**Introduction to Radiology**

**X-Ray :** electromagnetic waves , harmful to the body because it cause ionization .

 High atomic no. e.g. bone.metal will appear white

 Soft tissue , gas , air will appear black

In X-Ray the organs differ in appearance

Bone – Soft tissue – Fat – Air ( from light to dark )

When examining the GIT we give contrast (dye) so it could appear & give it a high atomic no. and appear white

Stomach Barium Meal

L.I Barium Enema

Esophagus Barium Swallow

S.I Barium full through

……. –gram >>>>> Procedure

…….-graphy >>>> Study

**Ultrasound :**  Can discriminate the borders of an organ e.g. Solid or cystic

 Easy , available , operator dependent

 Can’t pass through any hard object ( e.g. Bone , Brain because it

 is inside the skull ) or any organ with air .

 The sound is utilized to reflect organs & the sound is safe no

 radiation.

 Can evaluate ligaments , tendons & muscles .

With advanced technology increase radiation increase image quality

 increase cost

**CT :** Use small detector & thin X-ray beam

 Gives sagittal & axial views

 CT layers the body to separate structure from each other ( structures with

 in slices )

**MRI :** Our body contain water which contain water that includes protons & when

 we direct a magnetic wave toward it their movement will be arranged rather than random .

 Can study small structures , can see the bone e.g. vertebrae , intervertebral disc .

 Can detect an early infarction in the brain ( ask the doctor about I’m not sure )

**MSK Anatomy & Investigation**

**Conventional radiography :** regular plain film

**Fluoroscopy :** Improve functional anatomy by injecting a cement material

**CT :** additional view “ oblique view ” to see the intervertebral foramina to view any abnormality as Osteofication or compression

 In the advantages >>>>> reformation put the things together in 3D

**Angiography :** Colored , Catheter

 e.g. in trans femoral angiography by inserting a catheter until it reaches the Aorta then Coronary artery to remove the stenosis with a ballon or a stent (angioplasty)

**US “Ultrasound” :** advantage can compare the opposite side , can be performed on bed side .

**Scintigraphy Radionuclide Bone Scan :** It shows the functional body parts (where is the highest place of consumption in our body )

As the example shown in the lecture in prostate metastasis we use a nuclear rays by injecting a radiopharmacutical , shows hot spots & go to the most active places in the body . Then we take a picture by a gamma camera to see the deposits in the body .

**MSK non Trauma**

**Bone tumors :** Bone metastases can be 2ndry from Breast Ca. or Prostate Ca.

 Multiple myeloma can go to skull .

 In detecting any bone lesion we start from the lesion then medulla then expand to cortex .

Sclerotic lesion : Cotton like appearance

Lytic lesion : Black dark appearance

Osteosarcoma : is a very big extensive tumor

In well- defined lesions as if we draw it with a pencil (map-geographic)

Non-neoplastic lesion e.g. Osteomyelitis cause destruction to the bone

 Septic arthritis cause destruction to the joint

Not all sclerotic are malignant

**Arthropathy :** Septic arthritis is an infection of the joints (in antibiotic or

 Drainage with no proper treatment which will lead to arthropathy)

Rheumatoid arthritis affect the proximal phalanges rather than distal , periarticular osteoporosis “erosion” i.e. density in bones ,but in joints decreased in distal phalanges

Psoriatic Arthropathy - distal erosion

Ankylosin spondylitis الالتحام الالتهابي : back pain

 In predilection for spine in SIJ ( sclerotic lesion )

Syndesmophytes ( attached vertebrae ) نتوءات

 من كثر الالتهاب تصير الفقرات ملتحمة