Medical imaging

MEDICAL IMAGING

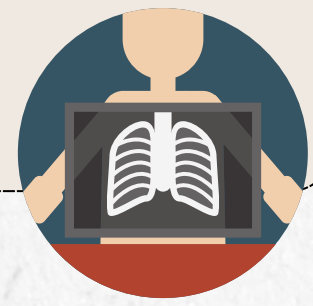
SUMMARY

X-RAY

Low Radiation

Principle: X-rays are a form of electromagnetic radiation that can pass through the body. Dense structures, such as bones, appear white on the X-ray image, while less dense tissues appear darker.

Applications: Commonly used to diagnose fractures, infections, tumors, and lung diseases.



CT (COMPUTED TOMOGRAPHY)

High Radiation

Principle: CT uses X-rays and computer processing to generate cross-sectional images of the body. CT eliminates overlap of structures to give a clearer view of many tissues.

Applications: Diagnosing internal injuries, bleeding, tumors, and organ diseases. It is particularly effective for evaluating trauma-related injuries.

PET (POSITRON EMISSION TOMOGRAPHY)

High Radiation

Principle: Utilizes radioactive tracers that are injected into the body. These tracers emit gamma rays that are detected by the PET scanner. It measures the activity of cells, especially those with high metabolic rates like cancer cells.

Applications: Primarily used for cancer diagnosis, staging, and treatment planning. They also assist in evaluating brain disorders, such as Alzheimer's disease

MRI (MAGNETIC RESONANCE IMAGING)

No Radiation

Principle: MRI uses powerful magnetic fields and radio waves to generate detailed images of the body's soft tissues. No ionizing radiation used.

Applications: Excellent for visualizing soft tissues like the brain, spinal cord, muscles, tendons, and ligaments. Useful for diagnosing neurological, musculoskeletal, and abdominal conditions. Contrast agents can enhance the visibility of certain structures.

US (ULTRASOUND)

No Radiation

Principle: Utilizes high-frequency sound waves to create real-time images of internal body structures. It operates on the principle of how sound waves bounce off tissues and organs.

Applications: Commonly used for assessing pregnancy, evaluating abdominal organs, checking blood flow in vessels, and guiding interventional procedures. It is non-invasive, cost-effective and does not involve ionizing radiation.

All these techniques help in diagnosing medical conditions and monitoring treatment response however the associated costs, availability, tolerability, and safety profiles differ among these imaging techniques.

Ultimately, the choice of imaging technique depends on the suspected condition, the body part being examined, and the specific information required for accurate diagnosis.

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