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Post COVID-19 Avascular Necrosis Of Hip – A Rare Case Report.

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Clinical history: 27 year old male diagnosed with COVID 19 got admitted in our hospital, and was treated on antibiotics, antivirals and short course of steroids. He was discharged after an uneventful course and resolution of symptoms. Three months later, patient presented with acute hip pain and was screened plain radiograph of Hip.

Imaging:

Plain Radiograph and MRI study of the bilateral hip joints was done for the patient using Philips Ingenia 3T MRI machine. The study showed the following imaging findings –

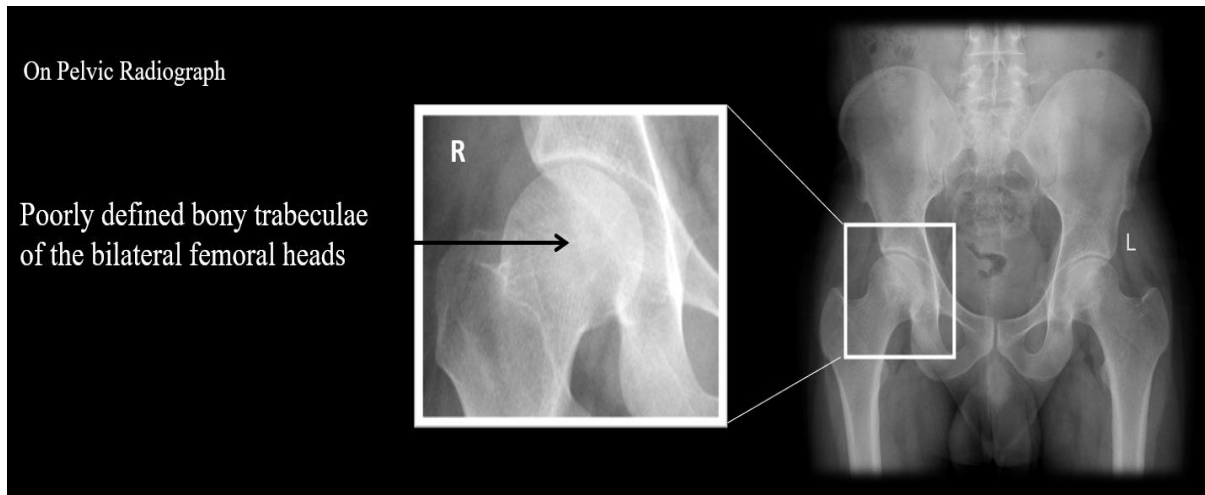


Figure 1: Pelvic Radiograph showing poorly defined bony trabeculae of the bilateral femoral heads.

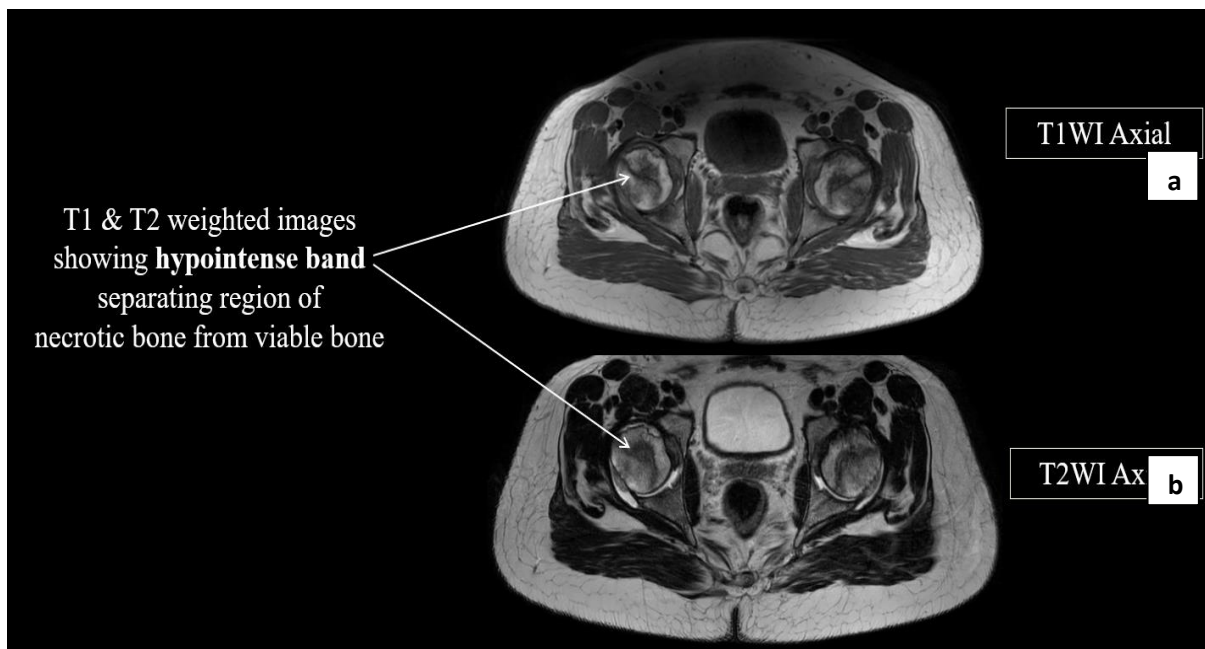


Figure 2: For further evaluation, MRI was done and it showed a subchondral area of AVN in the anterosuperior femoral heads bilaterally. Axial T1 (a) & T2 (b) weighted images showing hypointense band separating region of necrotic bone from viable bone.

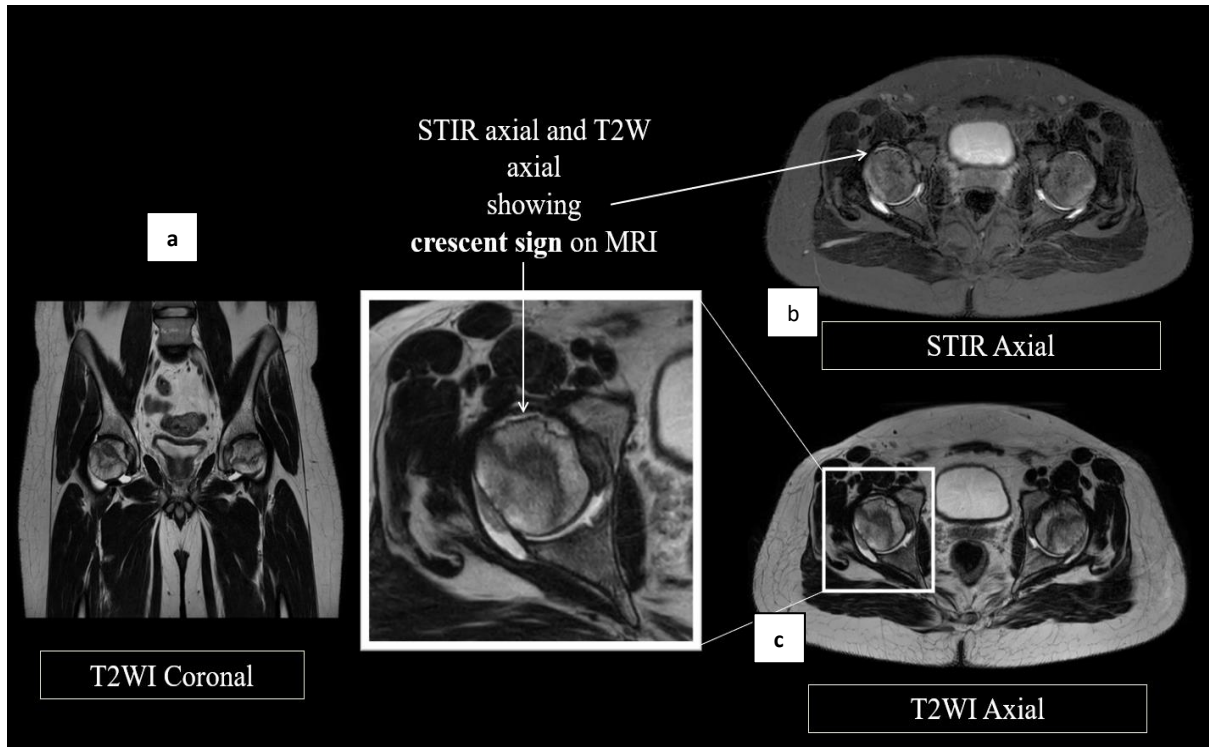


Figure 3: Coronal T2 (a), Axial STIR (b) and T2W (c) images showing crescent sign.

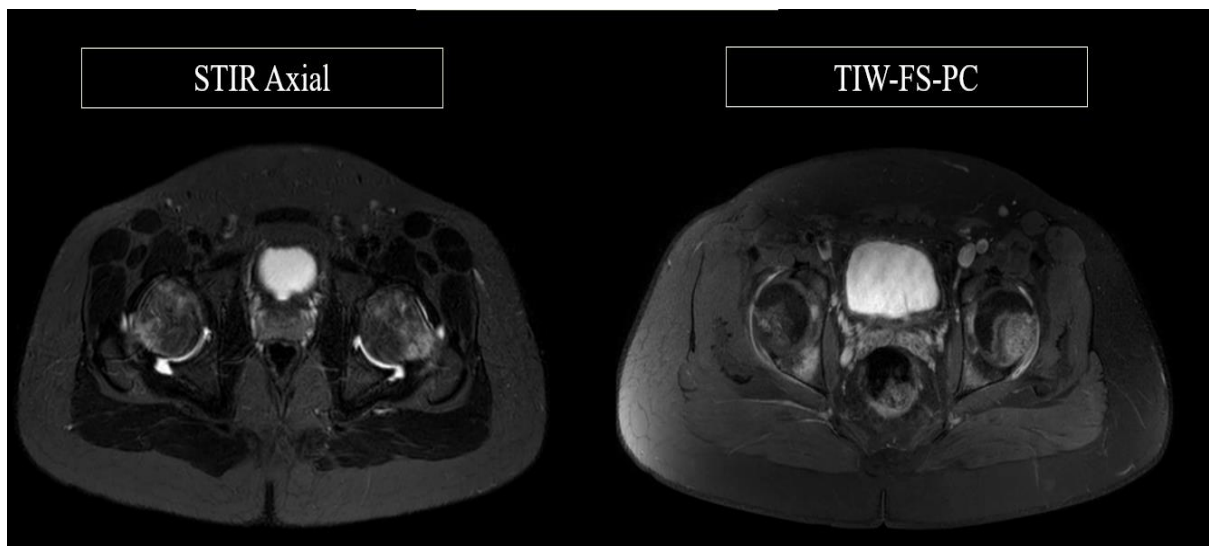


Figure 4: STIR hyperintensities showing enhancement on post contrast is noted in rest of head, neck, and greater trochanter of bilateral upper femur, right superior and left posterior acetabulum – s/o marrow edema.

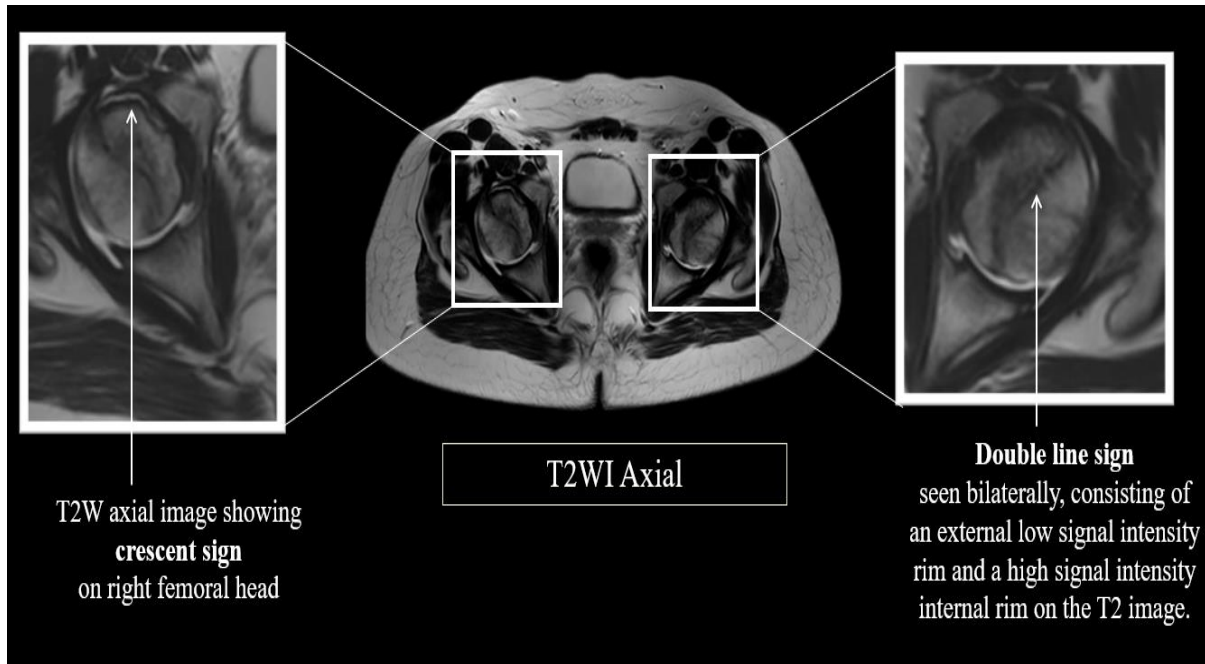


Figure 5: After 6 months, patient was again tested positive for COVID 19, and was treated on antivirals, antibiotics and antipyretics. Two months after the infection, the patient again presented with pain in the bilateral groin region. T2W axial image showing crescent sign on right femoral head. Double line sign seen bilaterally, consisting of an external low signal intensity rim and a high signal intensity internal rim on the T2 image.

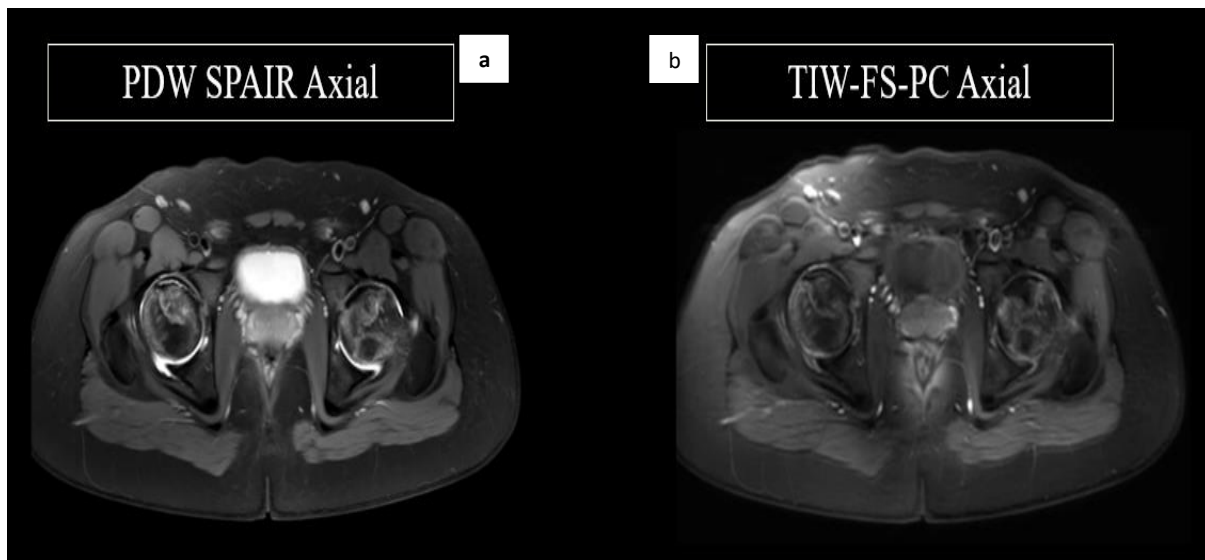


Figure 6: Marrow edema noted in PDW SPAIR (a) and T1W-FS-PC (b) axial images.

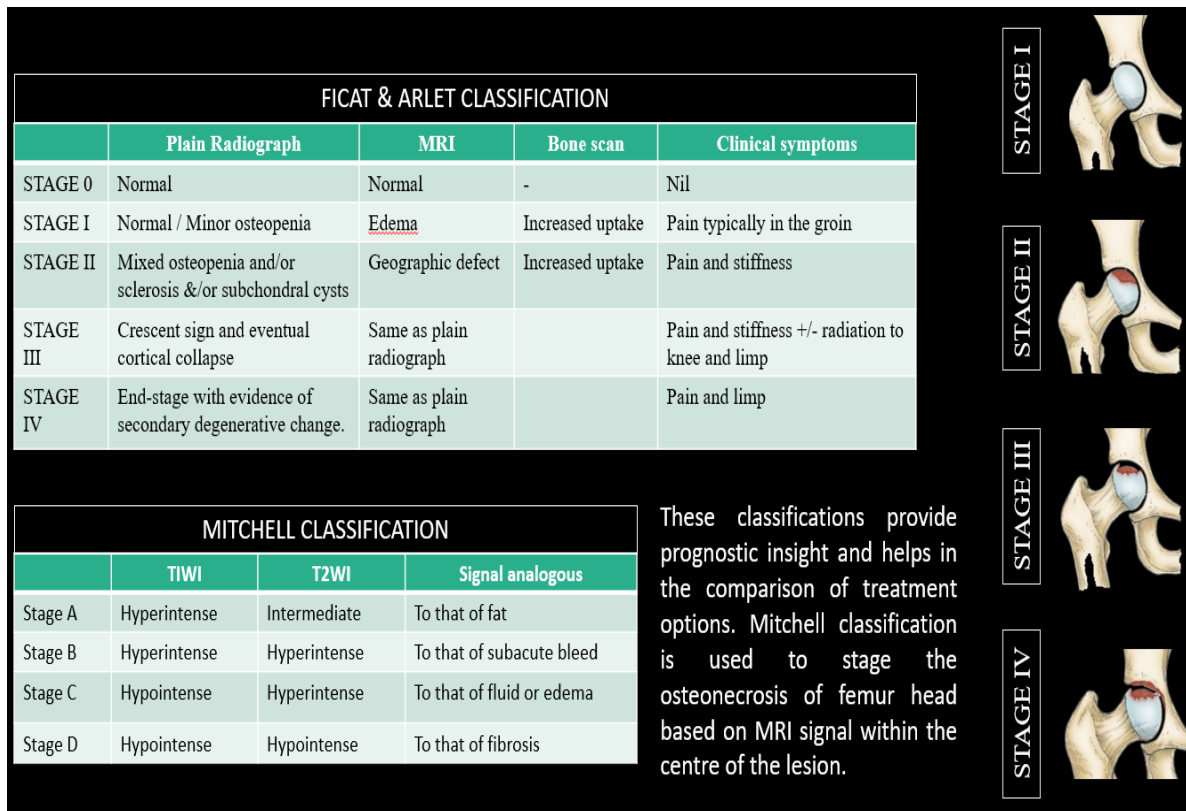


Figure 7: FICAT ARLET AND MITCHELL CLASSIFICATION OF AVN

Final diagnosis: The patient was diagnosed with stage III AVN and was managed accordingly.

Differential diagnosis:

- Subchondral insufficiency fracture.
- Idiopathic transient osteoporosis of hip.
- Complex regional pain syndrome.

Epidemiology:

COVID 19, caused by novel coronavirus SARS-CoV-2, has evolved from being a discrete respiratory infection in the initial days of pandemic to an infection that affects almost all body systems. Musculoskeletal manifestations of Covid 19 range from myalgia or arthralgia to rhabdomyolysis and joint necrosis. Osteonecrosis is one of the possible sequelae of covid 19 and it appears either in the acute phase of the infection or as a late consequence of the disease or as a side effect of excessive corticosteroid use in the management of Covid 19.

Etiopathogenesis:

Avascular necrosis of bone results generally from corticosteroid use, trauma, pancreatitis, alcoholism, radiation etc. AVN of Hip is more common than in other sites due to precarious blood supply and high loading when standing. Here in this patient, AVN of bilateral femoral heads developed four months after first episode of COVID 19 infection and two months after second episode of COVID 19 infection. The first episode of AVN was managed by decompression with growth factor. In both cases the cumulative equivalent steroid dose used was too less than the expected level needed to develop steroid induced osteonecrosis of the femur. A low cumulative dose of steroids in this patient suggests that the COVID-19 associated vasculitis may play a role in the pathogenesis of the osteo necrosis of femur head.

Clinical presentation:

The most commonly affected site is the femoral head and patients usually present with hip and referred knee pain. Early detection of AVN of Hip is critical, as all treatments geared towards preservation of the femoral head are more successful early in the course of the disease. MRI is highly sensitive and specific to early changes in bone marrow and the findings form the core of staging in AVN, which in turn influences the prognosis and the choice of treatment.

Imaging features:

Pain in hip region, in a post covid scenario, should alert the possibility of AVN and should be thoroughly evaluated with radiograph & MR Imaging, as early detection of AVN is the key to a successful outcome of joint preserving surgeries. The imaging findings, should be staged as per FICAT & ARLET classification and MITCHELL classification, (Figure 7) as it provides prognostic insight and helps compare treatment options.

Radiographic features – Radiograph can be normal in the initial stage and as it progresses, there can be osteopenia, sclerosis and subchondral cystic changes. In stage III a linear subchondral lucency and/or cortical collapse can be seen.

CT – more sensitive than radiograph in evaluating subchondral lucencies and sclerosis during the reparative stage, before the onset of femoral head collapse and superimposed degenerative disease.

MRI – most sensitive modality.

Treatment:

Core decompression with or without bone graft is the most appropriate treatment in the precollapse stage of AVN.

Teaching points –

- Pain in hip region, in a post covid scenario, should alert the possibility of AVN and should be thoroughly evaluated with radiograph & MR Imaging.
- MRI is highly sensitive and specific to early changes in bone marrow and the findings form the core of staging in AVN.
- A follow up protocol for COVID-19 patients for the fear of developing osteo-necrosis is mandatory.

References:

1. MRI spectrum of avascular necrosis of femoral head in patients treated for COVID-19: Sushil Ghanshyama Kachewar , Smita Sushil Kachewar; Indian Journal of musculoskeletal radiology
2. From the Radiologic Pathology Archives Imaging of Osteonecrosis: Radiologic-Pathologic Correlation: Mark D. Murphey , Kristopher L. Foreman, Mary K. Klassen-Fischer, Michael G. Fox, Ellen M. Chung, Mark J. Kransdorf – Radiographics 2014