CME 4
Bone & Joint Committee
Friday, October 23, 10:40-12:10

Session Title
Multimodality Imaging-Based Problem Solving for Multiple Bone Lesions

Chairperson
Frédéric Paycha (Paris, France)

Programme
10:40 - 11:04  Alberto Bazzocchi (Bologna, Italy): Multiple Osteolytic/Osteoclastic Lesions in the Axial Skeleton - Multimodality Imaging-Based Problem Solving

11:04 - 11:24  Sofia Carrilho Vaz (Lisbon, Portugal): Multiple Osteolytic/Osteoclastic Lesions in the Peripheral Skeleton - Multimodality Imaging-Based Problem Solving

11:24 - 11:48  Frédéric Paycha (Paris, France): Multiple Osteosclerotic/Osteoblastic Lesions in the Axial Skeleton - Multimodality Imaging-Based Problem Solving

11:48 - 12:08  Bénédicte Jonca (Paris, France): Multiple Osteosclerotic/Osteoblastic Lesions in the Peripheral Skeleton - Multimodality Imaging-Based Problem Solving

Educational Objectives
1. To triage multiple skeletal lesions according to hierarchical criteria, first of them featuring 
   phenotype (osteoclastic/osteolytic vs osteoblastic/osteosclerotic) and localization (axial vs 
   peripheral skeleton)
2. To set ordered shortlists of a) causative conditions shared with solitary osteoclastic/osteolytic or 
   osteoblastic/osteosclerotic lesions and b) causative conditions exclusively manifesting as 
   multiple lesions
3. To settle acquisition workflows for whole-body hybrid imaging modalities
4. To get acquainted with $^{99m}$Tc-bisphosphonates SPECT, CT, [18F]FDG PET, and MRI pattern 
   classifications respectively of the elementary osteoclastic/osteolytic and 
   osteoblastic/osteosclerotic lesions, aiming to assess aggressiveness & quiescence of lesions
5. To systematically delineate the meaningful criteria array contributing to narrow differentials 
   gamuts, and, eventually, in the most propitious cases, to derive the correct etiological diagnosis

Summary
Orders of magnitude in epidemiology are paramount to scrutinize when tackling with multiple 
skeletal lesions of unknown origin: 1000 pseudo-tumors for 100 metastases for 10 blood 
malignancies for 1 primitive tumor.
Pseudotumors break down in 4 memorable categories: a) Inflammation and infection group 
(osteomyelitis-arthritis/Langerhans cell histiocytosis/SAPHO), b) “OSES” group (sarcoidosis,
mastocytosis, angiomatosis), c) “T” group (trauma, brown tumors), d) Miscellaneous 99mTc-bisphosphonates scintigraphy hot spots group (fibrous dysplasia, Paget’s disease, bone infarcts).

The discovery of same phenotype multiple lesions of the skeleton requires a work-up by whole-body imaging modalities.

Tactically, clues pointing to pseudotumors must be first thoroughly searched for, then if missing or equivocal, arguments for bone malignancies are to be garnered.

The checklist of the 10 aggressiveness quiescence criteria of skeletal lesions for the imaging specialist are itemized: 1) localization, 2) number (distribution), 3) age, 4) pain?, 5) X-rays phenotype (lytic/sclerotic), 6) margins, 7) activity (encompassing bone lesion turn-over, metabolism, inflammation)/timeline, 8) cortical/periosteal reaction, 9) crossing or not the joint?, soft tissue expansion?

When all criteria are consistently flagging quiescent lesions (e.g. osteopoikilosis), bone biopsy may be avoided (“don’t touch lesions”), in the other scenarios, bone biopsy is the rule (“biopsy-oma”).

Multiple osteosclerotic/osteoblastic lesions picture proves more tricky to decipher than osteolytic/osteoclastic one because: a) more prevalent thoraco-abdomino-pelvic MDCT incidentalomas reported owing to high density contrast, b) more baffling underlying systemic conditions than for multiple osteolytic/osteoclastic lesions, c) [18F]FDG PET frequently negative, d) image-guided percutaneous core needle biopsy technically arduous to perform and pathological material difficult to analyse.

**Key Words**

Osteoblastic/osteosclerotic lesions, Osteoclastic/osteolytic lesions, Axial skeleton, Peripheral skeleton, Whole-body multimodality imaging, Etiological diagnoses gamut