



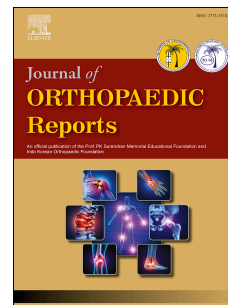
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# **A retrospective study on covid 19 infection and avascular necrosis of hip**

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## A case series on covid 19 infection and avascular necrosis of hip

### Abstract

#### **Background**

Musculoskeletal involvement was the least addressed area of post covid 19 infection sequela in literature even though they significantly reflect in mobility of survivors and ends up in morbidity. Emphasis on this grey area may enlighten further researches on the same. The study aims to identify the relationship between Covid 19 infection and avascular necrosis of femoral head, by retrospectively assessing the COVID 19 history of patients who attended a tertiary center.

#### **Materials and methods**

Study Period: 26/7/2021 – 26/7/2022). The data of all the patients diagnosed with avascular necrosis of hip during from 26/7/21 to 26/7/22 were retrospectively assessed to identify the history of COVID 19.

#### **Results**

A total of 17 patients were available for the study, the mean age of the patients were 37 years (range 23-60). Out of the 17 patients 7 were female and 10 were male. All the patients were presented to the OPD with hip pain. On assessing the history of COVID 19 it was found that out of the total 17 patients, 14 had history of COVID 19 infection (82.4%). On detailed history assessment, it was also found that all the 14 post Covid patients had their symptoms onset after COVID. The retrospective analysis of the AVN patients over the study period of one year indicates that the 82.4% of the patients had history of COVID prior to the onset of AVN symptoms, with average duration of onset of symptoms post COVID being 66 days.

#### **Conclusion**

Early diagnosis of post Covid 19 infection AVN hip can direct the management spectrum to its lower extremities and need of a case control study to confirm the causative effect Covid19 infection on avascular necrosis of hip were suggested.

#### **Key words**

Avascular necrosis, Femoral head, covid 19 infection

### **Introduction**

World Health Organization declared pandemic Covid 19 infection<sup>5</sup> and the survival tale of human over it were well documented in history, at the same time sequelae are increasingly reported in survivors which is known as post-COVID-19

syndrome. Clinical spectrum includes malaise, fatigue, dyspnoea, neuropsychiatric symptoms and cardiovascular symptoms are the major manifestations. Even though its multi organ involvement recognized, the underlying pathological and physiological mechanisms were not clearly understood for the time being. Thrombophilic changes of COVID-19 infection in systems other than respiratory system such as multiorgan failure, cardiovascular events, cerebrovascular accidents, acute renal injury, hepatic dysfunction, and venous thrombosis were described in literature in detail.<sup>4</sup> Early and accurate diagnosis may reflect in prognosis since prognosis is dependent on the stage and location of osteonecrosis of femoral head<sup>1</sup>. Musculoskeletal system involvement were the least addressed one since it was not life threatening in initial scenario, but in post covid sequelae it requires considerable attention in view of mobility and morbidity of survivors.

## **Materials and methods**

All the patients diagnosed with avascular necrosis of hip during from 26/7/21 to 26/7/22 were retrospectively assessed to identify the history of COVID 19. The diagnostic method for avascular necrosis of hip was magnetic resonance imaging and was staged using FICAT and ARLET staging. The data was collected from the hospital medical records department (Table 3). Variables were compiled in excel and were analyzed using excel data tools. All radiologically diagnosed patients with avascular necrosis of hip during the study period were included in study. Patients with post traumatic AVN hip, AVN in dysplastic hip, previously diagnosed and treatment undergoing AVN hip, patients on chemotherapy, patients with chronic illness and on steroid treatment, patients without covid 19 PCR evaluation and patients received steroid therapy as a part of Covid 19 management or its sequelae were excluded from the study. A total of 17 patients were available out of 29 patients for the study, after excluding those patients who were satisfying the exclusion criteria. The mean age of the patients were 37 years (range 23-60). Out of the 17 patients 7 were female and 10 were male. All the patients were presented to the OPD with hip pain. The distribution of avascular necrosis of hip of the patients and their Ficat and Arlet grading (table 1). The average duration of onset of symptoms post COVID is 66 days, Range 43-100 (Table 2)

## **Discussion**

Most of the patients with covid 19 infection are asymptomatic while some had mild to severe symptoms and its consequence on multiple organ systems that can compromise quality of life<sup>6</sup>. Osteonecrosis/ avascular necrosis (AVN) of the hip is the vascular disruption mediated cell death of the femoral head, systemic inflammation mediated by Cytokines which includes CXCL10, IL-17, and TNF-alpha are results in reduction of proliferation and differentiation of osteoblasts<sup>3</sup>. Causes of AVN of the femoral head includes direct trauma, and some times the causative factors were unknown and there may be associated risk factors that can predispose to the disease<sup>7</sup>. Corticosteroid use is considered to be one of the most common cause for the development of AVN<sup>8,9</sup> and

have been widely used in the treatment of severe acute respiratory syndrome (SARS). This study excluded all patients received steroid treatment either as a part of covid 19 infection treatment or for chronic systemic illness. AVN of femoral head is asymptomatic in the beginning, there is segmental collapse, pain and hip become stiffer, which reflected in the gait of the patient when they starts to limp while all patients in this study presented with hip pain only. MRI hip is the investigation of choice in patients with high index of clinical suspicion because of its ability in multiplanar determination of the volume and location of infarcted segments of bone. MRI is also useful in patients with risk factors for development of osteonecrosis, such as corticosteroid therapy, proximal femoral trauma includes femoral neck fracture, femoral head dislocation, slipped capital femoral epiphysis and congenital hip dislocation<sup>2</sup>. Among the 21 diseased hips 38 percent was 2A, 43 percent was 3 and 19 percent was 2B according to Ficat and Arlet grading based on MRI findings. Osteonecrosis has wide association with other disease conditions and many theories have been put forward for the mechanism behind it, but none have been proven. In diseases such as systemic lupus erythematosus, bilateral involvement in 50 to 80 per cent and here it is 23.5 percent. AVN of the hip is becoming an more important concern in the general population after SARS-CoV infection than in non-Covid populations. The diagnosis of avascular necrosis is seen with the onset of hip pain in the patient, which occurs over an average period 66 days in this study population. Early diagnosis and treatment of femoral head osteonecrosis will prevent the progression of disease into to subchondral collapse and final disabling arthropathy. Surgical procedure choices like core decompression, rotational osteotomy, or bone graft are depend on the stage of disease. The retrospective analysis of the AVN patients over the study period of one year indicates that the 82.4% of the patients had history of COVID prior to the onset of AVN symptoms, with average duration of onset of symptoms post COVID being 66 days.

### **Conclusion**

Early diagnosis of post Covid 19 infection AVN hip can direct the management spectrum to its lower extremities. The study recommends for the need of a case control study to confirm the causative effect of COVID 19 on avascular necrosis of hip.

### **DISCLOSURE STATEMENTS**

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Conflict of Interest: None

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Institutional Ethical Committee: Not applicable

Authors contribution: All authors are equally contributed in conceptualization, data curation formal analysis ,methodology; Project administration, Resources, software supervision and Writing of original draft;

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No	Side of AVN	Grading (Left)	Grading (Right)
1	B/L	2A	2A
2	L	2A	
3	B/L	3	2A
4	R		2B
5	L	3	
6	B/L	2A	3
7	B/L	2B	2A
8	L	3	
9	R		2B
10	R		3
11	L	2A	
12	R		3
13	L	2A	
14	R		3
15	R		2B
16	L	3	
17	R		3

Table 1-The distribution of avascular necrosis of hip of the patients and their Ficat and Arlet grading(table1)

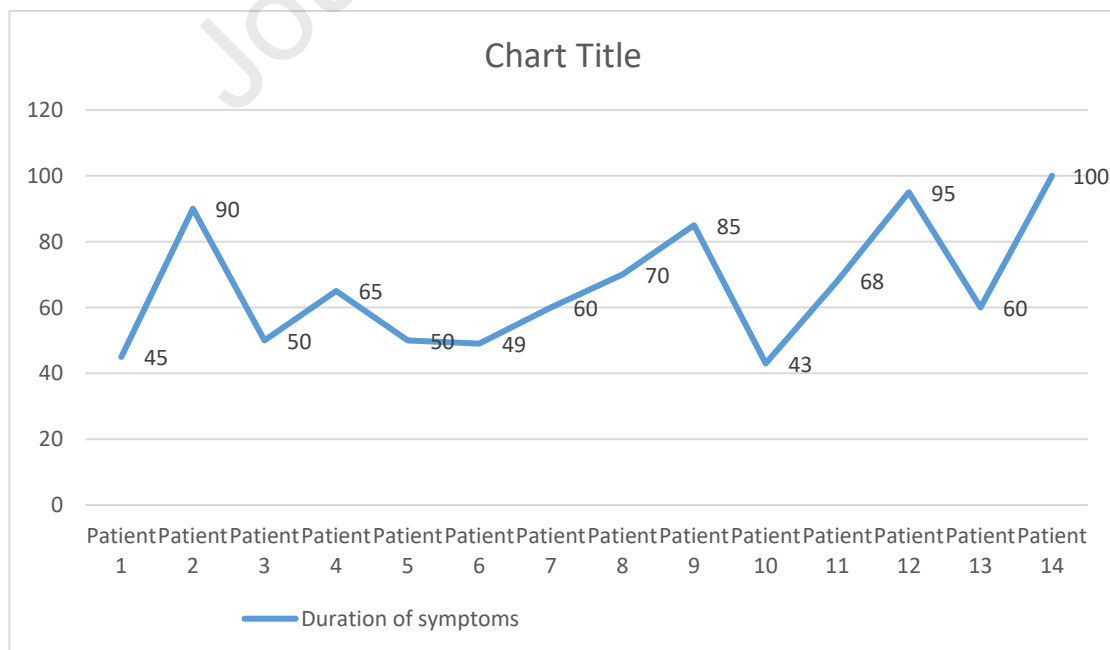


Table 2-Duration of symptoms post COVID are depicted in the line diagram