice.org/artificial-intelligence-diagnostic-imaging-radiology
9.Fryback DG, Johnbury JR. The efficacy of diagnostic imaging. MedDecis Making 1991;11:88-94.
10. Aerts HJWL. The potential of radiomic-based phenotyping in precision medicine: a review. JAMA Oncol 2016;2:1636-42.
11. Obermeyer Z, Emanuel EJ. Predicting the future—big data, machinelearning, and clinical medicine. N Engl J Med 2016;375:1216-9.
12. Chockley K, Emanuel E. The end of radiology? Three threats to the future practice of radiology. J Am Coll Radiol2016;13:1415-20.
13. Cho J, Lee K, Shin E, et al. How much data is needed to train amedical image deep learning system to achieve necessary high accuracy? arXiv preprint arXiv 2015. 1511.06348. Available at: https://arxiv.org/abs/1511.06348. Accessed January 18, 2018.


BLUENEEM®
BLUENEEM® UROLOGY
YOUR FELT NEEDS PARTNER
BLUENEEM® INTERVENTIONAL SYSTEMS
YOUR INNOVATION PARTNER
BLUENEEM PEDIATRIX
OUR KIDS DESERVE THE BEST
CLINICIANS' TRUSTED PARTNER
EXPLORE COMPLETE PRODUCT RANGE
LEADER IN DESIGN, DEVELOPMENT AND END-TO-END MANUFACTURING OF MINIMALLY INVASIVE MEDICAL DEVICES
OPTICORE
BIOPSY GUN - FULLY AUTOMATIC
CYTO CORE
BIOPSY GUN - SEMI AUTOMATIC
TRACER™
HYDROPHILIC GUIDEWIRE
+91 80 2976 1335/36
+91 97399 72854, 97399 72855
contact@blueneem.com
marketing@blueneem.com
CE 0123
TÜV SÜD

# Radiographic positioning of the Lumber Spine (Special Views)

**Ramesh Sharma,** Rtd. Chief Technical Officer Radiology, NCI-AIIMSy- New Delhi

Radiologists & Orthopedicians consider a lumbar spine radiographic film of good quality when it demonstrates the lower ribs, lumbar vertebral bodies, transverse processes, pedicles, spinous processes, sacrum, and sacroiliac joints. On lateral projections, the inter vertebral disc spaces and inter vertebral foramen as well as the superior and inferior articular processes should be visible along with the vertebral bodies and spinous processes.

**Lumber spine PA** (ferguson method)**:** An alternate view of the lumbar spine in PA projection to protect radio sensitive organs from exposure. This is a scoliosis series that is used to distinguish a primary deforming curve from a compensatory curve.

**Position of patient:** Standing or seated in front a vertical grid. The IR should be adjusted to include about 1 inch of the iliac crests. The midsagittal plane of the body should be aligned to the midline of the grid. The arms hang by the side of the body in the standing position. The elbows are flexed and the hands rest on the lap in the seated position. A second radiograph is taken with the hip or foot elevated with a block or sandbag under the foot or buttock. The Ferguson method requires the patient to expend some effort to maintain this position without support.

**Lumber Spine Lateral View**

An additional view of the lumbar spine for patients with injuries.

**Position of patient** Supine with a horizontal beam. The midsagittal plane is centered to the middle of the grid. The hips and shoulders are in the same plane horizontally. The elbows are flexed and the hands are placed on the upper chest to remove the forearms from the exposure field. The patient may be asked to flex the knees and hips to bring the back in firm contact with the table and reduce lumbar lordosis.

**Position of part:** The gonads are shielded. The patient should be asked to breathe OUT and hold respiration during exposure. The image demonstrates the lumbar vertebral bodies, intervertebral disc spaces, transverse and spinous processes, pedicles, and laminae. The sacroiliac joints are seen on either side at equal distance from the vertebral column. The vertebrae are symmetric with the spinous processes centered on the bodies. In trauma patients, a larger field may be used to enable visualization of additional abdominal organs such as the kidneys, liver, spleen, and psoas muscle.

**Lumber Spine AP Oblique:** An oblique projection that is usually performed after the AP projection to demonstrate the articular processes and/or lumbosacral processes.

**Position of patient:** Supine and turned 45 degrees towards the affected side. The long axis of the body should be parallel to the long axis of the table. The spine is centered to the midline of the grid. The lumbar spine is approximately 2 inches medial to the elevated anterior superior iliac spine in the oblique position. The arms are in a comfortable position. The patient should be asked to hold the breath during exposure.

**Position of part:** A support may be placed under the elevated parts of the body (shoulder, hip,knee). The gonads are shielded. The degree of body rotation should be 45 degrees to demonstrate the articular processes and 30 degrees to demonstrate the lumbosacral processes. The image shows an oblique projection of the area from the lower thoracic vertebrae to the sacrum. The articular processes on the side closest to the IR are visualized. Zygapophyseal joints are open and uniformly seen through the vertebral bodies. The other side is imaged for comparison.

**Sacrum AP:** A basic view of the lumbosacral junction and sacroiliac joints.

**Position of patient:** Supine with a vertical beam angled at 15 degrees. This view is NOT used in children. Gas and fecal matter in the bowel can interfere with images of the sacrum and coccyx. A bowel preparation (by physician's order) may be needed. The bladder should be emptied prior to the examination.

**Position of part:** The tube should be angled at 15 degrees. Centering should be done 3 cm above the pubic symphysis. The patient can breathe normally during exposure. The gonads are shielded in men. Female gonads cannot be shielded for this projection. The image clearly demonstrates the sacrum free of superimposition.

**Lumber Spine Junction Lateral**

A basic view of the lumbosacral junction. This view is NOT used in children.

**Position of patient:** Lying on the left or right side. The patient should be asked to bend the knees to stabilize the body. A pad should be placed under the waist for support. If possible, the hips should be fully extended.

**Position of part:** Centering should be done 3 cm below the iliac crest. The knees are exactly superimposed. The patient should be asked to suspend respiration during exposure. The gonads are shielded. The image demonstrates the lumbosacral joint in the center of the image. The entire L5 and upper sacrum should be visualized.

# Invitation

## 2nd State Conference of Andrapradesh Radiographers & Imaging Technologists - 2023

Association of Radiographers & Imaging Technologists

2nd State Conference ARIT 2023

ADVANCES OF RADIOGRAPHIC APPLICATION IN NEWER IMAGING

TIRUPATHI - 2023

Date: 02 July 2023, Sunday

Venue: Minerva Grand, Renigunta road, Near railway fly over, next to reliance smart, Tirupathi, Andhrapradesh- 517501.

Dear friends & well wishers

Its our Previlage and Immense Pleasure to Acquaint that Andhrapradesh Association of Radiographers and Imaging Technologists group (**APARIT**) is desirous to conduct 2nd state Conference at Tirupati on 2nd july 2023 at Hotel Minerva Grand We are Highly Enlighted to Extend our Comfy Invitation to attened this acadamic fiesta.

In Brief **APARIT** (Andhrapradesh Association of Radiographers and Imaging Technolgists) started in 2018 with a small group of Enthusiastic Technologists with High Commitment. **APARIT** conducted CME's workshops in Several Places and Conducted a State Level Conference at **Rajamahendravaram**. **APARIT** Organizing Comitee Members has Vast Technological Experience to Organise Radiology Symposiums. Our Scientific Comitee is Entrusted with the Resposibility of Ensuring that the Conference meets the Expectation of the Students as well as the Radiology Technologists.

The Theme of this Conference is " Advances in Radiography and Imaging Sciences.This Conference is mainly Focusing on Advances in Cardiac MRI, Contrst media , Breast Imaging as well Radiation Safety and Precations . We Assure that this Conference will give you Immense Technical Knowledge and wonderful memories. We Cardially Invite you all to take part in this Event and make it Grand Success

*****Short while Ago our Association APARIT is Affliated with Society of Indian Radiographers for Future Betterment *****

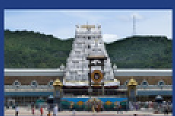
**WITH WARM REGARDS: THE ORGANIZING COMITEE**

### Program schedule

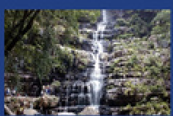
| | | |
|---|---|---|
| 8:30 AM 9:30 AM | Registration, Spot Registration | Organizing Committee |
| 9:30 AM 10:30 AM | Inauguration | Cheif Guest Dr. V.N Varaprasad MD, FICR PRESIDENT ELECT IRIA |
| 10:30 AM 10:45 AM | Tea Break | |
| 10:45 AM 11:30AM | Advanced Techniques in Breast Imaging | Dr. V.N Varaprasad |
| 11:30 AM 12:15 PM | Dual Energy CT Scan | Dr. Uma Maheswara Rao |
| 12:15 PM 1:00 PM | Vessel wall MR imaging | Dr. Prudhvinath reddy A MBBS, MD, DNB, FWBI, Assistaant Professor & i/c HOD Dept of Radio Diagnosis DY Medical superintendent AIIMS Mangalagiri |
| 1:00 PM 2:00 PM | Lunch Break | |
| 2:00 PM 2:30 PM | Contrast Media | Arco Life Sciences |
| 2:30 PM 3:15 PM | Advance in Cardiac MRI | Monica Gunasingh ( Clinical Application Specialist MRI , Phillips India limited ) |
| 3:15 PM 3:45 PM | Radiation Safety | M V Ranga Rao Cheif technologist & RSO Dept of Radiology SVIMS |
| 3:45 PM 4:00 PM | Vote of thanks | |

### Special Invitees
from society of Indian radiographers

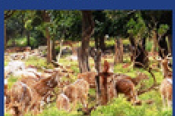
| | |
|---|---|
| Mr Triloknath Mishra | Chairman |
| Mr Vilas b bhadane | President |
| Mr Jagadish. N jagtap | General Secretaory |
| Mr Shankar k bhagat | National Coordinator |
| Mr srinivasulu siramdas | Chief executive officer |
| Mr Damodar naidu koti | Director Acadamics |
| G. Venkata Ramanappa | Treasurer |
| Mr Abinay Akkisetty | Joint secretary |



Tirupathi Devasthanam



Talakona Waterfalls



Deer Park

Chandragiri fort

### Organizing Committee

Organizing Chairperson
R. PREM KUMAR
KADAPA/ 9000724137

Organizing Co Chairperson
SWAMY NAIDU A
KAKINADA / 7989951285

Organizing Co Chairperson
BASANTH.CH
GUNTUR / 9492849498

Organizing Secretary
BHARATH.I
8106920606

Treasurer
SUNIL KUMAR.CH
9985471026

**Coordinators** Abdul Azeez.s Abdul Raheem.s Ramachenrudu.g Khader Valli.s Ilangoavan saman.s Sudhir reddy.p Bharath reddy.s.p Srinivas.v Jani sardar Nagaraju Lovaraju.v Subash.b Suresh.l Senthil Kumar.s subba rao suresh.l Vinod.c.r

### Regestration Fee Details

Before June 26th 500/- | After June 26th 1000/- | Spot 1000/-

Acc Holder Name : CHATRATHI SUNIL KUMAR
Account number : 918010029640185
BANK : AXIS BANK
IFSC Code : UTIB0001962
BRANCH : Bhimavaram.

Note- Kindly note spot registration are limited number only

Note- The Registration fee includes the conference materials and proceedings as well as food and refreshments



SOCIETY OF INDIAN RADIOGRAPHERS — SIR — TECHNOLOGY FOR HUMANKIND AND SAFE PRACTICE — INDIA — Learn - Earn - Serve — Regd. No. 282/1996

To apply for

SIR Life Membership

Visit

www.radiographers.org

# Sonomammography

**Disha Sharma, Joy Banik, Prakash Shil, Sagardeep Dey, Malabika Mondal,**
B. Sc. MRIT Students, Tripura Institute of Paramedical Sciences, Agartala, Tripura

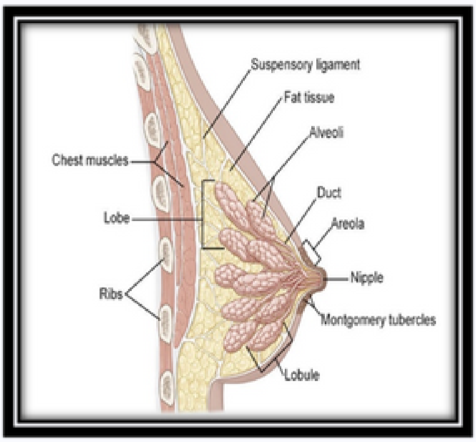
**Introduction:** Breast ultrasound is an imaging technique that uses ultrasound waves to look at the inside of the breasts. It can help healthcare find breast problems. It also lets the healthcare provider see how well blood is flowing to areas in the breasts. This test is often used when a change has been on an X-ray mammogram or when a change is felt but does not rule on a mammogram and a patient below 45 years of age.

**Anatomy:**
Breast ultrasound is often used to localize palpable and non-palpable masses before surgical excision. The basic breast anatomy comprises 15 to 20 lobules, each consisting of smaller breast ducts, known as the terminal duct lobular units (TDLUs). All the ducts drain into a single lactiferous sinus towards the nipple.

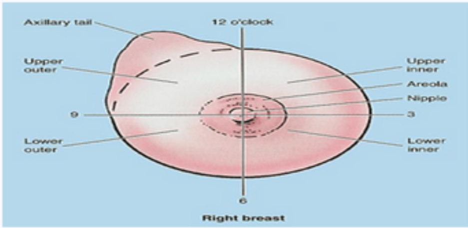
The three main anatomical zones consist of fatty tissue fibro-glandular tissue, and muscular tissue.

From a sonography point of view, the breast is divided into various hypoechoic and hyperechoic layers:

- Skin (hyperechoic, white fibrous bands).
- Fat (hypoechoic, subcutaneous fat lobules).
- Breast parenchyma (hyperechoic, fibro-glandular soft tissue).
- Retro-mammary fat (hypoechoic fat lobules).
- Pectoralis major muscle (hyperechoic fibrous tissue).




**Anatomy of Breast**




**Various quadrants of breast anatomy**

**Aims & objectives:The objectives of a sonomammogram include:**

- Detection and Characterization of Breast Abnormalities: The primary objective of a sonomammogram is to detect and characterize breast abnormalities, such as masses, cysts, solid nodules, or areas of increased vascularity. It can help differentiate between benign and malignant lesions by assessing their shape, size, margins, internal composition, and vascularity.
- Supplement to Mammography: Sonomammography is often used as a complementary imaging modality to mammography. It can provide additional information when mammography is inconclusive or when the breast tissue is dense, making it challenging to interpret mammographic findings. It is especially useful in evaluating younger women or women with dense breasts.
- Evaluation of Breast Lumps or Pain: Sonomammogram is valuable in assessing breast lumps or areas of pain. It can help determine whether a lump is solid or fluid-filled (cystic). It aids in guiding needle aspirations or biopsies of suspicious lesions, facilitating accurate targeting and sample collection.
- Assessment of Breast Implants: Sonomammogram is commonly used to evaluate breast implants. It can detect implant ruptures, leaks, or other implant-related abnormalities. It helps assess the integrity of both silicone and saline implants and can aid in guiding interventions, such as implant removal or replacement.
- Monitoring and Follow-up: Sonomammography plays a role in monitoring and follow-up of known breast abnormalities or lesions. It helps track changes in size, appearance, or vascularity of a lesion over time, aiding in assessing treatment response or disease progression.
- Guidance for Procedures: Sonomammogram provides real-time imaging guidance for various procedures, such as needle aspirations, biopsies, or cyst drainages. It helps in accurately targeting the abnormal area and avoiding surrounding structures, minimizing complications and ensuring adequate sample collection.

The aims and objectives of sonomammogram are to improve the detection, characterization, and evaluation of breast abnormalities, guide interventions, and aid in treatment planning and follow-up. It is a valuable tool in breast imaging, particularly when used in conjunction with other modalities such as mammography or magnetic resonance imaging (MRI).

**Indications:**
Common indications for breast ultrasound are:

- Palpable lump during clinical breast evaluation
- Axillary lymphadenopathy present on mammogram imaging
- Women younger than 40 years with the clinical presentation of certain anomalies.
- Pregnant or lactating women
- Suspicious abnormality identified on mammogram imaging
- Nipple discharge
- Skin retraction or inversion of the nipple
- Surgical scarring evident in mammogram imaging

- Needle guided percutaneous breast biopsy
- Follow up patients receiving neo adjuvant chemotherapy.

**Equipment of Sonomammography:**

Breast ultrasound uses high-frequency sound waves to map the internal structures of the breast.

The main equipment of sonomammogram are:

- Ultrasound equipment.
- Transducer (7.5 MHz linear array probe should be used).
- Ultrasound gel.


**Patients preparation:**

- The patient will be asked to remove any jewelry and clothing from the waist up and wear the given gown.
- The patient will lie on her back on an exam table. Then raise the patient's arm above the head on the side of the breast to be looked at.
- The sonologist will put a clear, warm gel on the skin over the breast area to be looked at.
- The sonologist will press the transducer against the skin and move it over the area being studied.
- Once the test is done, the technologist will wipe off the gel.

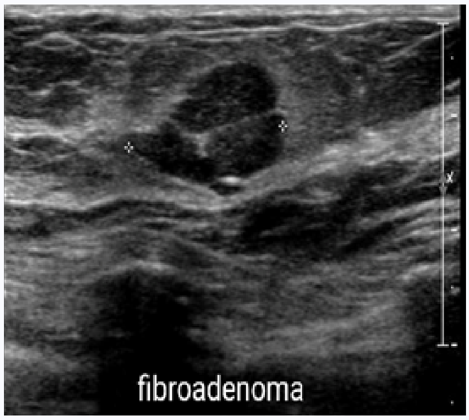
**Procedure:**

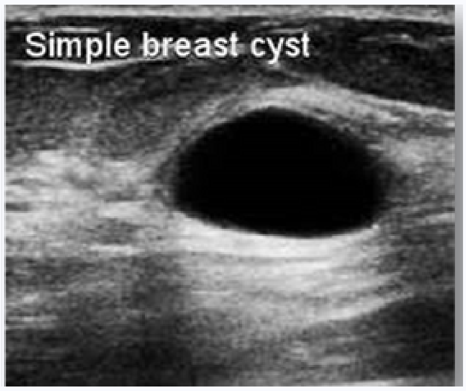
- Patient positioning: Supporting elbow, flat, supine,undress from the waist up and put on a gown,leaving your upper body exposed.
- It's important to inform the technologist or radiologist if you have any breast implantsor if you arepregnant or breastfeeding.
- The patient is asked to raise the arm on the side being examined and placed it behind the head to provide better access to the breast.
- The Sonologist or radiologist will use an ultrasound probe, which emits and receives sound waves, to capture images of the breast.
- They will move the probe gently across the breast, applying light pressure, to obtain images from various angles and sections of the breast.
- Probe: linear array 7-13 MHz
- Correct depth (skin to pectoral fascia) and correct focal zone (up to '2' is acceptable)
- Dynamic range: some settings can make a cystic lesion look solid and vice versa
- Scanning: radial/anti-radial
- Clock face with distance from the nipple.
- Only caliper things that are real
- Compression and angulation of probe from heel to toe to sharpen up the edges of a lesion
- As the probe is moved, real-time images of the breast tissue will be displayed on a monitor.

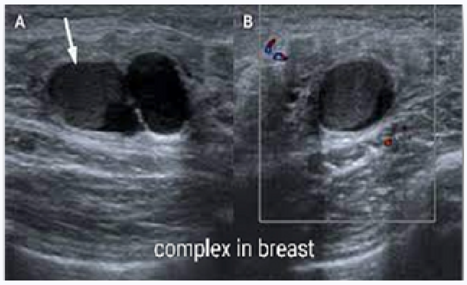
\

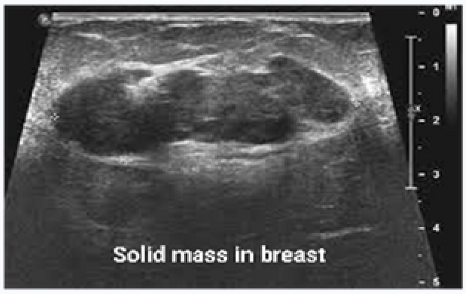
- The Sonologist or radiologist may take measurements and capture still images or video clips of specific areas of interest.

**Pathology:**




**References:**

https://www.apolloclinic.com/for-patients/service/conultations.
www.radioopedia.com.
www.pubmed.ncbi.in.com


One Stop Shop
Products & Solutions
AMS
Cath Lab
Radiation Protection
C-ARM
PACS
Dental Solutions
CBCT
OPG
X - Ray
Computed Radiography
Digital Radiography
CT Scan
MRI
Ultrasound
X-Ray Accessories

# Imaging in Gall Bladder Cancer

**J Venkat,** MBA, Ireland recognized Radiographer (CORU), Asst. Professor, Global Hospital, Chennai

**Introduction:** Gallbladder cancer is a rare form of cancer that starts in the gallbladder, a small pear-shaped organ located below the liver. It typically begins in the inner lining of the gallbladder and can spread to other nearby organs or lymph nodes.

**Imaging in Gall bladder cancer**

Imaging plays a crucial role in the diagnosis and staging of gallbladder cancer. Several imaging modalities can be used to evaluate gallbladder cancer, including ultrasound, computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET) scans. The specific imaging protocol for gallbladder cancer may vary depending on the individual case and the available resources.

However, we can provide general overview of the imaging protocols commonly used for gallbladder cancer:

**Ultrasound:** Ultrasound is often the initial imaging modality used to evaluate suspected gallbladder cancer. It is a non-invasive and cost-effective imaging technique. High-frequency sound waves are used to create detailed images of the gallbladder and surrounding structures. Ultrasound can help identify gallbladder wall thickening, masses, or any signs of tumor invasion into nearby structures.

**Computed Tomography (CT) Scan:** CT scans are commonly used to further evaluate gallbladder cancer and determine the extent of the disease. A contrast-enhanced CT scan provides detailed cross-sectional images of the abdomen. It can help identify the size and location of the tumor, involvement of nearby lymph nodes, and the presence of metastases in distant organs. CT scans may also assist in determining the resectability of the tumor.

Magnetic Resonance Imaging (MRI): MRI is another valuable imaging modality for gallbladder cancer. It provides detailed images of soft tissues and can help evaluate the tumor extent and local invasion.

**1.** T2-weighted images are commonly obtained to provide anatomic detail of the gallbladder and surrounding structures. A standard T2-weighted sequence, such as a fast spin-echo (FSE) sequence, is typically used.

**2.** T1-weighted imaging: T1-weighted images may be acquired to assess gallbladder morphology and to evaluate the presence of certain pathologies. This can be done using a gradient echo or spin-echo sequence.

**3.**Magnetic resonance cholangiopancreatography (MRCP): MRCP is a specialized imaging technique that allows for the evaluation of the biliary system, including the gallbladder, bile ducts, and pancreatic ducts. It provides detailed images of the biliary tree without the need for contrast agents. MRCP sequences, such as heavily T2-weighted single-shot fast spin-echo or 3D acquisition, can be acquired to obtain high-resolution images of the gallbladder and biliary system.

MRI may be particularly useful in detecting small tumors, assessing vascular involvement, and evaluating the biliary tree for any obstruction or dilation.

**Positron Emission Tomography (PET) Scan:** PET scans are sometimes used in gallbladder cancer to assess metastatic disease. A small amount of radioactive tracer is injected into the patient, which is taken up by metabolically active cells, such as cancer cells. PET scans can help detect distant metastases and provide information on the overall metabolic activity of the tumor.

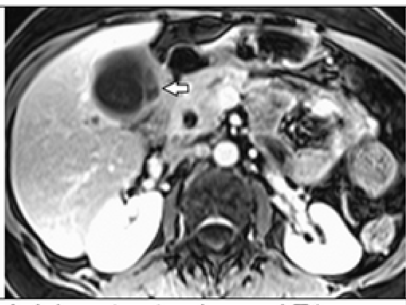
**Imaging Presentation:**

Three imaging presentation of gall bladder cancer is

- Mass occupying or replacing GB lumen (40-60%)
- Focal or diffuse asymmetric GB wall thickening (20-30%)
- Intraluminoid Polypoid lesion (15-25%)

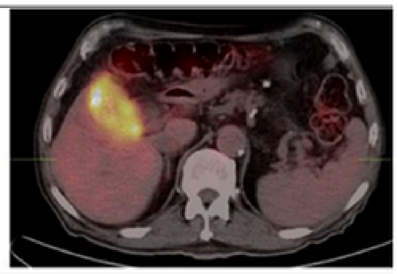
And also Cholelithiasis very common (60-90%). Lymph nodes in the porta hepatis peripancreatic region and celiac axis may be involved.


Polypoid intraluminal mass lesion from the fundus of the gallbladder with calcification focus and vascularity.



Axial contrast-enhanced T1-weighted image shows heterogeneous enhancement of the wall thickening (arrow).

Axial portal venous phase contrast-enhanced CT image shows an enhancing gallbladder mass



Increased FDG uptake in GB

## Patents for X-ray Chair and X-ray Supporting Pad

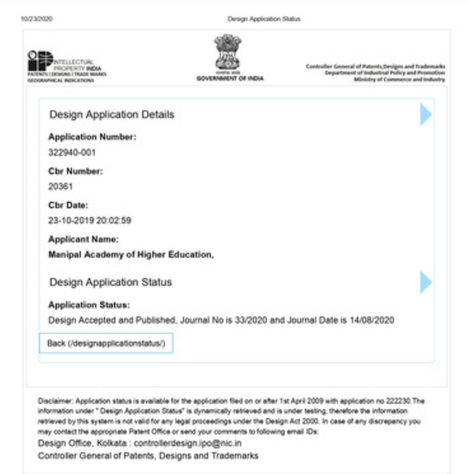
**Dr. Suresh Sukumar,** Additional Professor and RSO Diagnostic Radiology, Deputy Management Representative, Dept. of Medical Imaging Technology, Manipal College of Health Professions, Kasturba Medical College of Manipal and the Manipal Institute of Technology, Manipal, Karnataka

**X-RAY CHAIR :** The X-RAY CHAIR is innovative in the field of medical imaging technology. The X-RAY CHAIR is designed to revolutionise lower extremity X-ray procedures and improve patients' overall experience. It combines advanced technology, ergonomic design, and expertise from various disciplines to offer enhanced comfort, streamline imaging processes, and increase diagnostic accuracy.

**X-ray Supporting Pad :** The X-ray Supporting Pad, developed by a team of experts, is a patented invention designed to enhance patient comfort and improve diagnostic accuracy during PNS X-ray procedures.

This innovative pad is specifically designed to conform to the patient's body shape, ensuring optimal alignment and minimizing any discomfort. By reducing movement and providing targeted cushioning, the X-ray Supporting Pad enhances patient stability and overall experience during the PNS - X ray. Its introduction has the potential to revolutionize patient positioning in X-ray examinations, leading to improved diagnostic outcomes and elevated standards of patient care.

These remarkable chair & X-ray Supporting Pad has been developed by professionals from the Manipal College of Health Professions, Kasturba Medical College of Manipal and the Manipal Institute of Technology. The team consists of Dr. Suresh Sukumar, an Additional Professor in the Department of Medical Imaging Technology; Dr. Shovan Saha,an Assocaite Professor from the Department of Occupational Therapy; Dr. Rajagopal K. V., a Professor in the Department of Radio Diagnosis; Mr. Pavan Hiremath, an Assistant Professor in the Department of Mechanical & Industrial Engineering, and Dr. Sathyashankara Sharma, the senior Professor and Head of the same department.



10/23/2020 Design Application Status

INTELLECTUAL PROPERTY INDIA PATENTS | DESIGNS | TRADE MARKS GEOGRAPHICAL INDICATIONS

GOVERNMENT OF INDIA

Controller General of Patents,Designs and Trademarks
Department of Industrial Policy and Promotion
Ministry of Commerce and Industry

Design Application Details

**Application Number:**
322940-001

**Cbr Number:**
20361

**Cbr Date:**
23-10-2019 20:02:59

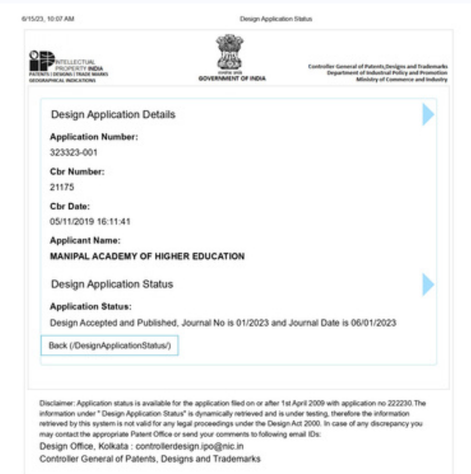
**Applicant Name:**
**Manipal Academy of Higher Education,**

Design Application Status

**Application Status:**
Design Accepted and Published, Journal No is 33/2020 and Journal Date is 14/08/2020

Back (/designapplicationstatus/)

Disclaimer: Application status is available for the application filed on or after 1st April 2009 with application no 222230.The information under " Design Application Status" is dynamically retrieved and is under testing, therefore the information retrieved by this system is not valid for any legal proceedings under the Design Act 2000. In case of any discrepancy you may contact the appropriate Patent Office or send your comments to following email IDs:
Design Office, Kolkata : controllerdesign.ipo@nic.in
Controller General of Patents, Designs and Trademarks



6/15/23, 10:07 AM Design Application Status

INTELLECTUAL PROPERTY INDIA PATENTS | DESIGNS | TRADE MARKS GEOGRAPHICAL INDICATIONS

GOVERNMENT OF INDIA

Controller General of Patents,Designs and Trademarks
Department of Industrial Policy and Promotion
Ministry of Commerce and Industry

Design Application Details

**Application Number:**
323323-001

**Cbr Number:**
21175

**Cbr Date:**
05/11/2019 16:11:41

**Applicant Name:**
**MANIPAL ACADEMY OF HIGHER EDUCATION**

Design Application Status

**Application Status:**
Design Accepted and Published, Journal No is 01/2023 and Journal Date is 06/01/2023

Back (/DesignApplicationStatus/)

Disclaimer: Application status is available for the application filed on or after 1st April 2009 with application no 222230.The information under " Design Application Status" is dynamically retrieved and is under testing, therefore the information retrieved by this system is not valid for any legal proceedings under the Design Act 2000. In case of any discrepancy you may contact the appropriate Patent Office or send your comments to following email IDs:
Design Office, Kolkata : controllerdesign.ipo@nic.in
Controller General of Patents, Designs and Trademarks

# Calibration Laboratory

## For Radiation Monitoring Instruments & Dose Calibrators

India's first and only comprehensive calibration facility for any brand of Radiation Survey meter, Contamination Monitor, Pocket Dosimeter, Area Zone Monitor and Radioisotope Dose Calibrator.

We are recognized by Atomic Energy Regulatory Board (AERB) and Accredited by N.A.B.L.

We offer complete solution for service, repairs and recalibration for any brand or type of RMIs and Dose Calibrators. We are specialized and factory trained and have the required infrastructure to repair Pressurised Ion Chamber Survey Meters.

NABL ACCREDITED
Certificate No. CC-1027

***Salient Features:***

- Calibration reminder services
- Pickup and drop facility for RMIs
- Routine turnaround recalibration time is 5-6 days from any part of country
- Before sending the instrument, please make sure about the working condition, to avoid delays
- Calibration Validity: Two Years
- ISO9001:2015 Certified
- ISO/IEC 17025 Certified


**Radimage Healthcare India Pvt. Ltd.**
(An ISO 9001 : 2015 Certified Company)
G-236, Sector-63, Noida - 201 303 (INDIA)
Telefax: +91 120 4263270, 2406096, 2406097
• www.radimageindia.com • radimagehealthcare@gmail.com
(A Meditronix Corporation Group Company)

# CT Image Artifacts

**Arindam Sarkar,** Masters in Medical Radio Imaging Technology (1st year Student)
Tripura Institute of Paramedical Sciences, Hapania, Amtali, Agartala, West Tripura

Artifacts are defined as anything which is seen in the image that is not present in the scanned object. In computed tomography (CT), the term artifact means any systematic discrepancy between the CT numbers in the reconstructed image and the true attenuation coefficients of the object.

There are three main causes of artifacts seen in computed tomography (CT) scan. They are as follows:-

- Physics based artifacts.
- Patient based artifacts.
- Scanner based artifacts.

**Physics based artifacts:** This type of artifact results from the physical processes involved in the acquisition of CT data.

**Beam hardening artifacts :-** The x-ray beam which are produced in CT image is not monochromatic beam (single energy ).The beam contains x-rays with different energies. When x-ray beam passes through a dense object, lower energy x-ray photons get absorbed while higher energy photons are transmitted, then the mean energy of transmitted beam is increased and the rays become hardened, this effect is called beam hardening. The beam hardening occurs mostly by dense objects (e.g. more by bone than fat).

Two types of artifacts can result from this effects .They are described below:-
**Streaking artifacts:-**In this type of artifact many dark streak bands are positioned in between two dense objects, which are occurred due to polychromatic x-ray beam hardening at different rates depending on rotational position of tube or detector.
**Cupping artifact:-** This artifact occurs because CT number at center of the object is lower than the periphery.

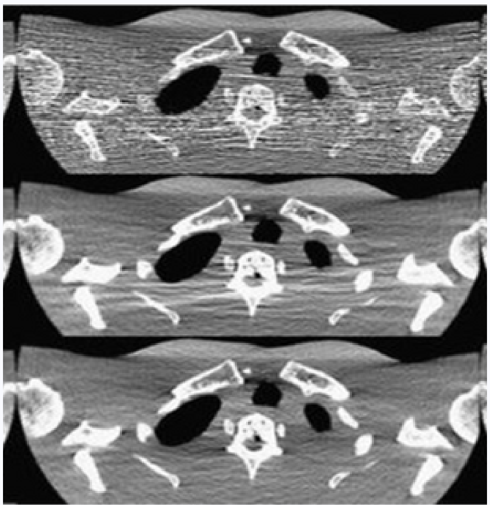
**Correction:-** Beam hardening can be corrected by following three main features such as by using proper filtration , correct calibration and beam hardening correct software.


**Beam Hardening Artifacts (Dark bands and Streaks)**

**Partial volume artifacts :-** This type of artifact occurs due to more than one type of tissue is contained within a same CT voxel producing beam attenuation proportional to the average value of these tissues.

**Correction:-**By using thinner slices partial volume artifacts can be reduced.

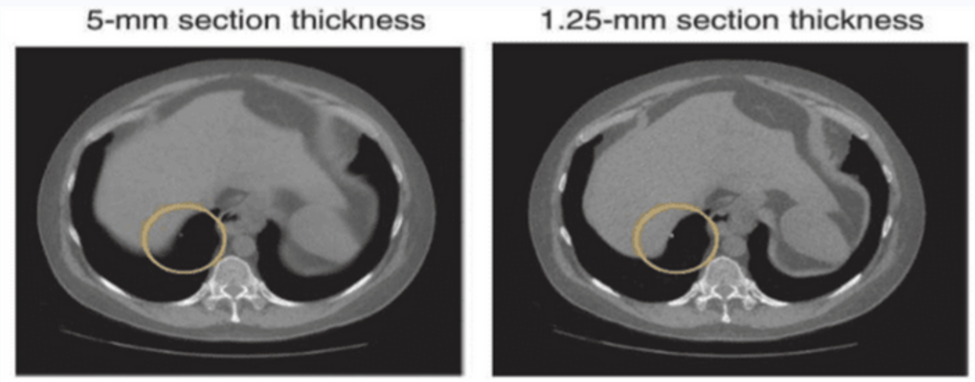
**Photon starvation artifact :-** This type of artifacts occur when the x-ray beam is travelling horizontally, the attenuation is greatest and insufficient photons reach the detectors.
**Correction :-** This type artifact is reduced by increasing the tube current during the scan but patient will receive an unnecessary dose.



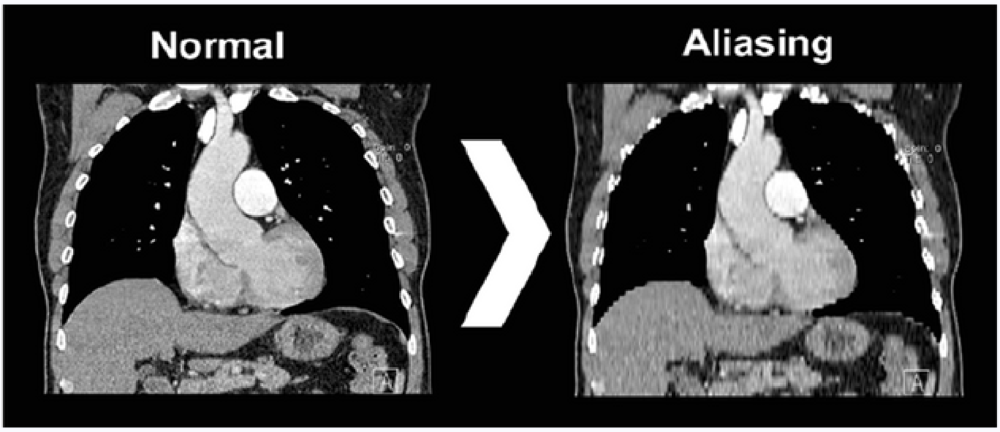
**Photon starvation artifact**

**Under sampling artifact (Aliasing artifact) :-** An adequate number of projection, as well as adequate amount of data from each projection is must be collected for reconstruction of CT image to get better quality of image. Under sampling artifact is seen when less amount of sample is collected for reconstruction of CT image.

**Correction :-** This type of artifact is reduced by increasing the scan time or by reducing the helical pitch.




**Partial volume artifacts (Circled in Yellow) decrease with decreased voxel size.**

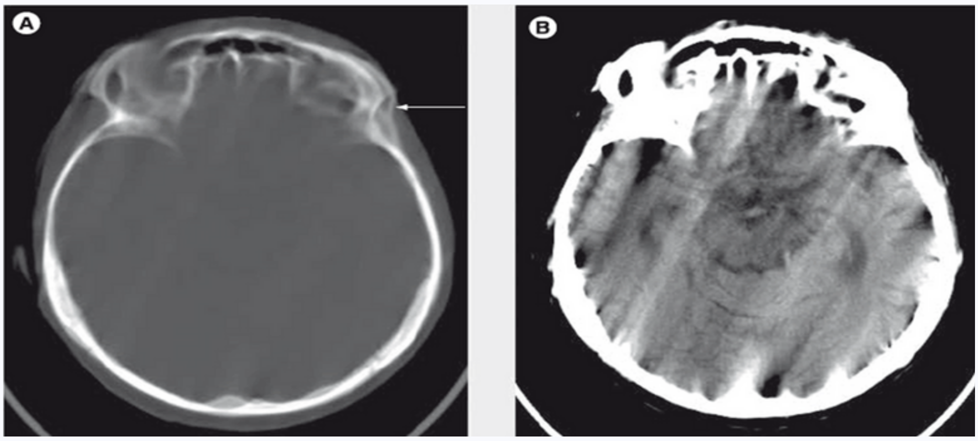



**Under sampling artifact (Aliasing artifact)**

**Patient based artifacts:** This type of artifact is seen when patient is moved during scan is going on or any other matellic objects present in the scan field of view (SFOV).

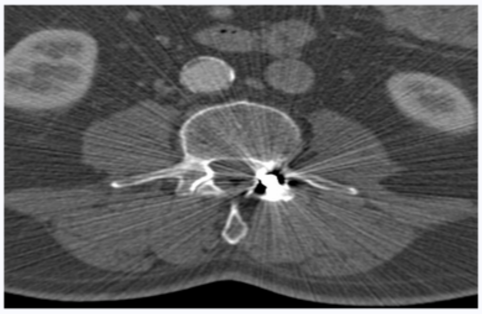
**Motion artifact:-** This type of artifact is cause due to patient movement during scan is going on which appear as shading , ghosting (objects appear to have a shadow), streaking or blurring.

**Correction:-** Give patient a clear breathing instructions to the patient, practice breath-holding , use immobilization devices ,use sedation particularly for pediatric patients , use short scan time if possible.




**Metallic Artifact :-** Any metallic object can create artifact in CT because density of metal exceeds the HU values that the equipment is design to handle (metal have attenuation values higher than 1,000). The upper limit on older CT systems was often 1,000 HU but in newer system it is approximately 4000 HU.

**Correction:-** If possible remove all the metallic objects from SFOV , angle the gantry if required to remove the metal from scan area, increase technique , use thin slices.



**Scanner based artifacts:** This type of artifacts is seen due to imperfection in scanner function.

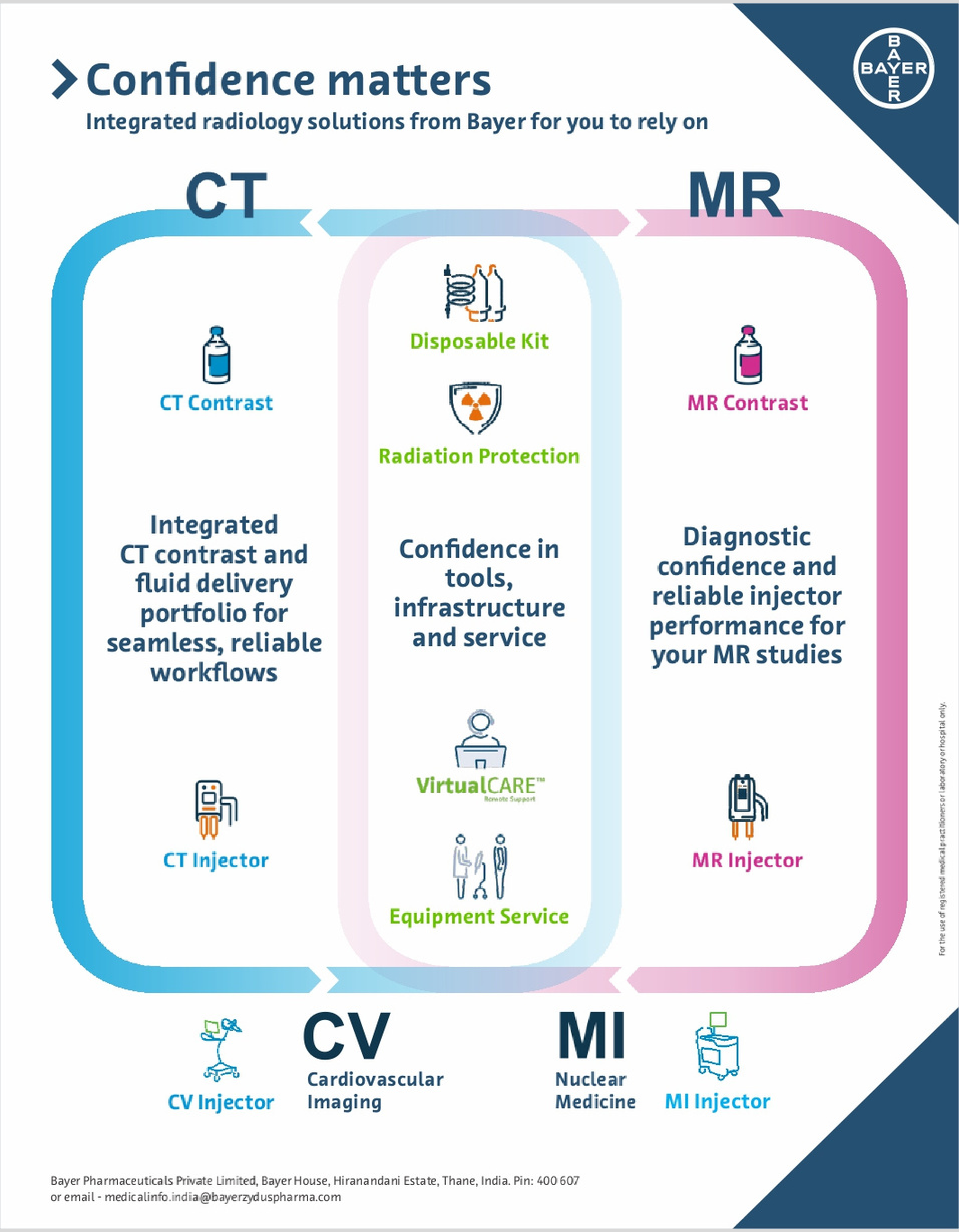
**Ring Down Artifacts:-** This type of artifact mostly seen in rotate – rotate geometry scanners and appear on the image as a ring or concentric circular structures centered on the rotational axis , which cause due to imperfect detector – either faulty or simply out of calibration.

**Helical and cone beam effect:-** Helical scans can be affected by all of the artifacts which are discussed in previous artifacts . The helical scanning needed new image reconstruction methods because now the table moved continuously in the 'Z' direction during data collection and the views needed to reconstruct the images were not all in the same plane.To address these problems, interpolation methods used measurements from either side of the image plane to create each image.This interpolation can result in artifacts,when automatic structures change rapidly in the 'Z' direction. Higher pitches require more interpolated data , and result in more artifacts. The interpolation process become even more complicated as the number detector row increased.Wind mill artifacts appear only on MDCT helical systems.

**Correction :-** This type of artifact can be reduced by using proper pitch selection recommended by manufacturer.

**Stir-step artifact:-** This type of artifact appears as wavy pattern or series of steps around the edges of the sanned object and it is mostly seen in coronal and sagittal sections. When wide collimation and non –overlapping reconstruction intervals are used this type of artifacts are seen on multiplanar and 3D reconstructed CT images.

**Correction :-** These types of artifacts are reduced by using thinner slices.


Confidence matters
Integrated radiology solutions from Bayer for you to rely on
BAYER
CT
MR
Disposable Kit
CT Contrast
Radiation Protection
MR Contrast
Integrated CT contrast and fluid delivery portfolio for seamless, reliable workflows
Confidence in tools, infrastructure and service
Diagnostic confidence and reliable injector performance for your MR studies
VirtualCARE™
Remote Support
CT Injector
MR Injector
Equipment Service
CV Injector
CV
Cardiovascular Imaging
MI
Nuclear Medicine
MI Injector
Bayer Pharmaceuticals Private Limited, Bayer House, Hiranandani Estate, Thane, India. Pin: 400 607
or email - medicalinfo.india@bayerzyduspharma.com
For the use of registered medical practitioners or laboratory or hospital only.

# CT Coronary artery calcium score

**Wilson Hrangkhawl,** Asst. Professor, Dept of Radiation & Imaging technology, NIMS University, Jaipur, Rajasthan

**Introduction:**
Coronary Artery Calcium Scoring (CAC) is a non-invasive CT scan that measures the amount of calcium buildup in the arteries leading to the heart. The CAC score is considered a useful measure of coronary atherosclerosis and is commonly used by cardiologists to assess the risk of heart disease in patients. It can detect the earliest signs of disease in the coronary arteries before a person has any symptoms. This article will discuss the acquisition and quantification protocols in CT scans.

**Acquisition and Quantification Protocols in CT scan**
The CAC score is obtained through a CT scan, which can be performed with the use of a 64 slice CT scanner or higher. The scan is done without contrast and requires the patient to hold their breath for a few seconds. The CAC score can be calculated by CT scan, taking in axial view with a thickness of 3 mm without overlapping or gaps. The triggering of the scanning process is related to the heart's electrical activity, in the specified time of the R-R interval, usually in the mid/late diastole, without the use of intravenous contrast medium. The effective dose of radiation is usually low, typically less than 1.5 mSv, which is the highest effective dose recommended for use in image acquisition, according to the Society of Cardiovascular Computed Tomography. Calcification is identified as areas of hyper attenuation of at least 1 mm2—with > 130 Hounsfield units (HU) or ≥ 3 adjacent pixels. Calcification is identified as areas of hyper attenuation of at least 1 mm2—with > 130 Hounsfield units (HU) or ≥ 3 adjacent pixels.

The quantification of the CAC score is usually done through the Agatston method, which calculates the score based on the amount of calcium present in the coronary arteries(determination of the volume of calcium, and determination of the calcium mass score). The score is then classified into four categories: 0 (no calcium detected), 1-100 (mild to moderate), 101-400 (moderate to severe), and greater than 400 (severe).The first two are the most widely used, especially the Agatston method, which is used as a reference for most population databases and publications involving risk stratification and is therefore the method most often used in clinical practice

Agatston method – The Agatston method uses the weighted sum of lesions with a density above 130 HU, multiplying the area of calcium by a factor related to maximum plaque attenuation: 130–199 HU, factor 1; 200–299 HU, factor 2; 300–399 HU, factor 3; and≥ 400 HU, factor 4.

Therefore, the slice thickness and the interval must followthe original protocols to reduce the noise variation and, consequently, the maximum attenuation of the plaques, allowing the original published scores to be reproduced.

Calcium volume score – The calcium volume score has proven to be the most robust and reproducible method.It is calculated by multiplying the number of voxels with calcification by the volume of each voxel, including all voxels with an attenuation > 130 HU. However, this method is particularly sensitive to the partial volume (especially in plaques with high attenuation) and subject to variability between tests, depending on the position of the plaque in the axial slice acquired.

Relative calcium mass score – The relative calciummass score is calculated by multiplying the mean attenuationof the calcified plaque by the plaque volume in eachimage, thus reducing the variation caused by the partial volume.The absolute calcium mass score uses a correction factor based on the attenuation of water.

Stratification of Coronary Risk and Relationship of the CAC Score to Other Clinical Scores:

The CAC score is a widely accepted measure of coronary risk, as it predicts the likelihood of a future cardiovascular event, such as a heart attack or stroke. The score is also useful in determining the severity of coronary disease and assessing the response to treatment.

Several clinical scores are used in conjunction with the CAC score to assess coronary risk, including the Framingham Risk Score, the Reynolds Risk Score, and the ASCVD (Atherosclerotic Cardiovascular Disease) risk estimator. Studies have shown that the CAC score is a stronger predictor of coronary risk than these other scores.

**Repeat CAC score performed:**
Some studies have demonstrated that an increase in the CAC score can have value in clinical practice to evaluate the progression of atherosclerotic plaques and the future cardiovascular
Risk. There is no well-defined method for calculating the progression of atherosclerotic plaques. The higher the CAC score is, the greater is the variability across studies.The progression of atherosclerotic plaques is over estimated when absolute values are used in patients with a high initial CAC score. If the percentage increase in relation to the initial examination is used, the progression will be over estimated in patients with a low score. Some studies suggest that an annual increase of at least 15% in the volume of coronary calcium may significantly increase the risk of a cardiovascular event. The most accepted method for tracking progression is a mathematical regression model proposed by Hokanson et al., which considers an increase of at least 2.5 mm3 as significant progression. Statins have been speculated to slow CAC score progression, but results have been inconsistent and randomized controlled trials do not support this claim. Follow-up examinations for patients with no detectable CAC scores may not be necessary for four to five years after initial evaluation, but progression rates may vary based on age, smoking status, and diabetes. More research is needed to fully understand the benefits and limitations of using CAC scores to monitor atherosclerotic plaque progression and treatment efficacy.

**CT CAC Score in Asymptomatic Patients**
Several studies have been conducted to examine the relationship between CAC scores and cardiovascular events in asymptomatic patients. In 2018, a study by McEvoy et al. found that higher CAC scores could accurately predict an increased risk of coronary heart disease in asymptomatic patients. Similarly, a study published by Nadir et al. in 2019 determined that CAC scores were associated with a higher risk of death in asymptomatic patients over a period of 11 years.


IITPL
Made in India For the World
PREMIER elite
Experience the Unmatched Flexibility of
Operating Space and Deepest Angles on a
Floor Mounted Cath Lab
COMING SOON
IITPL'S LATEST AND MOST ADVANCED CATH LAB
+/-120 Gantry Movement Provides Unmatched Space Optimization Enabling a Wide Range of Cardiac, Neuro, and Peripheral Vascular Procedures
3 MHU Grid Controlled Liquid Metal Bearing Tube
100 KW High Frequency X-Ray Generator
43" Medical Grade Monitor for Sharper and Consistent Image Quality
Backed by Superlative Software Intelligence, Real-Time Stent Enhancement Saves Precious Procedural Time and Facilitates Clinical Judgement for Optimal Stent Placement
Optional OCT/IVUS Co-registration with any Brand of IVUS and OCT Equipment
Optional Virtual FFR Integration Capabilities
Contact us:
Innovation Imaging Technologies Private Limited
Manufacturing Unit: #121F, Bommasandra Industrial Area, Phase 1, Hosur Main Road, Electronic City, Bangalore-560099, Karnataka, India
R&D Center: #B-705, Baner Bizbay, 110/11/23, Baner Road, Baner, Pune-411045, India
Sales : +91-63648 82806 | Service : +91-63648 82820 | Mail : pinnacle@innvolution.in | Website : innvolutionimaging.com

Moreover, in 2020, another study by Wu et al. showed that CAC scores are also related to the risk of stroke in asymptomatic patients. Overall, the CAC score is a valuable indicator of cardiovascular disease risk for asymptomatic patients. Further research is needed to quantify exactly what level of CAC score is an indicator of an increased risk of cardiovascular events.

Use of the CAC score in patients with diabetes Patients with diabetes present a risk of cardiovascular events similar to that of patients with a clinical history of atherosclerotic disease. Despite the higher cardiovascular risk and higher prevalence of ischemia on functional tests, there is no evidence so far that routine screening for silent ischemia reduces mortality in this group of patients.The presence of any degree of CAC in patients with diabetes mellitus translates to a higher risk of all-cause mortality than in patients without diabetes. Several international guidelines have shown that screening for silent ischemia is not warranted in patients with diabetes and a CAC score < 100, although it is recommended in those with a CAC score > 400.

**Conclusion**

The CAC score is an independent marker of risk for cardiac events, cardiac mortality, and all-cause mortality. In addition, it provides additional prognostic information to other cardiovascular risk markers.The use of the CAC score alone is limited in symptomatic patients.In patients with diabetes, the CAC score helps identify the individuals most at risk, who could benefit from screening for silent ischemia and from more aggressive clinical treatment.

## Process Mapping in Radiology

**Sanjeev Kumar,** District Hospital, Bathinda.

**Introduction:** Process mapping is a methodology used to visualize and analyze a process in order to identify inefficiencies and opportunities for improvement. In the field of radiology, process mapping can be used to improve the efficiency and quality of radiology services. This paper will discuss the importance of process mapping in radiology, the steps involved in the process mapping process, and examples of how process mapping has been used to improve radiology services.

**Importance of Process Mapping:** in Radiology Radiology services are critical to the diagnosis and treatment of a wide range of medical conditions. Process mapping can be used to identify inefficiencies in the radiology process, such as delays in scheduling appointments, long wait times for patients, and errors in imaging reports. By identifying and addressing these inefficiencies, process mapping can improve the quality and efficiency of radiology services.

**Steps in the Process Mapping Process:** The process mapping process consists of several steps, including:

**Define the process:** Define the scope of the process and identify the stakeholders involved in the process.

**Create a flowchart:** Create a visual representation of the process using a flowchart, which shows the sequence of activities involved in the process.

**Identify inefficiencies:** Identify inefficiencies in the process, such as delays, waste, or errors.

**Analyze the data:** Collect and analyze data on the process, such as wait times, turnaround times, and error rates.

**Identify opportunities for improvement:** Based on the data analysis, identify opportunities for improvement, such as streamlining the process, eliminating waste, or reducing errors.

**Implement changes:** Implement the changes identified in the process mapping process and monitor the impact on the process.

**Examples of Process Mapping in Radiology:** Process mapping has been used in radiology to improve the efficiency and quality of radiology services. For example, a study published in the Journal of the American College of Radiology used process mapping to identify inefficiencies in the radiology process and implement changes to improve the process. The study found that process mapping helped to reduce the turnaround time for imaging reports and improve the overall efficiency of the radiology department.

Another example is the use of process mapping to improve the scheduling process for radiology appointments. By analyzing the scheduling process and identifying inefficiencies, such as long wait times for patients, changes were made to streamline the process and reduce wait times. As a result, patient satisfaction improved, and the overall efficiency of the radiology department increased.

**Conclusion:** Process mapping is a valuable tool for improving the efficiency and quality of radiology services. By identifying inefficiencies and opportunities for improvement, process mapping can help to streamline the radiology process, reduce errors, and improve patient satisfaction. Process mapping should be an essential part of any quality improvement initiative in radiology.

**Congratulations to R. Hunchalkar & M. Joel for getting elected as President & General Secretary for Indian Railway Radiographers Association**


**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**

# CT- Guided Bone Sclerotherapy Procedure

**Anurag Kumar Shukla,** Scientific Assistant B, Radio-diagnosis Department
Homi Bhabha Cancer Hospital & Research Centre, Visakhapatnam, Andhra Pradesh.

**Introduction:**

- CT Guided Bone Sclerotherapy is a medical procedure that involves injecting a sclerosing agent into a bone lesion, such as an aneurysmal bone cyst, to cause shrinkage and healing of the lesion.
- It is performed under CT guidance to ensure accurate needle placement and avoid injury to surrounding structures.
- It is an alternative treatment to surgery for some bone lesions that are difficult to access or have high recurrence rates.
- This procedure is often done on an outpatient basis. However, some patients may require admission following the procedure. Ask your doctor if you will need to be admitted.
- It has a high diagnostic yield and a low complication rate.
- The procedure is usually completed within 30 to 45 minutes.

**Indication:**

- Aneurysmal bone cysts – These are benign but aggressive bone lesions that can cause pain, swelling, deformity, and fracture. They are often difficult to treat with surgery because of their location or recurrence rate. Ct Guided Bone Sclerotherapy can be an alternative treatment that can reduce the size and activity of the cysts and promote bone healing.
- Sclerotic bone lesions – These are bone lesions that have increased density or hardness due to various causes, such as metastatic cancer, infection, or trauma. They can cause pain, fracture, or nerve compression. Ct Guided Bone Sclerotherapy can be used to obtain a tissue sample for diagnosis and to deliver a sclerosing agent that can reduce the blood supply and growth of the lesion.

**Contra-indications:**

- Local infection in the area of sclerotherapy or severe generalized infection.
- Immobility, confinement to bed.
- Hyperthyroidism (in the case of sclerosants containing iodine).
- Pregnancy in the first trimester and after the 36th week of gestation.
- Known allergy to the sclerosant.
- Known allergy to the CT contrast.

**Risks:**

- Bleeding
- Pain
- Infection
- Non-target injection/sclerotherapy
- Ct-contrast allergic reaction

**Modality:** CT-guided

**Preparation before Procedure:**

- Will need pre-operative scan to confirm diagnosis, evaluate surrounding structures.
- Patients are generally seen in Orthopedics oncology OPD for full evaluation and an in-person discussion of the procedure.
- Patients should be NPO for 4 Hrs .
- Recent RFT & PT-INR & CBC labs values should be in normal range.
- Patients should be ask to change the gown and ask to wear loose and comfortable gown for the procedure.
- Information about the procedure and risk during procedure should be explain to patients.
- High Risk consent is mandatory before the procedure.

**Materials:**

- Disposable syringe.
- Disposable guaze.
- Needles.
- Sclerosing solutions (Polidocanol).
- Cotton gauze balls
- Elastic tape.

**Sedation:**

- Moderate conscious sedation should be appropriate for most adults .
- General anesthesia should be given to children.

**Technique:**

- Patients should be lies on ct-scan couch in appropriate position decided by Radiologist and Orthopaedic.
- Pulse oximeter monitor should be connected to the patients.
- If the patients needed GA (general anaesthesia) then given GA by Anaesthesia doctor.
- Then patient positioning done by Technologist suggested by Radiologist.
- Pre-scans through the area of interest, use 'Standard' kernel.
- Select the shortest & safest path to the lesion.
- Paying attention to the needle orientation with respect to the lesion shape & dimensions.
- Multiple access site may be required for a single lesion.
- The radiologist will use CT images to guide a special needle through patients skin and into the bone lesion.
- Patients may feel some pressure or discomfort during this step.
- The radiologist will inject a sclerosing agent into the lesion through the needle.
- The sclerosing agent is a chemical that irritates the lining of the lesion and causes it to shrink and scar.
- Patients may feel some warmth or burning sensation during this step.
- The radiologist will remove the needle and apply a bandage over the entry site.

**Patients Care after Procedure:**

- Patients may need to stay for a short observation period after the procedure.
- Patients will be given instructions on how to care for the site and when to resume your normal activities.
- Patients may need to take some pain medication or antibiotics after the procedure.


## Advertising in Radiographers' Journal

Advertise your business or market your product on "Radiographers' Journal" - monthly ebulletin.

Radiographers' Journal is circulated electronically to thousands of Radiographers across the globe and posted on Social media platforms.

### Monthly Tariff for Advertisement

- Full page - Rs. 3000/-
- Half page - Rs. 1500/-
- Quarter page. - Rs. 1000/-

For **yearly subscription of advertisement 50% discount in above charges**

To book your advertisement call on **+91 9322035920**