Radiology
ARRT-Mammography
ARRT – Mammography Certification Examination

Latest Version: 6.0

Question: 1

One type of paddle used in compression is the SOFT paddle. What does SOFT stand for?

A. Special optimized full tilt paddle
B. Special optical full tilt paddle
C. Soft optical full texture paddle
D. Specially occurring full tilt paddle

Answer: A

Explanation:
The term SOFT stands for "Special Optimized Full Tilt" paddle. This type of paddle is used in mammography during the breast compression process. The design and functionality of the SOFT paddle are specifically tailored to enhance the effectiveness and comfort of the procedure.
The primary feature of the SOFT paddle is its ability to tilt, which allows for a more uniform distribution of pressure across the breast. This is particularly beneficial as it helps to evenly spread out the breast tissue, making it thinner and more uniform. This can lead to better image quality because the x-rays can penetrate the tissue more effectively, resulting in clearer and more detailed images.
The optimization in the SOFT paddle's design also considers the comfort of the patient. By providing a tilt, the paddle adjusts to the natural contour of the breast, thereby reducing discomfort and pain associated with compression. This is especially important as it can influence the patient's willingness to participate in regular screenings.
The "Special Optimized Full Tilt" design is a significant advancement in mammography technology. It not only improves the diagnostic quality of the mammograms but also enhances patient comfort, which can potentially lead to higher screening rates and early detection of breast cancer. This paddle design exemplifies how equipment tailored to patient anatomy and needs can significantly impact the effectiveness of medical imaging techniques.

Question: 2

The angle of an MLO projection can be adjusted according to the patient's needs. For instance, patients that are taller or have slimmer body frames will have projections in what angle range?

A. 20 to 30 degrees
B. 50 to 60 degrees
C. 70 to 90 degrees
D. 90 degrees to 120 degrees

Answer: B

Explanation:

In the context of mammography, the Mediolateral Oblique (MLO) view is a critical projection used to examine breast tissue. The standard angle for the MLO projection typically ranges from 40 to 50 degrees. This angle is effective for most patients and is known to capture high-quality images that allow for thorough examination of the breast tissue, including the upper outer quadrants and the axillary tail area.
However, the anatomy and body type of a patient can necessitate adjustments to the standard projection angle to ensure comprehensive imaging. Particularly for taller patients or those with slimmer body frames, adjustments are often required. These individuals may have a different distribution or orientation of breast tissue, which might not be fully visualized at the standard MLO angle.
For taller or slender-framed patients, the MLO projection angle is typically increased to between 50 and 60 degrees. This adjustment helps to accommodate the unique shape and orientation of the breast tissue in these individuals, ensuring that the mammogram is as effective as possible. By increasing the angle, the X-ray beam can capture more of the breast tissue that might otherwise be missed at lower angles due to the body structure of these patients.
The rationale behind this adjustment is rooted in the geometry and physics of X-ray imaging. A steeper angle can help to spread out the breast tissue more evenly over the detector, particularly in cases where the breast might be more tightly compressed against the chest wall, as can be the case with slimmer individuals. This ensures that the maximum amount of tissue is visualized and that the images produced are of sufficient quality for diagnostic purposes.
In summary, while the standard MLO angle is 40 to 50 degrees, it is crucial to adjust this angle for taller or slender patients, typically to between 50 and 60 degrees, to ensure comprehensive and effective mammographic imaging. This personalized approach in adjusting the angle according to the patient's body type helps in achieving more accurate and diagnostic quality images, which are essential for effective screening and diagnosis of breast conditions.

Question: 3

A lumpectomy is typically followed by what?

A. Colonoscopy
B. Dialysis
C. Radiation therapy
D. None of the above

Answer: C

Explanation:
A lumpectomy is typically followed by radiation therapy.
A lumpectomy, also known as breast-conserving surgery, is a surgical procedure aimed at removing only the cancerous or abnormal tissue from the breast, along with a small margin of surrounding healthy tissue. This approach helps to preserve as much of the breast as possible. After the removal of the lump, the main objective is to minimize the risk of cancer recurrence in the breast.
Following a lumpectomy, radiation therapy is commonly recommended as a subsequent treatment. Radiation therapy involves the use of high-energy rays or particles to target and kill any remaining cancer cells in the breast. The goal is to reduce the likelihood of the cancer returning, which is a risk even when the initial tumor has been surgically removed.

The combination of lumpectomy and radiation therapy is considered an effective treatment for early-stage breast cancer and is designed to conserve the appearance and function of the breast as much as possible. This treatment strategy allows for targeting the affected area precisely while sparing the rest of the breast and surrounding tissues.
In summary, while a lumpectomy involves the surgical removal of the tumor within the breast, it is typically followed by radiation therapy to eliminate any residual cancer cells, thereby providing a comprehensive treatment approach aimed at curing the patient and preserving the breast.

Question: 4

Grids that move back and forth during the exposure are referred to as which of the following?

A. Mobile grids
B. Reciprocating grids
C. Sliding grids
D. Standard grids

Answer: B

Explanation:
The correct answer to the question is "Reciprocating grids." Reciprocating grids are specifically designed to move back and forth during the exposure in radiographic imaging procedures. This movement helps to blur out the grid lines that could potentially appear in the final image, thereby enhancing the quality of the radiograph.
In radiology, grids are vital components used to improve image contrast by absorbing scattered radiation before it reaches the film or detector. The primary purpose of a grid is to allow the primary radiation (which is aligned with the grid lines) to pass through, while blocking or absorbing scattered radiation that comes at different angles. This is crucial in reducing the amount of scatter radiation that contributes to image fogging, thus enhancing the clarity and contrast of the final image.
Reciprocating grids consist of thin lead strips arranged in a precise pattern, separated by radiolucent material. During an X-ray exposure, the reciprocating grid moves rapidly back and forth in a linear motion. This movement is synchronized with the X-ray exposure time. By moving during the exposure, the grid lines are effectively blurred in the resulting image, which prevents grid line artifacts from appearing and degrading the image quality.
The speed and range of the reciprocating motion can often be adjusted depending on the specific requirements of the radiographic examination. This adjustability ensures optimal image quality across different types of examinations and varying patient anatomies. Reciprocating grids are commonly used in fixed radiography systems, such as those found in hospitals and diagnostic imaging centers, where high-quality imaging is essential for accurate diagnosis.
In summary, reciprocating grids are an advanced type of grid used in radiology to reduce the visibility of grid lines in the radiographic image and to enhance overall image contrast by effectively managing scattered radiation. Their ability to move during the exposure differentiates them from other types of grids, such as stationary or standard grids, which do not have this capability.

Question: 5

The kVp values will need to be increased if which of the following is present?

A. A dense breast
B. Low density beam
C. Increased magnet field
D. A tall patient

Answer: A

Explanation:
The kVp (kilovolt peak) values in imaging procedures such as mammography are crucial in determining the quality and effectiveness of the resulting images. These values are often adjusted based on the density or thickness of the material being imaged to ensure that the x-rays can penetrate adequately to produce a clear and detailed picture.
In the context of mammography, when imaging a dense breast, adjustments in kVp values are necessary. Dense breast tissue, which contains less fat and more connective and glandular tissue, can make it harder for x-rays to pass through. This increased density can result in images that are unclear or incomplete if standard kVp settings are used.
To compensate for the increased density and to ensure that all areas of the breast are adequately exposed, technicians typically increase the kVp values. This adjustment allows the x-rays to penetrate the denser tissue more effectively, improving the overall quality of the mammogram by producing clearer and more detailed images. Raising the kVp not only helps in capturing a better image but also plays a role in accurate diagnosis by revealing subtler contrasts within the dense tissues.
It's important to note that adjusting kVp values is a calculated decision that balances image quality with patient safety, as higher kVp values also mean higher exposure to radiation. Therefore, the increase must be sufficient to improve image quality without unnecessarily exposing the patient to excessive radiation. This balance is critical in medical imaging, particularly in screenings like mammography where patients often undergo multiple exams over time.

Question: 6

The drug Tamoxifen is sometimes used for a cancer patient to perform all but which of the following actions?

A. Prevent cancer
B. Increase cancer
C. Slow cancer
D. Stop cancer

Answer: B

Explanation:
Tamoxifen is a medication known primarily for its role in the treatment and prevention of breast cancer. It belongs to a class of drugs called selective estrogen receptor modulators (SERMs). These drugs work by modulating the effects of estrogen in the body, particularly in tissues such as the breast. Estrogen can

promote the growth of some types of breast cancer cells, and Tamoxifen acts by blocking estrogen from binding to its receptor in these cells.
In the context of its usage, Tamoxifen is employed to achieve several key outcomes in cancer management. Firstly, it is used to prevent breast cancer, particularly in individuals who are at high risk of developing the disease. This includes women with a family history of breast cancer or those who have genetic markers that increase their risk. By blocking the effects of estrogen, Tamoxifen helps reduce the likelihood of cancer cells developing and multiplying.
Secondly, Tamoxifen is used to slow the progression of existing breast cancer. In patients who already have breast cancer, the drug can help slow the growth and spread of cancer cells. This is particularly useful in the management of estrogen receptor-positive (ER+) breast cancer, where the cancer cells require estrogen to grow.
Thirdly, Tamoxifen is used to stop cancer, particularly after initial treatments such as surgery or chemotherapy. It is often prescribed as part of adjuvant therapy to prevent the recurrence of breast cancer. By continuing to block estrogen's action at the receptor sites, Tamoxifen helps decrease the risk of cancer returning.
However, the notion of using Tamoxifen to increase cancer is incorrect and counterproductive to its intended use. No aspect of Tamoxifen's action is designed to increase cancer growth; rather, all its therapeutic actions are geared towards prevention, slowing down, or stopping the progression of cancer. Thus, among the options given, "Increase cancer" is not a desired or expected outcome of Tamoxifen treatment. This medication is carefully administered to manage and mitigate cancer risks, not to exacerbate them.

Question: 7

To ensure there is no interference with the mammogram tube, the technologist should be sure to check for what during preparation?

A. Film cassette
B. Obstacles near the tube
C. Patient comfort
D. The nearest restroom

Answer: B

Explanation:
To ensure there is no interference with the mammogram tube, the technologist should be sure to check for what during preparation?
The correct answer is "Obstacles near the tube." During the preparation for a mammogram, it is essential that the area around the mammogram tube is free from any obstructions. The mammogram tube is a critical component of the machine that moves and adjusts to capture images from various angles to thoroughly examine breast tissue.
The mammogram tube requires a wide range of motion to achieve the necessary positions for different mammographic views, such as craniocaudal (CC) or mediolateral oblique (MLO). These views are vital for a comprehensive assessment of the breast tissues. If there are obstacles, such as personal belongings, medical equipment, or even the patient's own limbs inappropriately positioned, these can hinder the movement of the tube. Such interference can lead to incomplete or unclear images, which might result in the need for repeat scans or potentially missing critical diagnostic information.

Before beginning the mammogram, the technologist should perform a thorough check to ensure that the path of the tube's movement is clear. This includes adjusting the patient's position, removing any nearby movable objects that could obstruct the tube's path, and ensuring that all necessary equipment is properly situated. By taking these precautions, the technologist helps ensure that the mammogram is performed efficiently and effectively, providing clear images for accurate diagnosis.

Question: 8

Which of the following would be considered correct regarding a ductography?

A. High dose radiation is used.
B. Liquid nitrogen is used.
C. Contrast material is not used.
D. Contrast material is used.

Answer: D

Explanation:
The correct statement regarding ductography is: "Contrast material is used."
Ductography, also known as galactography, is a specialized imaging technique specifically designed to evaluate the ducts of the breast. This diagnostic procedure is employed particularly when there are abnormalities such as nipple discharge that is clear, bloody, or of another unusual color. The primary purpose of ductography is to identify any abnormal findings within the milk ducts that could explain the discharge, such as intraductal papillomas, duct ectasia, or, less commonly, breast cancer.
During a ductography procedure, a very small amount of contrast material is injected into the milk ducts through the nipple using a fine, flexible tube. This contrast material helps to outline the inner surface of the ducts by making them visible on X-ray images. The use of contrast is crucial as it enhances the visibility of the ductal structures and any associated abnormalities on the radiographs.
It is important to note that ductography involves the use of low dose radiation, similar to standard mammography. This is contrary to the misconception that high dose radiation is used. The amount of radiation exposure during ductography is carefully controlled and minimized to ensure patient safety while providing adequate imaging detail.
Liquid nitrogen is not used in ductography. This substance is used in other medical treatments, such as cryotherapy for the removal of skin lesions, but it has no role in the imaging of breast ducts.
Therefore, the only correct statement from the options provided is that contrast material is used in ductography. This test does not use high dose radiation or liquid nitrogen, and the assertion that contrast material is not used is incorrect.

Question: 9

To ensure the C-arm is able to move between mammogram views, how much rotation should be allowed?

A. 90 degrees
B. 180 degrees
C. 45 degrees

D. 360 degrees

Answer: B

Explanation:
The C-arm is an integral component of mammography equipment, specifically designed for obtaining various angles and views during a mammogram. This device is mounted on the mammography stand, enabling it to move around the patient who remains stationary during the procedure.
In mammography, particularly during screening, it is crucial to capture images from different perspectives to ensure comprehensive examination of breast tissues. The primary views required are the cranial-caudal view, which images the breast from top to bottom, and various oblique views, which image the breast at different angles.
To accommodate these essential views, the C-arm must have the capability to rotate sufficiently. A rotation of 180 degrees is necessary to allow the arm to move from one side of the patient to the other without any hindrance. This degree of movement ensures that all standard mammographic views can be captured efficiently and effectively.
Without the ability to rotate 180 degrees, certain views might not be achievable, potentially compromising the thoroughness of the breast examination. Therefore, the design of the C-arm with a 180-degree rotational capacity is critical for the functionality of mammography equipment in achieving optimal diagnostic results.

Question: 10

Picture Archiving and Communication Systems (PACS) is considered a type of healthcare technology which is used for both long and short term storage of images. PACS is used for all but which of the following?

A. Implementation
B. Retrieval of medical images
C. Management
D. Presentation

Answer: A

Explanation:
Picture Archiving and Communication Systems (PACS) are integral components of modern healthcare facilities, playing a crucial role in the management and distribution of medical imaging data. PACS technology enables healthcare providers to store, retrieve, manage, distribute, and present medical images electronically. The implementation of PACS has revolutionized how medical imaging is handled, moving away from traditional film-based methods to digital platforms. This transition not only enhances efficiency but also improves the quality of healthcare services.
The primary functions of PACS include: - **Storage:** PACS provides both long-term and short-term digital storage solutions for medical images, such as X-rays, MRIs, and CT scans. This digital storage eliminates the physical space required for film archives and reduces the risk of damage or loss of physical records. - **Retrieval:** PACS allows for quick and efficient retrieval of medical images. This is essential in healthcare settings where timely access to patient images can significantly impact diagnostic

and treatment decisions. - **Management:** PACS facilitates the management of medical images through features that organize and catalog images for easy access. Administrators can manage who has access to specific data, ensuring patient confidentiality and compliance with healthcare regulations. - **Presentation:** With PACS, medical images can be viewed in various formats and can be manipulated (e.g., zoomed in, rotated) to aid in diagnosis. This capability is crucial during medical reviews and consultations, as it allows healthcare providers to analyze images in detail. - **Distribution:** PACS enables the distribution of medical images across different departments within a healthcare facility or even across different locations. This is particularly valuable in multi-site healthcare systems, where specialists at different locations can review the same images simultaneously.

Given these functionalities, it is clear that PACS covers a wide range of operations related to medical imaging. However, one aspect it does not inherently handle is the direct creation or capture of medical images. This function is typically performed by specific medical imaging equipment (such as X-ray machines, MRI scanners, etc.), which are separate from the PACS. While PACS is crucial for managing and using these images after they are captured, the actual image capture process is not a function of PACS systems.

Therefore, when considering what PACS does not do, it is important to recognize that while it significantly enhances the handling of medical images post-capture, it is not involved in the initial creation or acquisition of these images. This understanding helps delineate the boundaries of PACS functionalities within the broader context of medical imaging and healthcare technology.

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