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# Fear of avascular necrosis in COVID survivors is real: A rare case series

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## Abstract

COVID-19' can affect different body systems. At present, osteo necrosis of femoral head as a sequalae of 'COVID-19' is rarely documented. By large-scale use of life-saving corticosteroids in COVID-19 cases, we anticipate that there will be a resurgence of AVN cases. We report a series of two cases in which patients developed AVN of the femoral head after being treated for COVID-19 infection. The mean dose of corticosteroid used in these cases was 600 mg (400–1250mg), which is less than the mean cumulative dose of around 2000 mg steroid, documented in the literature as causative for AVN. Patients were symptomatic and developed early AVN of bilateral hip at a mean of 42 days after COVID-19 diagnosis as compared with the literature which shows that it generally takes 6 months to 1 year to develop AVN post steroid exposure. Both the patient had significant dysfunction of coagulation with altered parameters. Thorough ophthalmic examination was done to both. literature has showed micro thrombi in eye, heart, liver, kidney, etc. Is corticosteroid being just a confounding factor??

**Keywords:** Fear, avascular necrosis, COVID survivors

## Introduction
### Background

Osteonecrosis of femoral head is most commonly seen in middle age causes are not known one of the cause like Steroid abuse with cumulative dosage of 2g and other cause like viral infections such as HIV, CMV, hepatitis, rubella, rubeola, varicella are also documented to cause osteonecrosis Currently is it due to Covid 19 infection or steroids?

### Hypercoagulability state in Covid 19

Cytokine storm pro-inflammatory cytokines like interleukin 6 (IL-6), IL-17A, and tumor necrosis factor α severe infection with COVID-19. Hypercoagulability is a usual finding in inflammation. Pro-inflammatory cytokines have a role in the platelet aggregation and intravascular clot formation and are also involved in the down regulation of physiological anticoagulant pathways in the body but no studies as shown Covid 19 as a primary cause

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**Case scenario: 1**

38 year old male who got infected with Covid 19 who was treated in the ICU foe two weeks patient blood parameters were deranged with altered coagulation profile patient treated with steroid with cumulative dose of 1200mg steroids for two weeks, after 65 days patient developed a pain in he both the hips which is a sudden in onset which dragging pain with disturbed sleep difficult in doing his regular activities, significantly walking distance has been reduced. X-ray and MRI has taken it showed a Ficat-Arlet stage II.
Since patient under stage 2 A patient posted for bilateral decompression post operatively patient relieved with pain post operatively at 6 months patient doesn't have a pain and doing well.

**Case scenario: 2**

A 26-year-old male patient was diagnosed with COVID-19 on 15 march 2020, for which patient received an intravenous methylprednisolone (600mg). Sixty days post COVID-19 detection, the patient developed pain in the bilateral groin. The patient had no history of hip pain in the past. Radiographs and MRI were done 50days post COVID-19 detection that showed bilateral hip AVN (Ficat-Arlet stage II).
Outcome and follow-up the mean dose of prednisolone equivalent steroid taken by the patient in our series was 900mg. The time duration for the development of AVN post COVID-19 diagnosis in our report of average of 62.5 days, all the three patients were started on oral alendronate 70mg weekly dosages along with intravenous zoledronic acid 5mg annually. At last mean follow up of 3 months, second patient with stage 2 doesn't required surgery and were comfortable. Mean Visual Analogue Score for pain reduced from 8 to 2 at the mean follow-up of 90 days. But case scenario 1 with stage 2 A again developed a pain repeat MRI shows progression of disease so decided to do a TOTAL hip arthroplasty.

**Discussion**

COVID-19, which is produced by SARS-CoV-2, is impacting a large number of people around the world. The virus is responsible for the deaths of a large number of people. Although many patients are healing from COVID19, it is crucial to remember that sequelae, including non-pulmonary consequences, may occur after recovery. Avascular necrosis (AVN) is one of these problems, which if left untreated can result in severe consequences and bone collapse. SARS has a lot of AVN, and COVID-19 infection may have a lot of it as well. It's important to remember that individuals who have recovered from COVID-19 infection, such as SARS, are still at risk of contracting AVN.
For certain COVID-19 situations, several guidelines recommend corticosteroids. Although corticosteroids are not recommended for routine use, they are indicated in some situations, such as COPD or asthma exacerbation, or septic shock, according to the WHO. 2 The Surviving Sepsis Campaign recommends (in the form of a weak recommendation) the use of systemic corticosteroids in patients with Acute Respiratory Distress Syndrome who are on a ventilator. Dexamethasone, on the other hand, is the first medicine to be found to be effective in preserving the lives of COVID19 patients. The RECOVERY clinical trial, one of the largest studies on COVID-19 treatments, found that this medication reduced the risk of death in hospitalised patients with severe COVID-19 who are on a ventilator or receive oxygen by 20%. 3 Aside from steroids, the virus's effects on the human body are also a concern.
Endothelial activation and changes in endothelial cells have been reported in severe COVID-19 infection who had a massive elevation of von Willebrand factor, which is thought to be caused by endothelial changes have reported multiorgan vascular injury in endothelial cells

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and endotheliitis of COVID-19 patients in post mortem studies found severe endothelial cell damage, widespread thrombosis, and microangiopathy in the lungs of COVID Another element leading to endothelial cell damage and subsequent thrombosis is the inflammatory effects of cytokines generated by SARS-CoV-2 in COVID-19.

The goal of AVN treatment is to relieve discomfort, slow disease development, prevent collapse and restore joint function. There are a variety of therapeutic options for AVN, ranging from conservative to medicinal to surgical, but no defined approach exists. Various medicinal interventions, such as iloprost, nifedipine, and hyperbaric oxygen therapy, have failed to provide significant advantages in the past. As a result, arthroplasty remains the therapy of choice. Although it produces positive results, when done at a young age, it will require at least one correction in the future. Agarwala *et al*. were the first to report the successful use of bisphosphonates for the treatment of AVN in adults. The researchers discovered that bisphosphonates not only improve clinical outcomes but also slow disease progression and reduce the need for surgery. Following that, other authors published papers on the role of bisphosphonates in the management of AVN, and it is currently regarded one of the conventional therapy options for AVN.

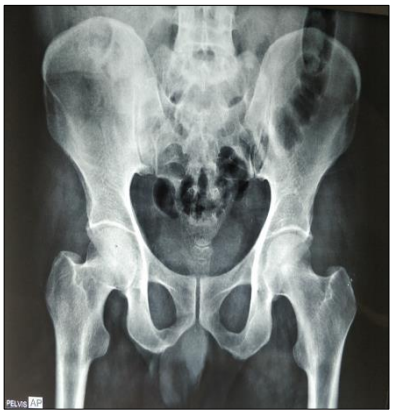

**Fig 1:** AVN1

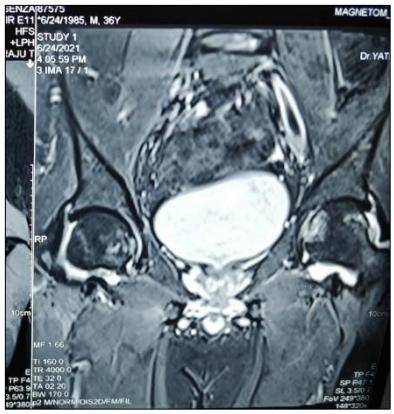


**Fig 2:** AVN 2

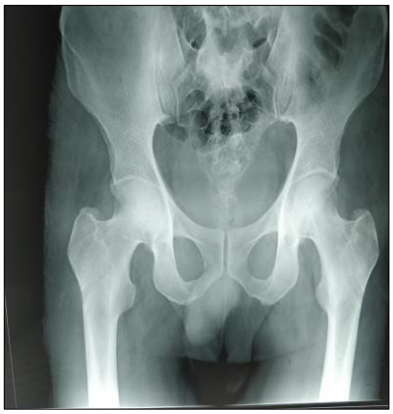

**Fig 3:** AVN3

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