

- **Pathophysiology of HIV:** HIV is a retrovirus that targets CD4+ T lymphocytes, leading to progressive immune dysfunction and increased susceptibility to opportunistic infections and systemic complications.
- **Musculoskeletal Manifestations in HIV:** While not as common, HIV can result in musculoskeletal disorders, including arthritis, myopathies, and bone-related complications.
- **Avascular Necrosis (AVN):** AVN refers to bone ischemia resulting from compromised blood flow, most commonly affecting the femoral head. Without intervention, it progresses to subchondral collapse and osteoarthritis.
- **Risk Factors in HIV:** AVN risk increases with corticosteroid use, metabolic dysregulation, vasculitis, and long-term antiretroviral therapy.
- **Presentation and Diagnosis:** AVN typically presents with gradual onset of groin or thigh pain, worsened by movement and sometimes present at rest. Early stages may be asymptomatic, and plain radiographs are often normal; Magnetic Resonance Imaging (MRI) is the most sensitive tool for detecting early ischemic changes before bone collapse occurs.
- **Clinical Relevance:** Given the potential for joint-preserving intervention, early identification of AVN in HIV patients with unexplained joint pain is essential for improving long-term functional outcomes.

## Case Description

### Patient Information:

- Greater than 30-years-old nonbinary biological male
- Medical history: HIV (currently treated, CD4 count unknown), nephrotic kidney disease

### Presenting Complaint:

- Acute-on-chronic right knee pain, difficulty walking
- Symptoms progressively worsening over the past several months

### Previous History:

- Seen in the ED 7 months ago for similar complaints
- Initial X-ray: Patchy sclerotic changes in the superior femoral head, no subchondral collapse

### Imaging Results:

- **Right Knee MRI:** Osteonecrosis noted in the lateral femoral condyle, with bone infarction observed. No significant joint effusion or soft tissue abnormalities
- **Left Hip MRI:** Avascular necrosis (AVN) of the femoral head with a 3 mm subchondral collapse. Bony edema seen extending through the acetabulum and into the femur, beyond the lesser trochanter
- **Right Hip MRI:** AVN features similar to the left hip, but without evidence of subchondral collapse. Bony changes noted but less severe than the left hip, with mild surrounding edema

## Imaging



Fig 1: MRI T1 coronal view of the pelvis demonstrates heterogenous signal through the bilateral femoral heads, seen extending to the level of the lesser trochanter on the right. There is subtle 3 mm subchondral collapse of the left femoral head.

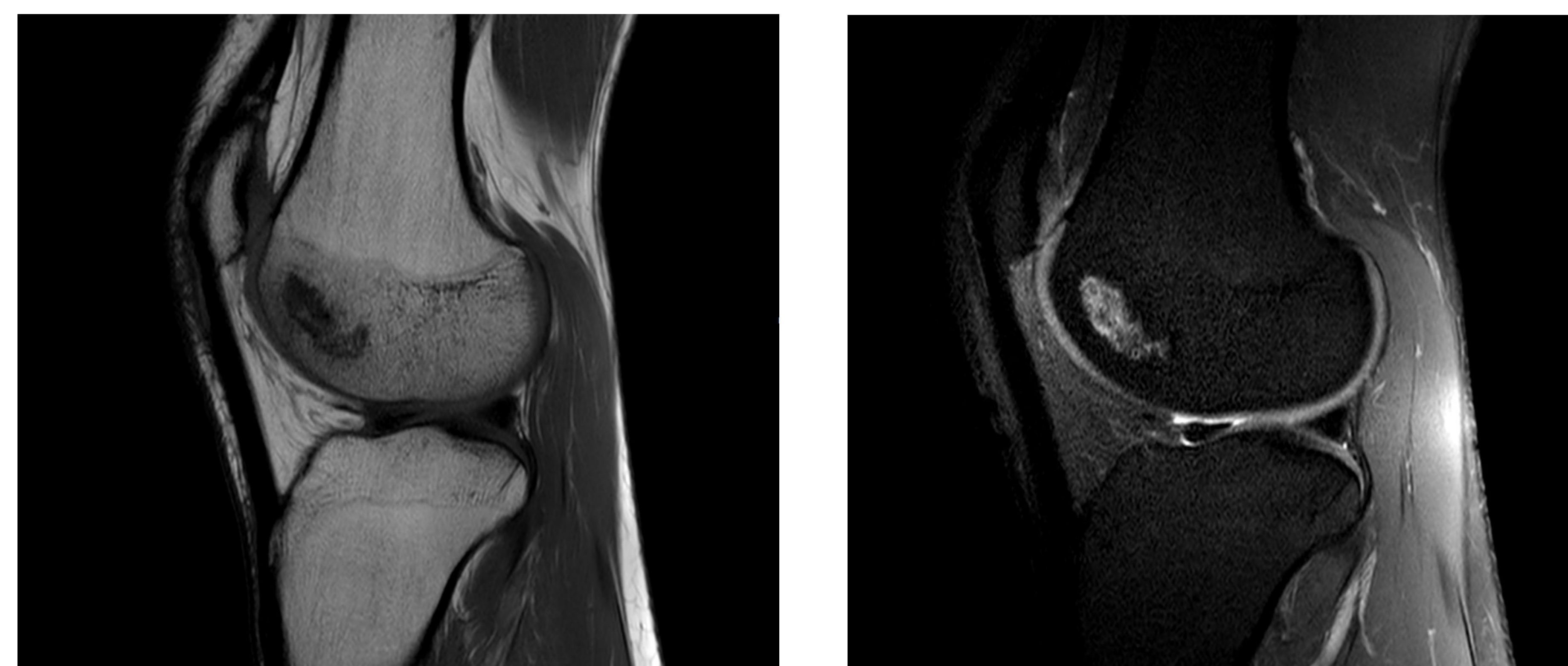


Fig 2: MRI T1 (left) and Proton Density (right) sagittal views of the right knee demonstrate a well circumscribed area of abnormal signal within the lateral femoral condyle, consistent with bone infarction.

## Clinical Course

- **Initial Presentation:** The patient presented with acute pain in the right knee, making walking difficult, and had a history of similar symptoms 7 months prior. No significant trauma or injury reported to the joints.
- **Follow-Up:** The patient's previous X-ray demonstrated patchy sclerotic changes in the femoral head, which were stable without subchondral collapse. After the latest episode of pain, MRI imaging revealed progression to osteonecrosis in the right knee and AVN in both hips.
- **Management:** The patient was referred to orthopedic surgery for further evaluation and management, including discussions about core decompression or hip arthroplasty as potential surgical treatments.

## Discussion

- **AVN in HIV Patients:** Avascular necrosis (AVN) is a condition where bone tissue dies due to poor blood supply, often affecting the femoral head. In HIV patients, AVN can be exacerbated by antiretroviral therapy (especially protease inhibitors), corticosteroid use, and comorbidities such as nephrotic syndrome.
- This patient's HIV status and nephrotic kidney disease are likely contributing factors to the development of AVN.
- **Imaging Features:** MRI is the gold standard for diagnosing AVN. In this case, the MRI findings of subchondral collapse in the left femoral head and bone infarction in the right knee confirm the diagnosis. These findings are typical of advanced AVN.
- **Differential Diagnosis:** Although conditions like rheumatoid arthritis and osteomyelitis can mimic AVN, the bilateral nature and imaging features (subchondral collapse, bone edema) strongly support AVN as the diagnosis.
- **Management and Prognosis:** Early intervention is critical to prevent further damage. Conservative measures may be helpful initially, but surgical treatments such as core decompression or hip arthroplasty may be needed in more advanced cases.

## Conclusion

This case highlights the importance of early recognition of AVN in HIV patients with persistent joint pain, especially in the context of comorbidities like nephrotic syndrome. Early diagnosis with MRI and timely intervention can prevent irreversible joint damage and long term outcomes.

## References

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2. Stanislavsky A, Sharma R, Bell D. HIV/AIDS (musculoskeletal manifestations). *Radiopaedia.org*. Published online November 7, 2010. doi:<https://doi.org/10.53347/rid-12287>