

International Journal of Radiology and Diagnostic Imaging



E-ISSN: 2664-4444
P-ISSN: 2664-4436
www.radiologypaper.com
IJRDI 2023; 6(4): 01-03
Received: 02-06-2023
Accepted: 07-07-2023

Dr. Mohit Choudhary
PG Resident, Department of
Radiodiagnosis, Varun Arjun
Medical College, Rohilkhand
Hospital, Shahjahanpur, Uttar
Pradesh, India

Dr. Pushpkant Tiwari
Professor and Head of the
Department of Radiodiagnosis,
Varun Arjun Medical College,
Rohilkhand Hospital,
Shahjahanpur, Uttar Pradesh,
India

Dr. Mohammad Nabeel
PG Resident, Department of
Radiodiagnosis, Varun Arjun
Medical College, Rohilkhand
Hospital, Shahjahanpur, Uttar
Pradesh, India

Dr. Aakriti Hans
PG Resident, Department of
Radiodiagnosis, Varun Arjun
Medical College, Rohilkhand
Hospital, Shahjahanpur, Uttar
Pradesh, India

Corresponding Author:
Dr. Mohit Choudhary
PG Resident, Department of
Radiodiagnosis, Varun Arjun
Medical College, Rohilkhand
Hospital, Shahjahanpur, Uttar
Pradesh, India

A rare case report of multiple bone involvement with avascular necrosis due to micro thrombi in a known case of COVID-19 can it be post sequale?

Mohit Choudhary, Dr. Pushpkant Tiwari, Mohammad Nabeel and Aakriti Hans

DOI: <https://doi.org/10.33545/26644436.2023.v6.i4a.353>

Abstract

Background: Although many patients have recovered from COVID-19, it is important to remember that long-term complications may occur after recovery. One of these complications is avascular bone necrosis. There is limited literature regarding multiple bone avascular necrosis due to micro thrombi in a patient recovering from COVID-19.

Case Presentation: We present here a 25-year-old patient with chief complaints of pain in the right knee and hip since 3 and a half months. MRI of the knee and hip revealed intramedullary infarcts in the distal femur and proximal tibia and bilateral hip AVN. After a gap of few weeks the patient also developed pain in his right shoulder, and from this point he was advised for an MRI of the shoulder, which revealed involvement of both humeral heads. He was a non-alcoholic and non-smoker with no significant past medical history except for bilateral severe pneumonia related to COVID-19, 3 years ago in 2020, for which he was hospitalized and underwent treatment with complete recovery. Taking into account all the radiological and laboratory examinations and as per the history, there is a very strong predilection of the development of AVN with microthrombi due to an inflammatory process that links them to the infection of COVID 19. As this can result in long-term morbidity, AVN of bone can be considered as one of the of the most harmful effects after infection with COVID-19.

Keywords: Intramedullary infarcts, avascular necrosis, COVID 19

Introduction

Coronavirus disease-19 (COVID-19) is a disease caused by 2019-nCoV/SARS-CoV-2, a novel group 2B β -coronavirus [1]. Manifestations include fever, cough, dyspnea, watery diarrhoea, myalgia, severe lymphopenia, prolonged coagulation profiles, cardiac disease, and sudden death [2, 3]. Although many patients have recovered from COVID-19, it is important to keep in mind that long-term complications, including adverse extra pulmonary effects, may occur after recovery. One of these complications is avascular necrosis (AVN).

The occurrence of bone death following reduced blood supply or complete cessation of blood supply is known as avascular necrosis (AVN). The affected bone part then disintegrates and eventually collapses. The femur is one of the commonly affected bones. Overuse of corticosteroids is one of the most common medical causes of AVN. Affected patients usually complain of gradually increasing pain and decreased range of motion. Treatment includes guided physiotherapy to medication and eventually surgery if necessary [5].

There is limited literature regarding multiple bone avascular necrosis in a patient recovering from COVID-19. Here we present a rare case of multiple bone involvement in a 25-year-old male patient.

Case Report

Here we report a rare case of avascular necrosis with multiple bones and joints involvement affecting hips bilaterally, humerus, distal femur and proximal tibia in a 25 year-old patient who presented with right knee and hip pain since 3½ months for which he was taking muscle relaxants and NSAIDs for symptomatic relief. Initially, the X-ray of the pelvis showed no significant radiological findings. He was advised an MRI of the knee and hip which revealed intramedullary infarcts in the distal femur and proximal tibia and bilateral hip AVN (Fig. 1),

areas with large groups of susceptible children. It affects all races and both sexes equally. A few weeks later he also developed right shoulder pain and was henceforth advised for MRI shoulder, which revealed involvement of the humeral heads bilaterally (Fig. 2).

He was non-alcoholic and non-smoker and had no significant past medical history except for COVID-19 associated bilateral severe pneumonia 3 years back in 2020 for which he was hospitalised and underwent treatment. During the course of treatment, he was prescribed low-dose steroids (Methylprednisolone) 4 mg OD dose for 7 days with a total dosage of 280 mg, along with COVID-19 treatment protocol.

Routine laboratory blood investigations at the time of the study were within normal limits except for mildly raised D-DIMER values (0.65 mcg/ml). Special investigations were done which include HLA B27, urine for Bence Jones protein, CK-MB, Troponin I and C, RA factor, cardiolipin IgG antibodies and ANA test which were found negative, Prothrombin time (PT) and aPTT, ALP levels, serum calcium levels, interleukin 1 beta levels, serum protein electrophoresis (No M band) were within normal limits, vitamin D levels were mildly below normal levels. He was prescribed on medications which include- Bisphosphonates (Alendronate 70 mg/weekly), Tab Calcimax K2 BD, Vitamin D 60k weekly, Vitamin E 400 mg OD, Vitamin C 500 mg OD, Tab Zscav BD.

Discussion

AVN has been frequently observed in SARS and may also be a potential long-term complication of COVID-19 infection. It should be kept in mind that the threat of AVN still remains in patients who have recovered from a COVID-19 infection, for which studies are still ongoing. Some guidelines suggest the use of corticosteroids in various COVID-19 conditions. Although corticosteroids are not recommended routinely according to the WHO, they are indicated in some cases, such as severe involvement of the lung parenchyma and patients with elevated inflammatory markers. The Surviving Sepsis Campaign suggests the use of systemic corticosteroids in ventilator patients who have acute respiratory distress syndrome. On the other hand, dexamethasone is the first drug to date that has been found to be very helpful in saving the lives of patients with COVID-19. According to the recovery clinical trial, which was one of the largest studies on the treatment of COVID-19, this drug reduced the risk of death in hospitalized patients with severe COVID-19 who are on a ventilator or receiving oxygen by 20%. In addition to steroids, another issue is the effects of the virus itself on the human organism [6, 7].

AVN can also occur as a result of microvascular thrombosis. The development of thrombi could be the result of endothelial cell damage. AVN can occur distal to the site of arterial obstruction [8]. Veyre *et al.* [9] wrote a case report presenting a 24-year-old man with mild COVID-19 who had femoral arterial thrombosis. The patient was diagnosed with thrombosis of the common femoral artery with extension in the first third of the profunda and superficial femoral arteries, accompanied by thrombosis of the tibialis posterior and popliteal arteries. Fortunately, the patient recovered with anticoagulant and antiplatelet therapy as well as thrombectomy. SARS-CoV-2 is known to enter host cells through the angiotensin-converting enzyme 2 protein, which

is expressed by both endothelial cells and the lung, and leads to vascular lesions through coagulopathy and an inflammatory syndrome [10].



Fig 1: Intramedullary infarcts in the distal femur and proximal tibia and bilateral hip AVN

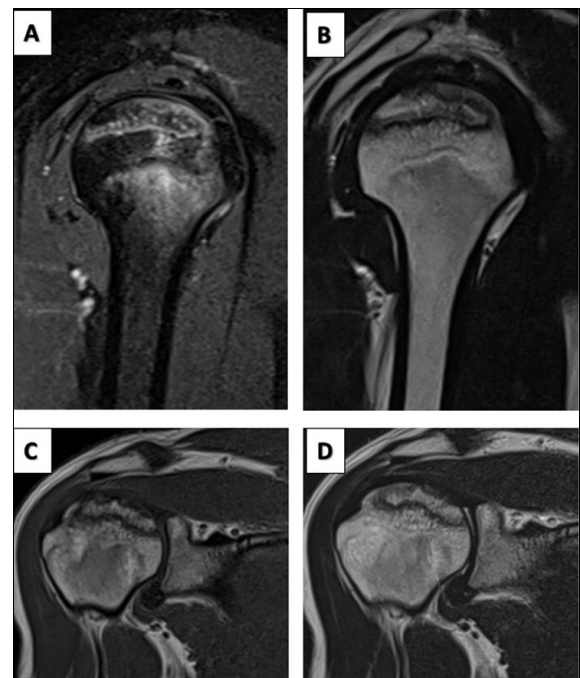


Fig 2: MRI of shoulder which revealed involvement of the humeral heads bilaterally

In this case, since there was no significant past medical history except for COVID-19 infection and all the

laboratory tests were normal or near normal, it was assumed that there must be a correlation between past COVID-19 infection to be cause of AVN affecting multiple sites as it is known that COVID-19 causes endothelial damage and microthrombi.

Conclusion

According to the findings of our case report, the development of AVN with microthrombi caused by an inflammatory process is closely associated with the infection of COVID 19, when all laboratory tests, including special examinations, and medical history are taken into account. Because it can result in long-term morbidity, AVN of bone can be considered one of the most damaging effects after infection with COVID-19.

Competing interests

The authors declare that they have no competing interests.

Funding

Nil.

Authors' contributions

MC helped in giving substantial contributions to conception and design, data analysis and interpretation.

MN helped in Drafting the article or critically revising it for important intellectual content.

PKT helped in final approval of the version to be published;

AH helped in data collection.

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How to Cite This Article

Choudhary M, Tiwari P, Mohammad N, Hans A. A rare case report of multiple bone involvement with avascular necrosis due to micro thrombi in a known case of COVID-19 can it be post sequale? *International Journal of Radiology and Diagnostic Imaging* 2023; 6(4): 01-03.

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