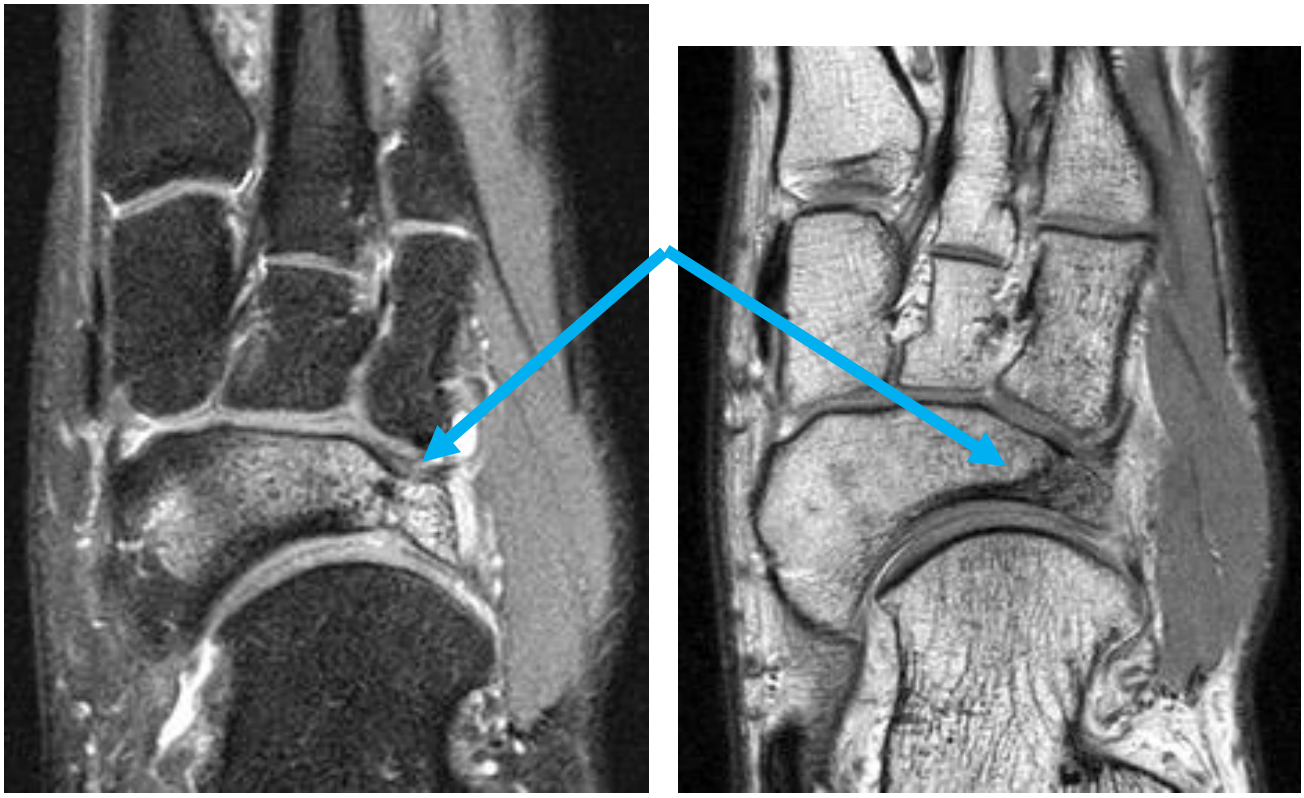
16M presents for assessment with persistent lateral left foot inflammatory type pain and stiffness

MRI Findings:

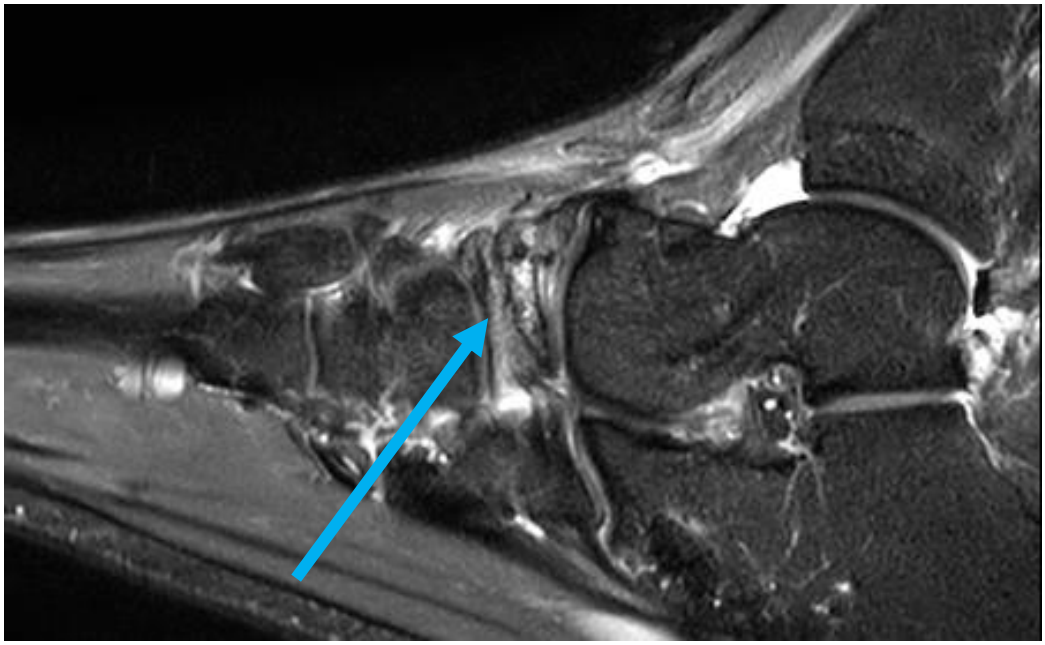
- Chronic stress reaction and comminuted fracture demonstrated lateral aspect navicular with associated collapse
- Large amount of bone marrow oedema with microcystic change in the region
- Navicular demonstrates a comma-shaped (type 3) morphology and medial subluxation



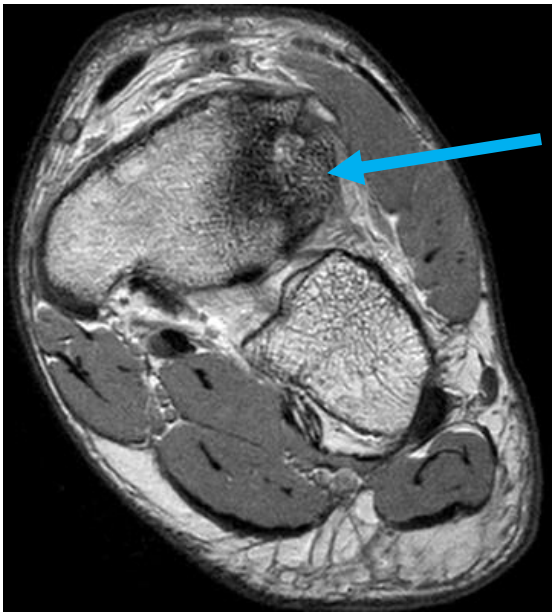
PD SPAIR and PD axial – volume loss / collapse lateral navicular (comma-deformity), with fragmentation, sclerosis, marrow oedema and medial subluxation

Discussion

- Case has the features of *Mueller-Weiss syndrome* classically seen in adults (middle age F>M)
- **Mueller-Weiss syndrome**: rare entity characterised by spontaneous (unknown aetiology) multifactorial adult onset osteonecrosis of the tarsal navicular (distinct from *Kohler disease*)
- Present with persistent lateral hind-midfoot regional pain, often severe
- Progressive navicular fragmentation and talo-navicular joint destruction result in mid and hind foot pain and deformity
- Classic radiological findings:
  - Collapse *lateral* aspect of the navicular with dorsal or medial protrusion
  - Initial volume loss resulting in the classic *comma-shape deformity*
  - Then medial or dorsal subluxation and fragmentation
- May be bilateral and associated with pathological fractures
- If conservative management (analgesia / orthotics etc) fails, surgery / arthrodesis required



PD SPAIR sagittal – fragmentation / collapse lateral navicular with marrow oedema and cystic change



PD coronal – sclerosis and fragmentation lateral navicular

DDx

- Kohler disease
  - osteonecrosis navicular of childhood (~4-6 yrs), typically self-limiting characterised by collapse/sclerosis of often “wafer-thin” navicular. Central 1/3 of navicular is watershed zone.
- Tarsal coalition
- Infection

XR / CT

- Collapse lateral navicular (comma-shaped deformity), sclerosis, fragmentation, medial or dorsal protrusion

MR

- PDFS or STIR sequences sensitive for marrow oedema and therefore detect early changes of disease

Further Reading:

Samim M, et al: Imaging of Mueller-Weiss Syndrome: A Review of Clinical Presentations and Imaging Spectrum. AJR Am J Roentgenol. 2016; W1-W11.
Haller J, et al: Spontaneous osteonecrosis of the tarsal navicular in adults: imaging findings. AJR Am J Roentgenol. 1988;151 (2): 355-8.
Mohiuddin T, et al: Müller-Weiss disease - review of current knowledge. Foot Ankle Surg. 2014 Jun;20(2):79-84.
Radiopaedia.com