Radiologic Sciences

- The Radiologic Sciences Program spans over three academic years.

  Each year includes two semesters (fall & spring, 30 credits each), in addition to a summer training for six weeks.
- Total credits for graduation: 180 Cr
- At the end of the three years you will be graduated with a BS degree in radiologic sciences and your professional title will be:

RADIOLOGIC TECHNOLOGIST

(not RADIOLOGIST)

- Learning opportunities will help you acquire academic knowledge, & develop required technical and professional skills.
- The program emphasizes on a combination of didactic and clinical instructions that foster critical thinking and problem solving.

- The Radiologic Technologist main duty is to perform the imaging procedure accurately through correct patient positioning & proper instructions, while adhering to protective & safety guidelines, in order to obtain the required high-quality image.
- Afterwards, the radiologist will interpret the image/images to give the proper diagnosis documented in a radiologic report.
- The Radiologic Technologist can be considered as the first virtual eyes of the radiologist.

First Year - Fall Semester Courses	Hours
Fundamentals of Radiologic Sciences	50
Cell Biology	40
Human Anatomy -I	30
General Chemistry	40
Practical Work of General Chemistry	20
Mathematics	30
Sociology	30
Public Health	30
Human Rights	36
Methodology of Oral Expression & Technical Writing	20

First Year - Spring Semester Courses	Hours
Biochemistry	20
Physics of Radiation	60
Human Anatomy –II	20
Human Physiology	40
Sectional Anatomy	30
Basic Medical Imaging Procedures	60
Nursing Practice in Radiology	20
Patient Care In Radiology	20
English Language	60
Medical Imaging Clinical Practicum -I	150

Second Year - Fall Semester Courses	Hours
Histology and Histopathology	20
Clinical Medicine and Pathophysiology	40
Image Production and Processing	40
Physics of Medical Imaging	60
Biostatistics & Epidemiology	30
Computer Skills	40
Medical Imaging Procedures	50
Medical Imaging Practicum -II	150

Second Year - Spring Semester Courses	Hours
Physics of Radionuclide Imaging	40
Radiation Biology & Protection	40
Radiological Pharmacology	50
Oncogenesis & Oncology	30
Nuclear Medicine Procedures	40
Breast Imaging Procedures	20
CT Procedures	30
First Aid - Red Cross	30
Medical Imaging Clinical Practicum -III	200

Third Year - Fall Semester Courses	Hours
Radiologic Pathology	40
Physics of Radiotherapy	40
Radiation Dosimetry and Instrumentation	30
Digital Imaging Processing Techniques	40
Angiography & Interventional Procedures	20
Medical Sonography Procedures	20
MR Imaging Procedures	30
Methodology of Research	20
Medical Imaging Practicum -IV	150

Third Year - Spring Semester Courses	Hours
Advanced Medical Imaging	35
Quality Assurance & Quality Control	40
Radiotherapy Procedures & Applications	50
SPECT & PET Procedures	30
Management Principles for Imaging Professionals	20
Radiology Informatics	20
Risk Management	30
Stretching	20
Medical Imaging Clinical Practicum -V	150

Why an X-Radiograph is Performed?

A medical doctor may request a patient to obtain an X-radiograph ; e.g. of the chest; if he/she needs to have more insight into the body.

For example, the physician may want to:

- View an anatomical area causing some pain
- Assess the effect of some drugs or treatment protocol
- Monitor the progression of a disease, such as cancer, osteoporosis …

Some conditions that may call for an X-ray image include: arthritis, blocked blood vessels, bone cancer, breast tumors, conditions affecting the lungs, digestive problems, enlarged heart, fractures, infections & inflammations, osteoporosis, swallowed items, tooth decay, …

How X-Radiography is Performed?

- X-radiography can be done in a hospital's radiology department, a dental clinic, or a center that specializes in diagnostic imaging procedures.
- Once the patient is ready for the procedure, the X-ray technologist will explain how he/she will be positioned in order to get the right image view.
- The technologist will most likely require the patient to lie on table, sit, or stand, in several positions during the imaging study.
- In general, the technologist uses an x-ray tube to expose the patient; and some cassettes/digital electronic panels to capture the X-ray images.

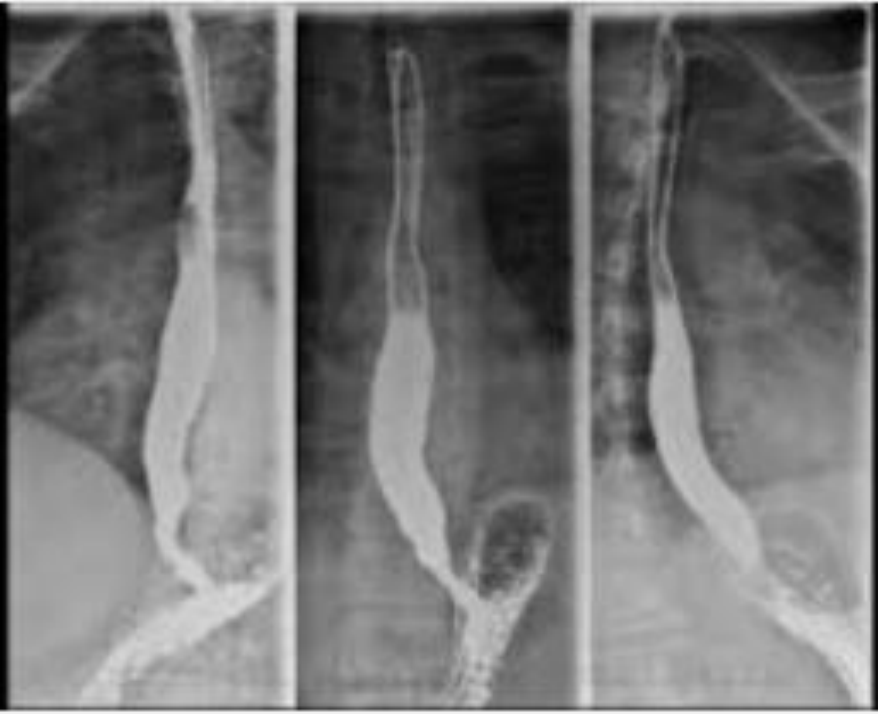
Risks of Having an X-Radiograph

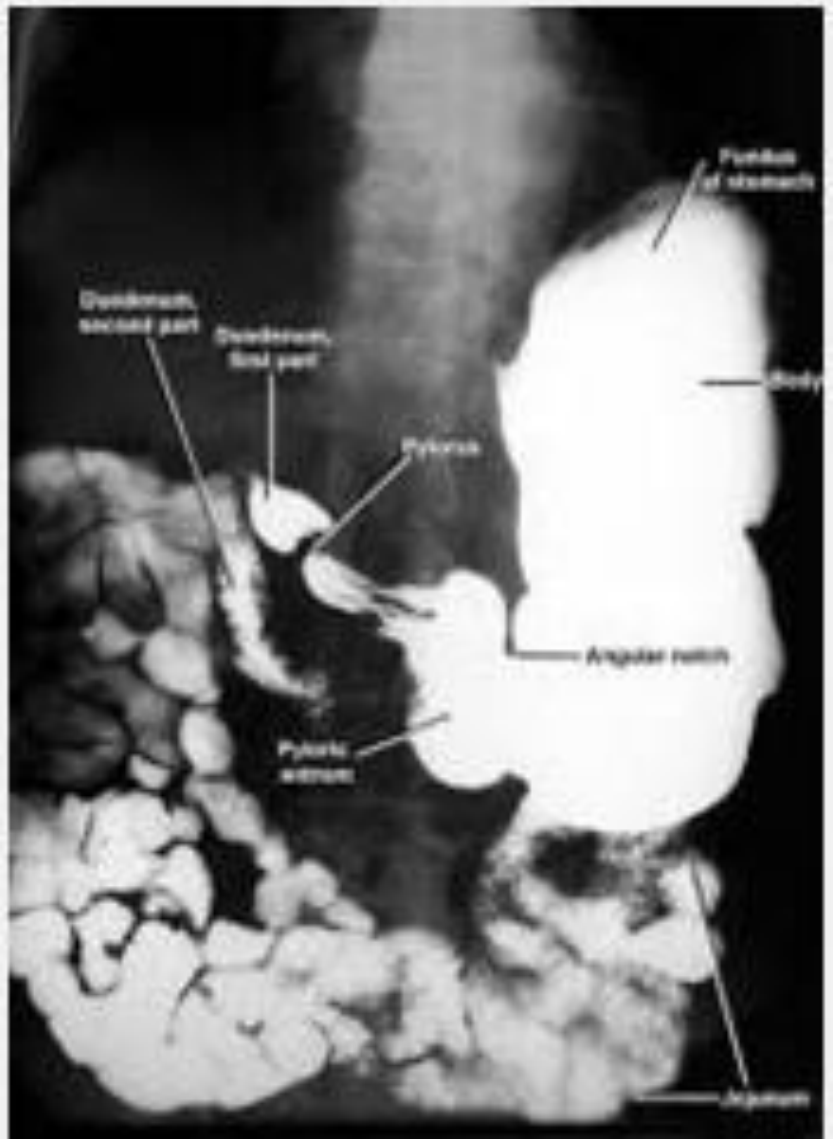
X-radiography uses small amounts of ionizing x-radiation. The level of radiation exposure involved is generally considered safe for adults, but not considered safe for a developing fetus. A pregnant/could be pregnant female needs to tell the doctor/technologist before undergoing the imaging procedure. The doctor may suggest a different imaging/testing method that does not use x-radiation, such as ultrasound or MRI.


L


R

GI Barium-Contrast Studies




Fundus of stomach
Duodenum, second part
Duodenum, first part
Body
Pylorus
Angular notch
Pyloric antrum

IVU

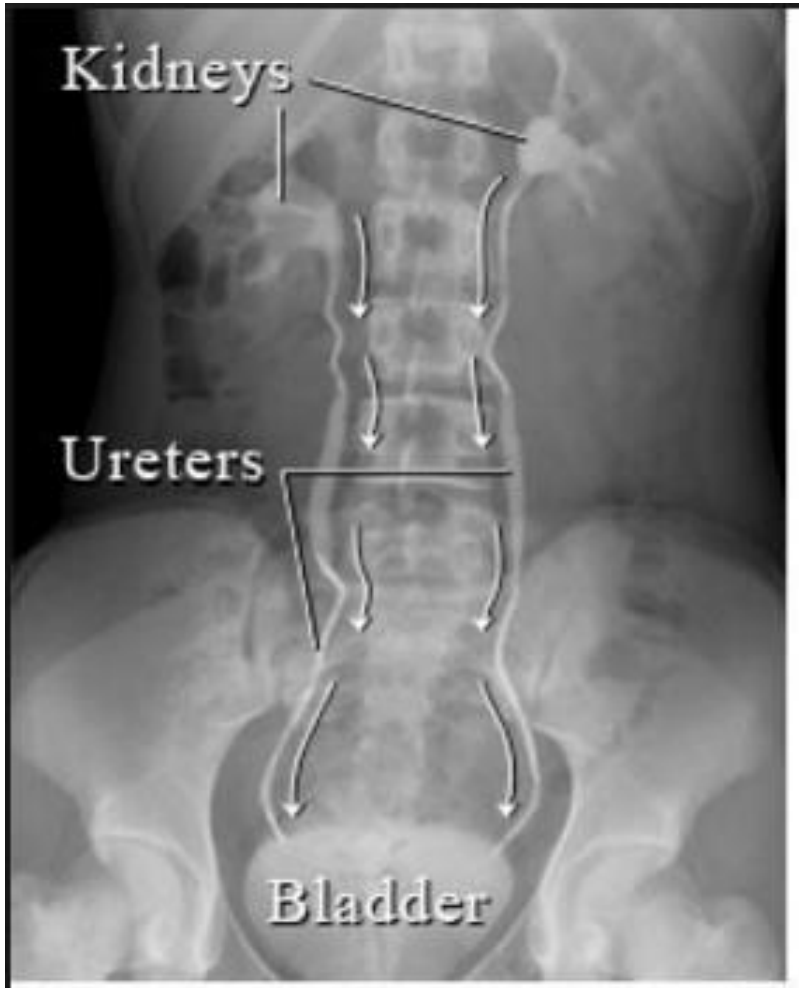


Figure 1

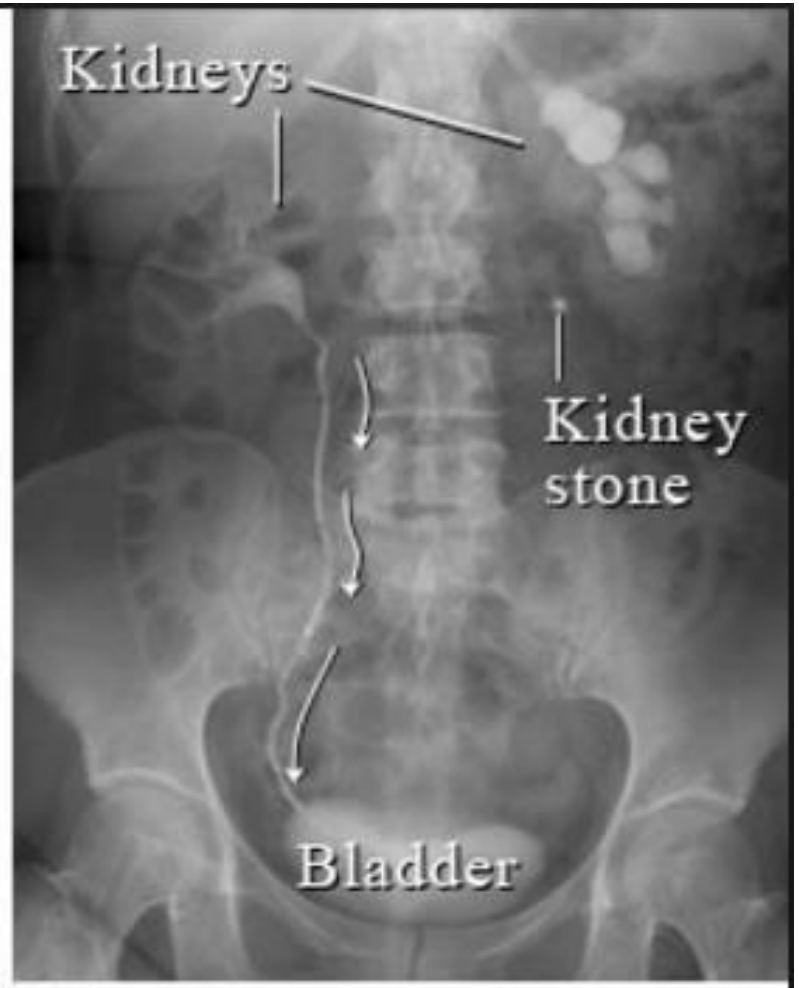


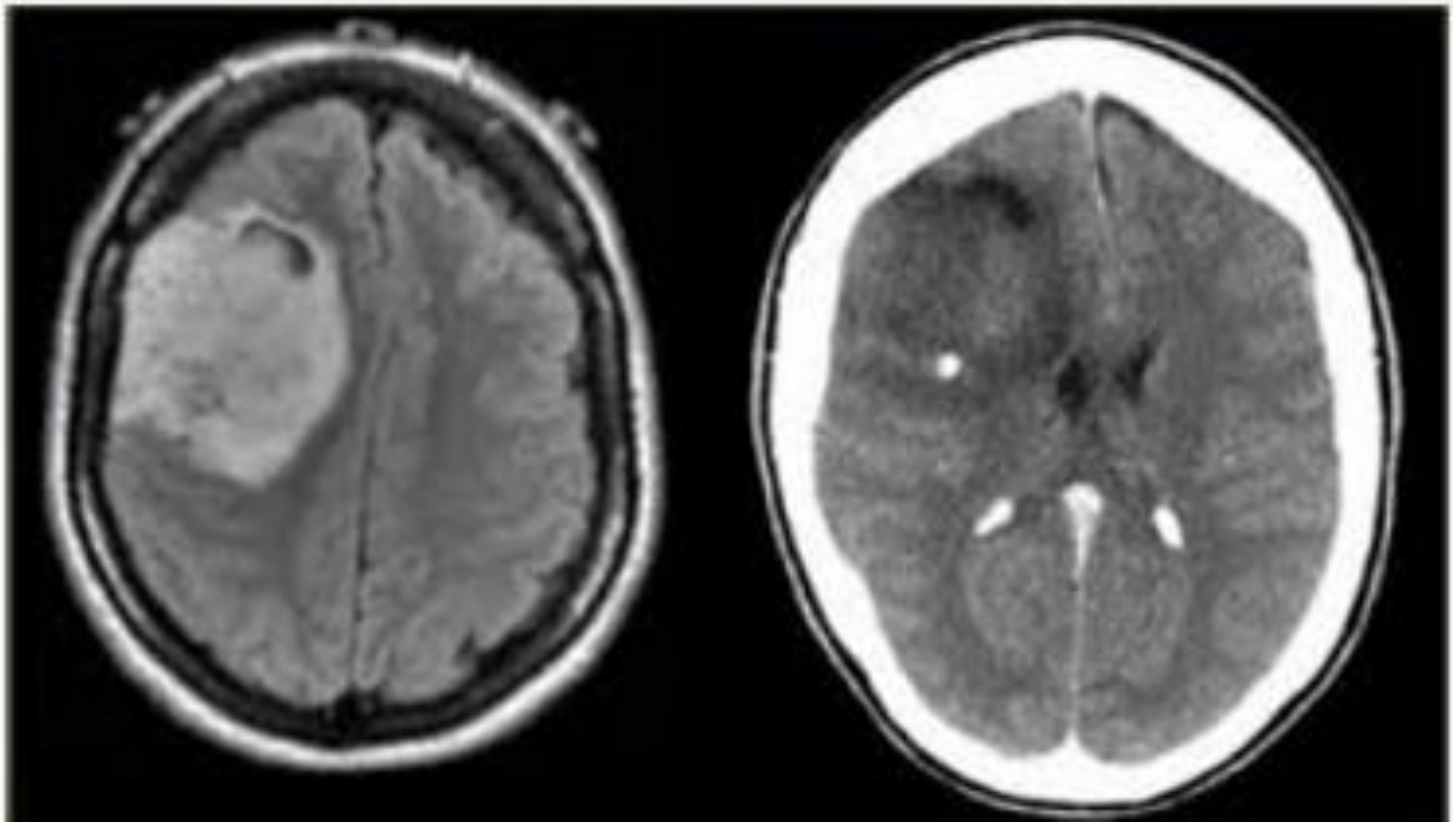
Figure 2

Computed Tomography

- With the aid of a computer; CT scanning produces cross-sectional X-ray images of a patient's anatomy.
- CT scans have higher quality than conventional x-radiographs.
- CT scanning is painless and often performed in the outpatient setting.
- Iodinated contrast material is sometimes used in CT scanning. Patients with a history of allergy to iodine or other contrast materials should notify their physicians and radiology staff.

CT Scanner

Brain CT with and without contrast



Tumor within the Brain

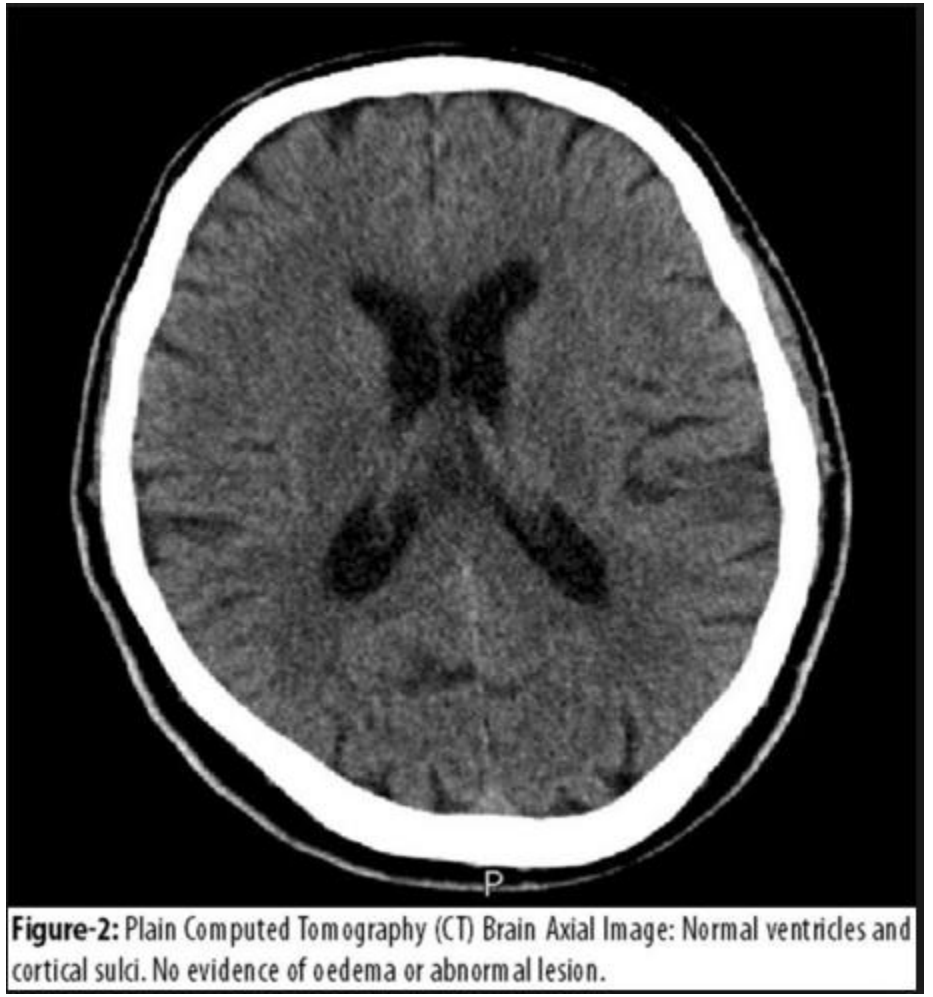
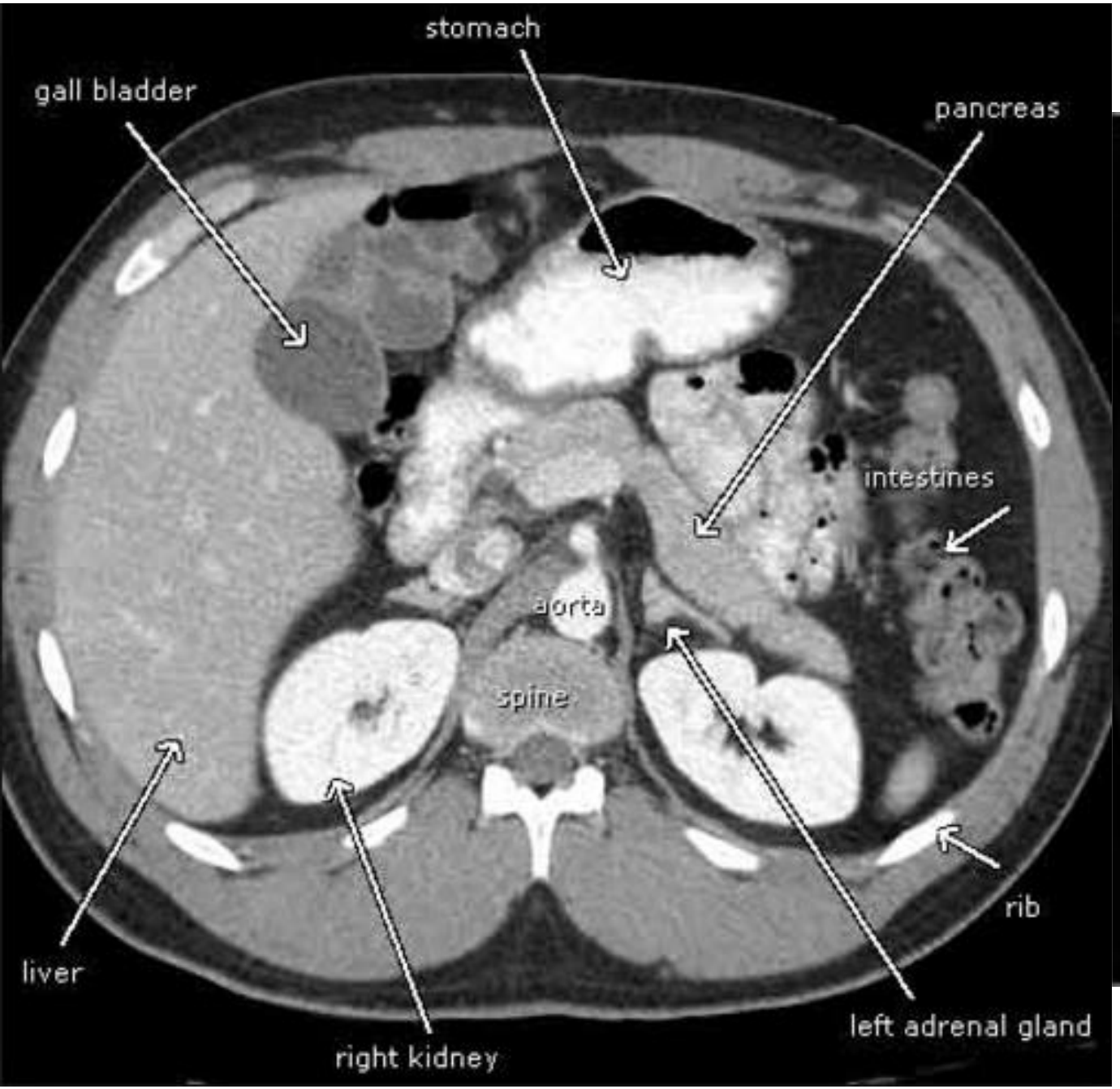
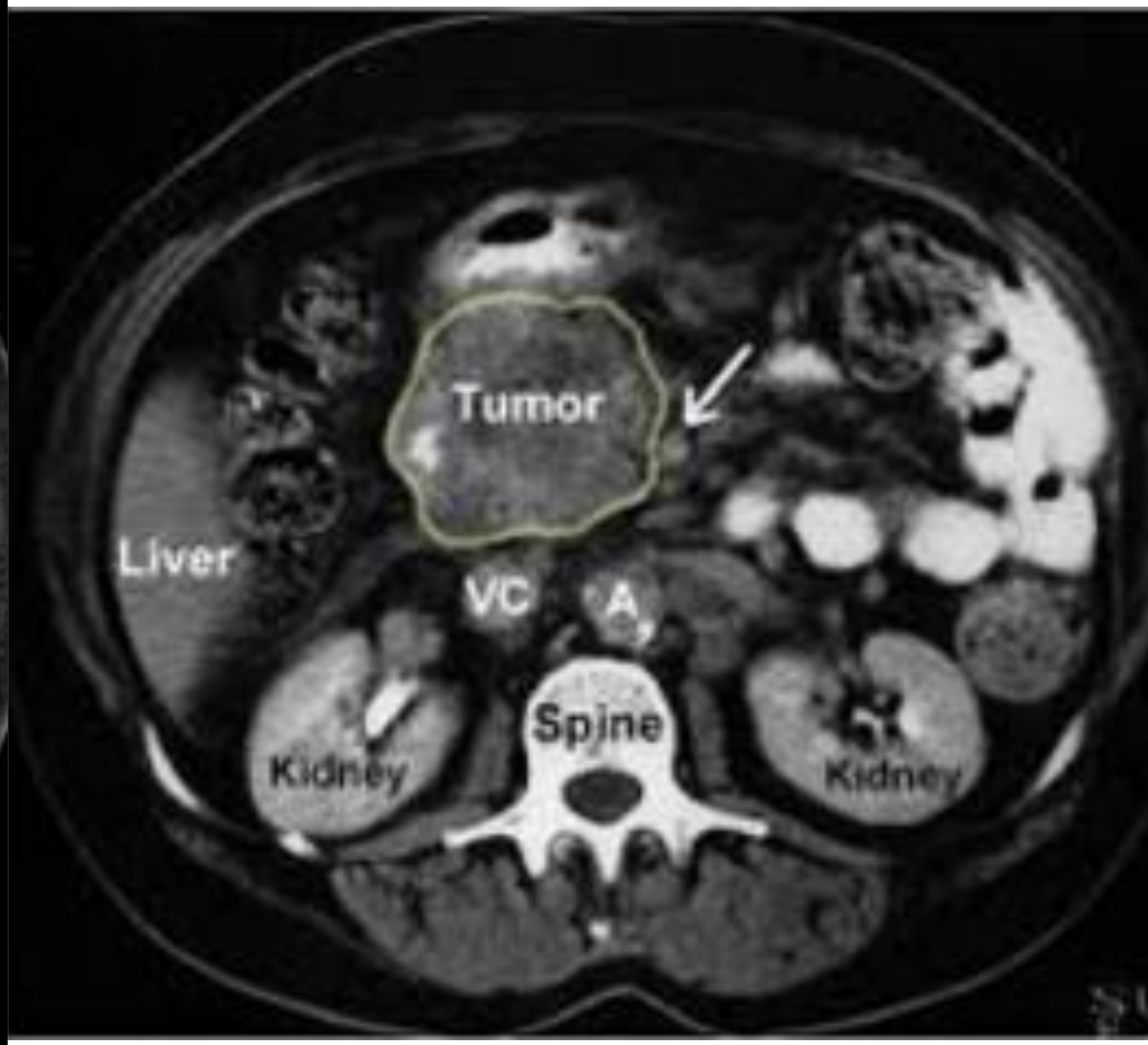


Figure-2: Plain Computed Tomography (CT) Brain Axial Image: Normal ventricles and cortical sulci. No evidence of oedema or abnormal lesion.

Normal Brain

Abdominal CT



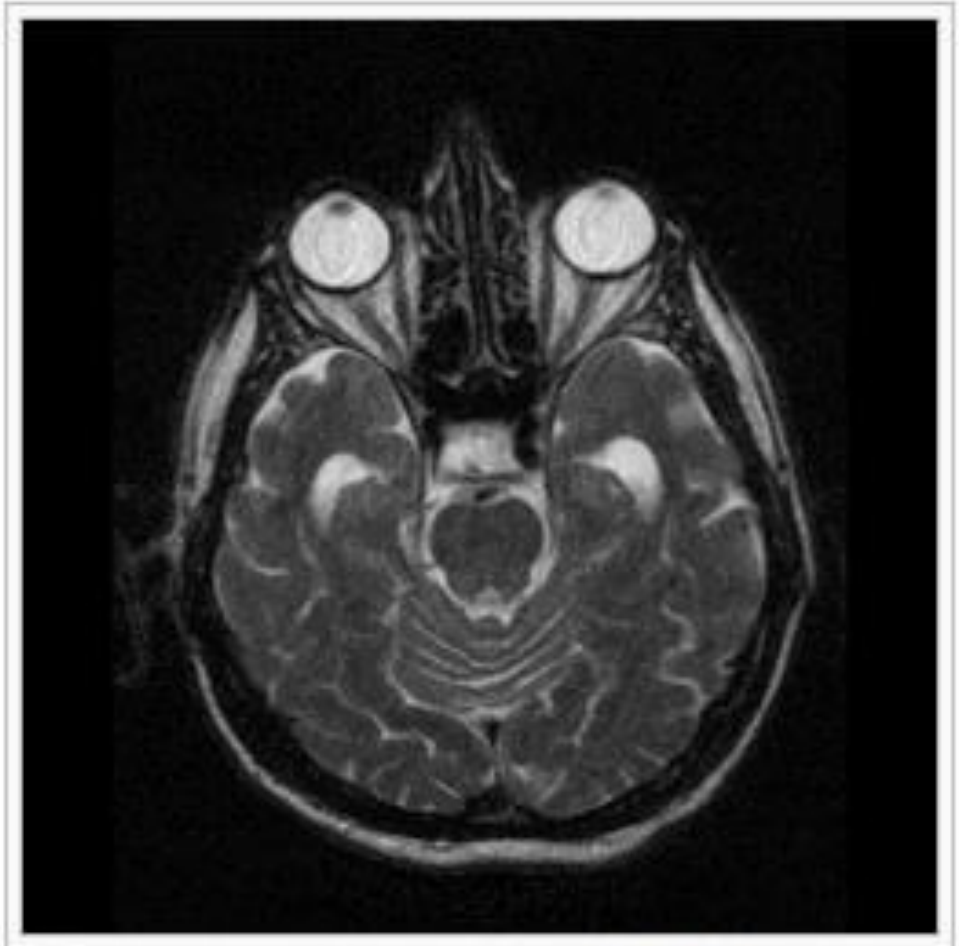


Magnetic Resonance Imaging

- **MRI** is a sophisticated type of scan that uses strong magnetic fields and radiowaves to produce detailed images of the inside of the body.
- An MRI scanner consists of a long tunnel with a powerful magnet.
- The patient lies inside the tunnel during the scan.
- MRI images have higher quality than CT images.
- In some cases, some paramagnetic contrast material may be used during the MRI scan to show certain structures more clearly.

MRI Scanner

صورة للمخ والرأس باستخدام الرنين المغناطيسي



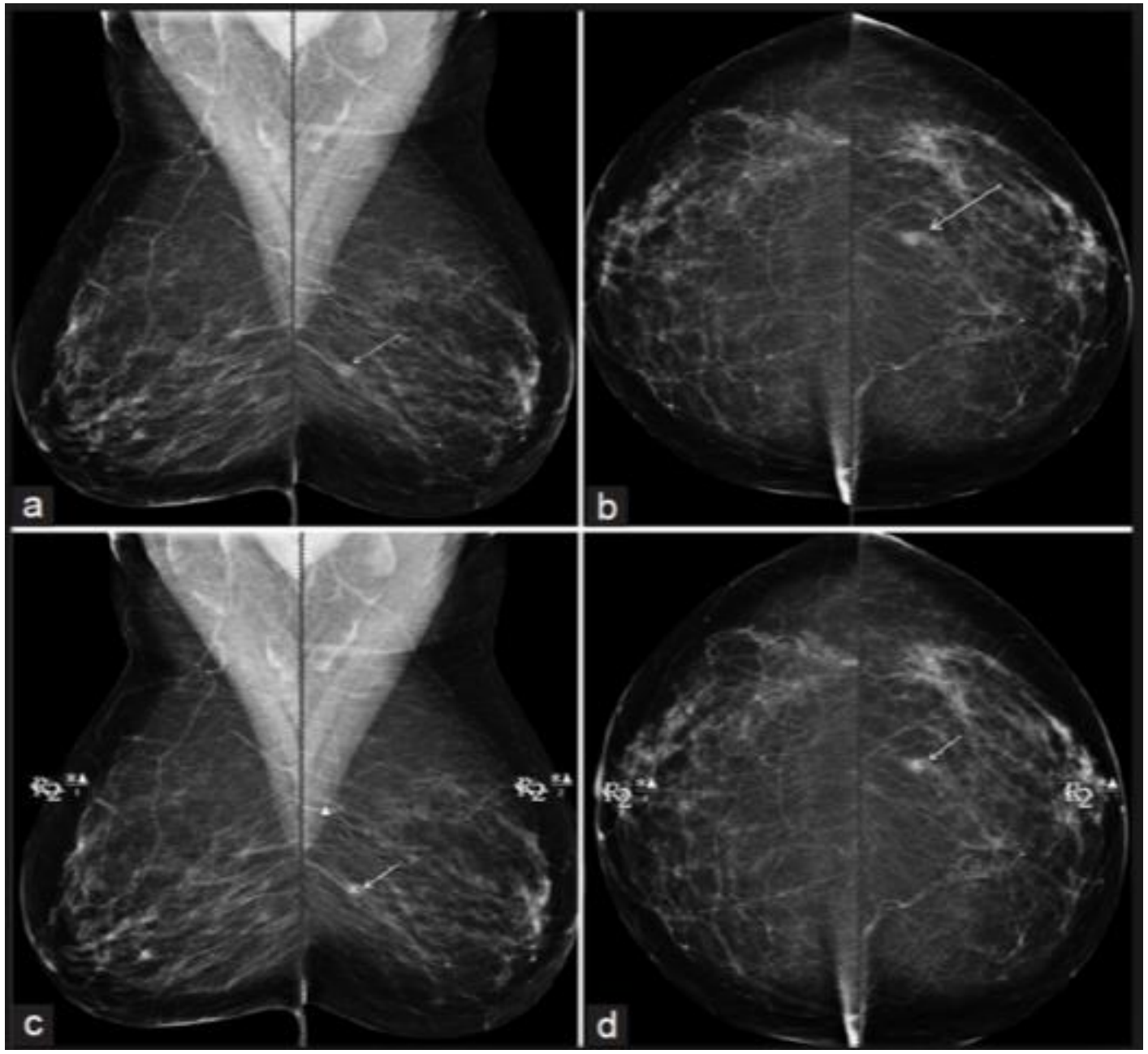
تصوير المخ بالرنين المغناطيسي

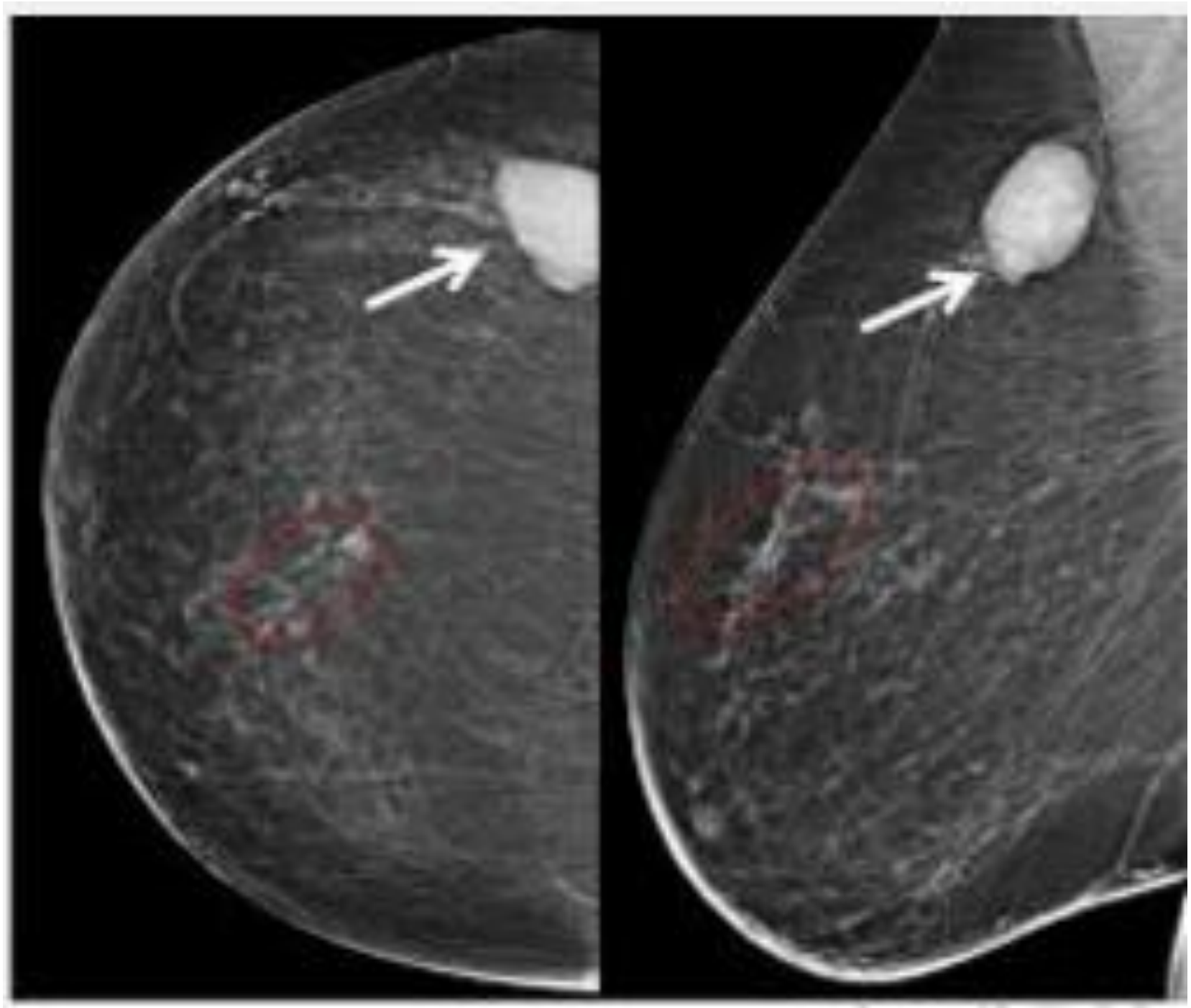
Mammography

A **diagnostic mammogram** is an X-ray image used to detect unusual breast content, such as cysts, lumps, breast cancer, microcalcifications, usually reflecting external changes in breast size or shape.

Mammography Machine

Mammograms

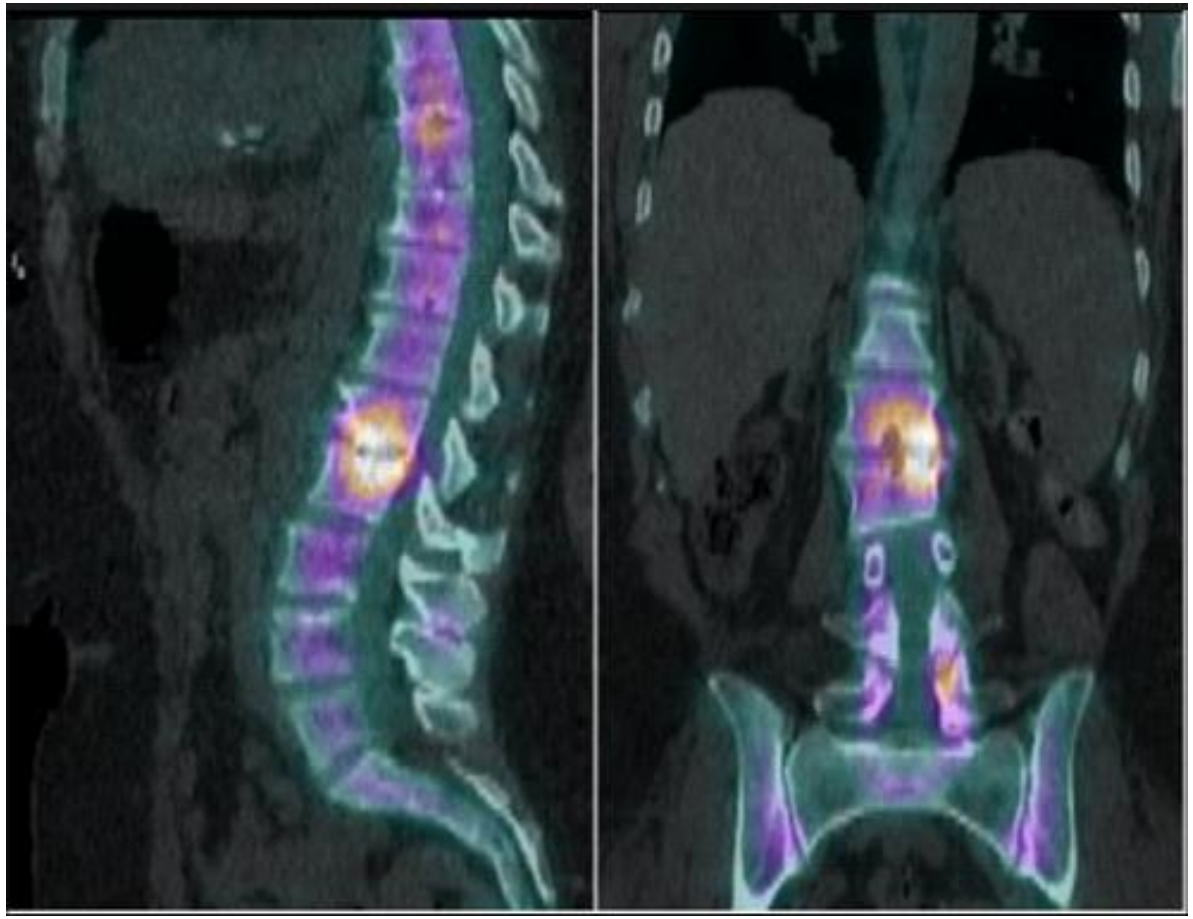




Radionuclide Imaging

(uses injected radioactivity into patient to show functional abnormalities)

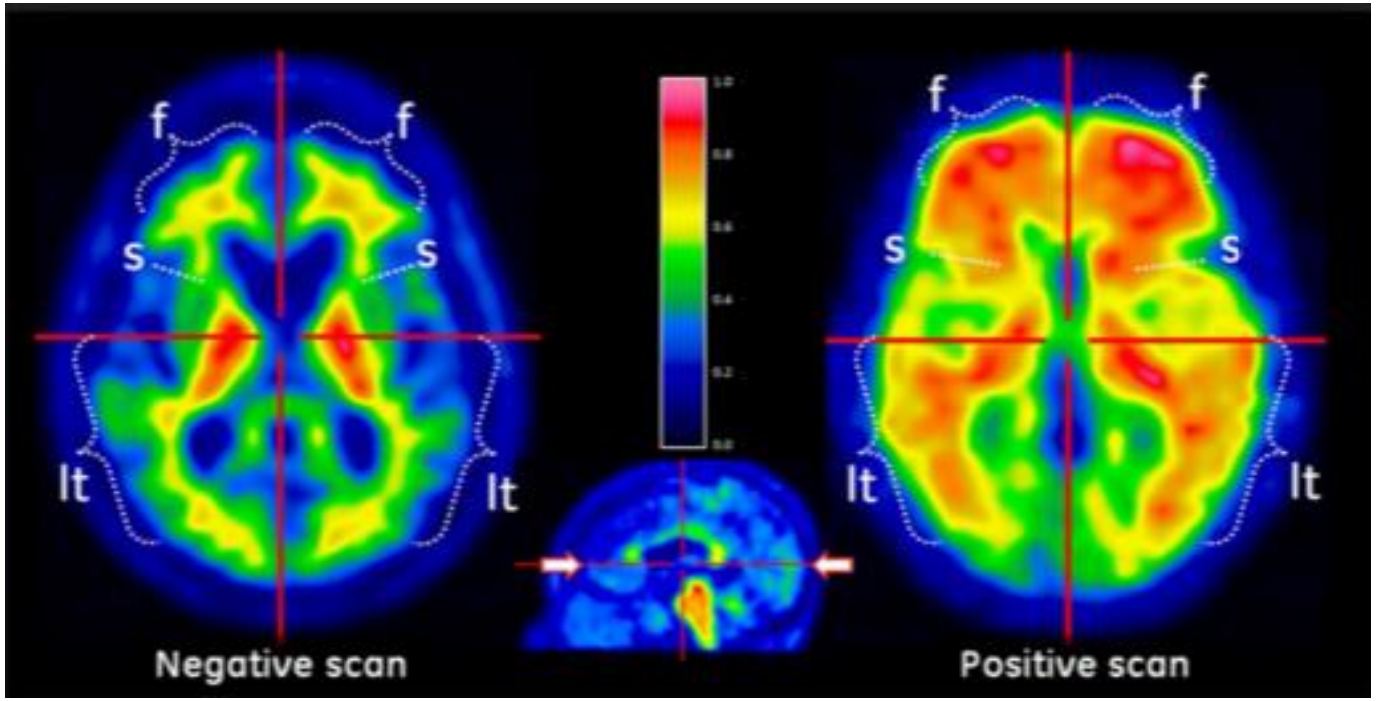
Spine SPECT Scans

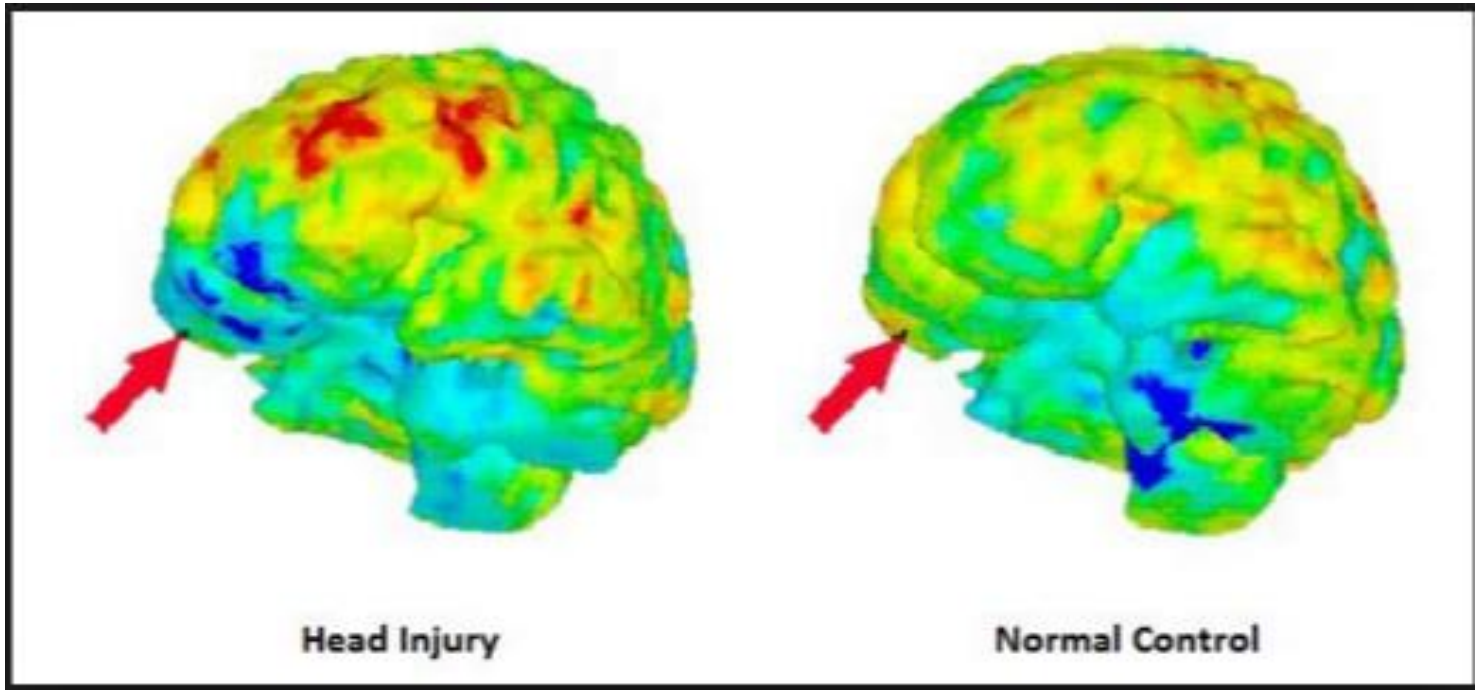


PET Scanner

(uses injected positron-emitting radioactivity into patient)

Brain PET Scans





Radiotherapy System

(to treat cancer with ionizing radiation)

Radiotherapy System

Panoramic Dental CT