Metabolic disorders and Bone scintigraphy
Maladies osseuses métaboliques et scintigraphie
Metabole aandoeningen en botscan
Generalized metabolic disorders

Newly mineralizing bone <-> related to general skeletal metabolism

 <-> influenced by parathyroid hormone, Vit D, Ca availability

 <-> increase in new osteoid will result in increased amount of the agent into amorphous Ca phosphate

 <-> increased uptake and « superscan image »

Superscan: Fogelman score: from 2 to 14 (or 12 in case of renal ostodystrophy)
- « tie » sternum
- « beading » of chondrocostal junctions
- reduced renal activity
- Increased long bones uptake
- Increased axial uptake
- Increased periarticular uptake
- Prominence of calvaria
Superscan in a case of renal osteodystrophy
Superscan in a case of $1^\circ$ HPT
Paget’s disease

Viral origin

\[ \Downarrow \]

Affects ostoclast \( \rightarrow \) increased osteoclast activity \( \rightarrow \) increased osteoblast activity + vascularity

Replacement of normal lamellar bone
By connective tissue containing immature \( \rightarrow \) new subperiosteal bone formation
Collagen

higly vascular, liable to fracture deformation

Raised alkaline phosphatases

Clinical findings: pain, tenderness, deformity of bone

Distribution: pelvis, spine, skull, long bones. Less frequently: ribs, bones of hands, shoulders (disease can involve almost any bone): total body scan mandatory

Follow up: Changes in SAP, Hypro, serum procollagen 1 N terminal propeptide, Urinary N terminal telopeptide type 1
Scintigraphic patterns of Paget’s disease

Intense uptake of the tracer in affected bone(s)

If lytic component present: hypoactive area with surrounding increased uptake at the margins of Pagetic involvement

Differential diagnosis with bone metastases (eventually association of both diseases): in Paget’s disease, preservation of normal bone anatomy

Transformation in osteogenic sarcoma can occur (rare)
Patient suffering from a Paget’s disease of the skull, lytic phase involvement (osteoporosis circumscripta: uptake increased at the margins of pagetic involvement)
Severe multicentric Paget’s disease: intense uptake of bone seeking agent, mild uptake (in some localizations) of labelled leucocytes
Osteoporosis

Vertebral crush fracture

Differential diagnosis: metastases, osteoarthritic changes (articular facets)
Osteoporosis

Little role of bone scintigraphy in the diagnosis (unlike bone mineral density measurements: important prognostic tool)

Fracture/vertebral collapse: intense linear accumulation

Gradual decrease of activity with healing (up to > 1 year)

SPECT helps to differentiate from bone metastases (more focal and osteoarthritic changes in articular facets)
Left: severe osteoarthritis of lumbar spine
Right: lytic lesion and osteoblastic response in a myeloma
(NMR: tumoral process with involvement of ant.lateral part of L1 body)
Osteoporosis: recent intertrochanteric right hip fracture, ribs fractures, crush fracture, sternotomy

Same patient: leucocytes scan note photopenic effect in case of vertebral crush fracture without infection

Osteoporosis: recent intertrochanteric right hip fracture, ribs fractures, crush fracture, sternotomy