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Case Series

A case series on Covid-19 infection and avascular necrosis of hip

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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 research 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 centre.

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, 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 82.4% of the patients had a history of Covid prior to the onset of AVN symptoms, with the average duration of onset of post Covid symptoms 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.

1. Introduction

World Health Organization declared pandemic Covid-19 infection 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 was 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. Early and accurate diagnosis may reflect in prognosis since prognosis is dependent on the stage an66d location of osteonecrosis of femoral head. Musculoskelet al 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.

2. 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 treatment 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 is 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. Among the 21 diseased hips 38% was 2A, 43% was 3 and 19% 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 50–80% and here it is 23.5%. 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 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 82.4% of the patients had history of COVID prior to the onset of AVN symptoms, with average duration of onset of post Covid symptoms being 66 days.

4. 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.

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Informed consent (patient/guardian)

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Institutional ethical committee

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Authors contribution

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

Table 1

| 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 2

Post COVID duration of symptoms are depicted in the line diagram.
Table 3

| No | Age | Sex | Side of AVN | Ficat & Arlet grading | Presenting complaint | Covid-19 infection status | Symptom Onset | Comorbidities and Habits | Past medical history | Hospital admission history | ICU admission history | Steroid therapy history |
|----|-----|-----|------------|----------------------|----------------------|--------------------------|---------------|--------------------------|---------------------|--------------------------|------------------------|------------------------|
| 1  | 23  | F   | B/L        | 2A 2A                | B/L HIP PAIN         | Post Covid              | 7 DAYS        | NIL                      | NIL                 | 3 DAYS                  | NILL                   | NILL                   |
| 2  | 60  | M   | L          | 2A                  | LEFT THIGH PAIN      | Post Covid              | 45 DAYS       | OLD WRIST TB             | ATT 9 MONTHS BACK  | 3 DAYS                  | NILL                   | NILL                   |
| 3  | 34  | M   | B/L        | 2A                  | B/L HIP PAIN         | Post Covid              | 90 DAYS       | DLP                      | ATORVASTATIN       | 4 DAYS                  | NILL                   | NILL                   |
| 4  | 27  | F   | R          | 2B                  | RIGHT HIP PAIN       | Non Covid               | 50 DAYS       | NIL                      | NILL                | NILL                    | NILL                   | NILL                   |
| 5  | 68  | M   | L          | 3                   | LEFT HIP PAIN        | Post Covid              | 65 DAYS       | T2DM                     | OHA                 | 5 DAYS                  | NILL                   | NILL                   |
| 6  | 27  | F   | B/L        | 2A 3                | B/L HIP PAIN         | Non Covid               | Gradual       | NIL                      | NILL                | 4 DAYS                  | NILL                   | NILL                   |
| 7  | 33  | M   | B/L        | 2B 2A               | B/L HIP PAIN         | Post Covid              | 50 DAYS       | NIL                      | NILL                | 5 DAYS                  | NILL                   | NILL                   |
| 8  | 28  | M   | L          | 3                   | LEFT HIP PAIN        | Post Covid              | 49 DAYS       | NIL                      | NILL                | 4 DAYS                  | ANTHYPERTENSIVE, OHA  | NILL                   |
| 9  | 33  | F   | R          | 2B                  | RIGHT HIP PAIN       | Non Covid               | 14 DAYS       | NIL                      | NILL                | 4 DAYS                  | ANTHYPERTENSIVE, OHA  | NILL                   |
| 10 | 55  | F   | R          | 3                   | RIGHT HIP PAIN       | Post Covid              | 60 DAYS       | HTN, T2DM                | ANTHYPERTENSIVE, OHA| 4 DAYS                  | NILL                   | NILL                   |
| 11 | 28  | M   | L          | 2A                  | LEFT HIP PAIN        | Post Covid              | 70 DAYS       | SMOKER                   | NILL                | 5 DAYS                  | NILL                   | NILL                   |
| 12 | 40  | F   | R          | 3                   | RIGHT HIP PAIN       | Post Covid              | 85 DAYS       | T2DM, HTN                | OHA, ANTHYPERTENSIVE| 3 DAYS                  | NILL                   | NILL                   |
| 13 | 35  | M   | L          | 2A                  | LEFT HIP PAIN        | Post Covid              | 43 DAYS       | NIL                      | NILL                | 4 DAYS                  | NILL                   | NILL                   |
| 14 | 39  | F   | R          | 3                   | RIGHT HIP PAIN       | Post Covid              | 68 DAYS       | T2DM                     | OHA                 | 3 DAYS                  | NILL                   | NILL                   |
| 15 | 30  | M   | R          | 2B                  | RIGHT HIP PAIN       | Post Covid              | 95 DAYS       | SMOKER                   | NILL                | 4 DAYS                  | NILL                   | NILL                   |
| 16 | 26  | M   | L          | 3                   | LEFT HIP PAIN        | Post Covid              | 60 DAYS       | NIL                      | NILL                | 3 DAYS                  | NILL                   | NILL                   |
| 17 | 51  | M   | R          | 3                   | RIGHT HIP PAIN       | Post COVID             | 100 DAYS      | SMOKER, T2DM, DLP, HTN   | STATIN, OHA, ANTHYPERTENSIVE | 5 DAYS                  | NILL                   | NILL                   |

Declaration of competing interest

None.

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