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CASE REPORT

Osteonecrosis of hip in COVID-19 survivors; A case series study.

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ABSTRACT… Osteonecrosis or avascular necrosis (AVN) of the hip, is a condition where bone degenerates over time due to a disruption in blood supply. After Covid-19 pandemic, lots of complication secondary to covid-19 were reported, one of them is hip AVN, the Covid-19 induced hip AVN resulted as complication of Covid-19 and not a complication of steroids used in these patients. It is a case series consist of 4 cases that were Covid-19 survivors and presented with hip pain and diagnosed as BL hip AVN with history of steroid used in suboptimal doses that has not been reported to cause hip AVN. After confirmation of diagnosis as covid induced hip AVN and rule out other possible causes of hip pain, we did core decompression in 3 patients bilaterally and in 1 patient unilaterally and unilateral Total hip replacement in 1 patient as treatment modality. In covid-19 survivor with hip pain, Covid-19 induced hip AVN must be keep in mind as differential diagnosis.

Key words: COVID-19, Core Decompression, Hip AVN.

INTRODUCTION

The coronavirus disease 2019 (COVID-19) and its consequences specifically musculoskeletal are intriguing subject that remains a focal point of ongoing research, captivating the attention of scholars and scientists alike.[1] Over two years have passed since the global population was first impacted by the COVID-19 pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).[2,3] After emerging from COVID-19 illness, it resounds with alarming signals about its perilous state. Several studies have shown that patients who contracted moderate and severe SARS infections have indicated a substantial musculoskeletal burden of this disease, including skeletal muscle, neurological, bone, and joint disorders.[2,4,5]

Literature shows COVID-19 chiefly targets the lungs and heart, but alveolar damage can let the virus infiltrate other body parts.[6] COVID-19 is referred to as a "vascular disease" because it can cause damage to the endothelium and abnormal blood clotting.[3,7] These vascular abnormalities can lead to tissue damage, including osteonecrosis.

Osteonecrosis or avascular necrosis (AVN) of the hip, is a condition where bone degenerates over time due to a disruption in blood supply.[8] Its pathogenesis is multifactorial.[9] Risk factors include bone fractures, joint dislocations, alcoholism, and high-dose steroid use. Corticosteroids, commonly used for COVID-19 cases, reducing the inflammatory process, can contribute to nontraumatic avascular necrosis (AVN) or osteonecrosis.[3,6]

New research unveils a surprising link between COVID-19 and the onset of Osteonecrosis across various joints.[6]

There is no definitive conclusion in the literature regarding the relationship between COVID-19, AVN, and corticosteroid use. However, patients receiving corticosteroid treatment for COVID-19 may face a higher risk of AVN, potentially due to a combination of COVID-19 infection and corticosteroid use, or the use of high-dose steroids alone.[6]

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This case series aims to shed light on the enduring impact of COVID-19 by uncovering osteonecrosis as a possible consequence of possible complications in covid 19 survivors with a history of corticosteroid use. It emphasizes that early diagnosis is a major factor in preventing osteonecrosis from achieving critical states requiring replacement surgery. Literature reveals early diagnosis saves patients from replacement surgery. In the early stages (I or II) of AVN hip, as per Ficat-Arlet's classification, 92-97% of patients thrive without the need for major surgery. (14,15)

Here we report 4 cases who presented to the Orthopedic Outpatient Department (OPD) Ghurki Trust Teaching Hospital Lahore (GTTH) with bilateral hip pain. This observational study started in October 2022 and all patients followed up to 12 months postoperative treatment of AVN. In this study, we will discuss our successful strategy for managing both COVID-19 and corticosteroid-induced AVN, as well as explore the fascinating connection between AVN and COVID-19 through existing research.

In all of the following mentioned cases, all other possible risk factors of hip AVN have been excluded like history of trauma, sickle cell disease, serum calcium, metabolic disorders, marrow replacing disorders, and hypercoagulable disorders.

Case No. 1

History

A 60-year-old female married, known with type 2 diabetes mellitus had been complaining of dry cough and shortness of breath back in NOV, 2021. The patient was taken to a nearby hospital in Sahiwal, where a chest x-ray was done which showed infiltrates in lung parenchyma. She was admitted to DHQ Sahiwal for 10 days. Where baseline investigation and COVID PCR were sent and HRCT was advised. Later on, she was diagnosed with COVID pneumonia as the PCR was +ve and HRCT showed greater than 60% of the lung parenchyma involvement. She was started on prophylactic antibiotics and IV steroid dexamethasone 4mg IV BID for 10 days. Then she was discharged from the hospital after 10 days and was advised chest and incentive spirometry. She presented to us in OPD in April 2023 with the B/L groin pain which started in December 2022 and is progressive and aggravated with walking upstairs and downstairs. Pain was localized in bilateral hip and normal response to painkiller.

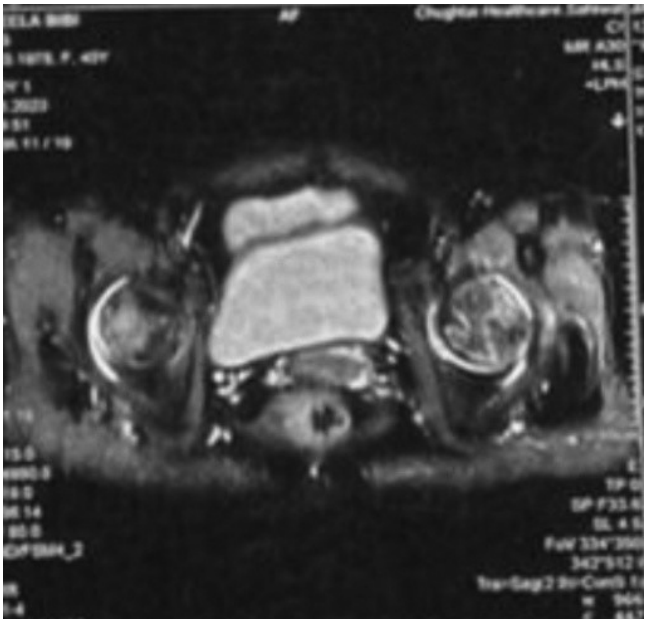
Examination

B/L hips ROM was painful, log roll +ive, and restricted with flexion of 60 and abduction up to 20.

Investigation

X-ray

MRI B/L hip joint shows AVN.

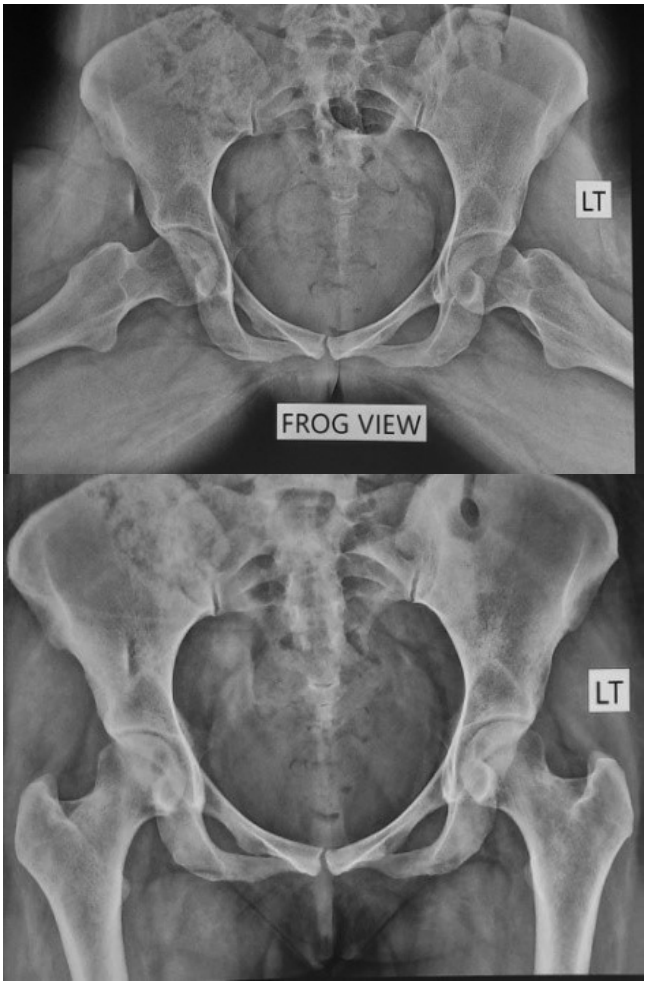


Treatment
We did Rt. hip joint replacement and Lt. Core decompression.

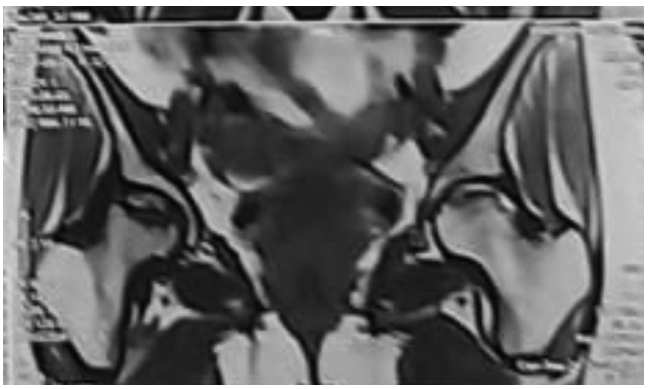
Case No. 2

History
A 32-year-old was diagnosed with B/L hips AVN in FEB 2023 by clinical signs and symptoms and radiological evidence. She was in the usual state of health back in July 2022 and according to her she has a cough and high-grade fever for which she visited a doctor her covid PCR was sent and she was started on empirical treatment for covid-19 along with symptomatic treatment and prophylactic antibiotic. she was started on injection dexamethasone 8mg iv BID in a tapering dose for 10days and later on she has been diagnosed with covid-19 again in OCT-2022 with positive PCR. After 10 days her signs and symptoms resolved. At the end of Feb 2023, mild pain started in her right thigh, she thought it would be a muscular sprain so she began physiotherapy for a week but it didn't get relieved, with time her pain intensity increased and burning pain started in her right groin area so she consulted a doctor he advised some x-rays and after examination, she was given treatment for 1month treatment for meralgia paraesthetica. But her condition was not much relieved.

- **Examination**
  B/L hip ROM mildly painful and log roll positive rom of both hips were almost normal range**.**
- **Investigation**
  X-rays



- MRI hip joints



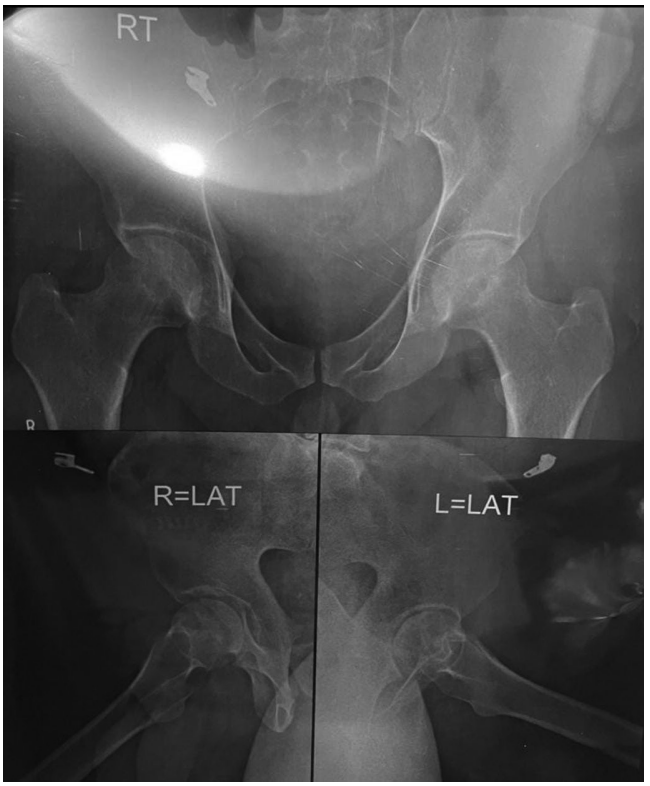
Treatment
B/L core decompression

Case No. 3

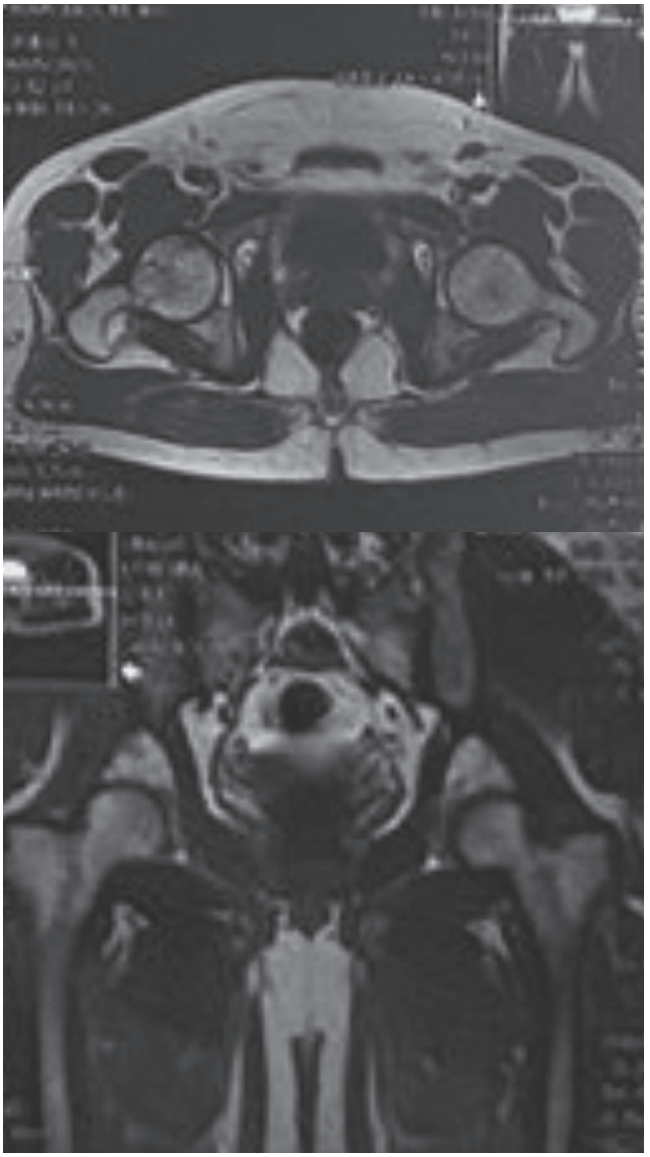
History
A 33years male office worker, with no known other comorbid, was diagnosed with COVID-19 disease in April 2021 and confirmed with covid PCR, he has been treated at home with symptomatic treatment, prophylactic antibiotic and IV steroids dexamethasone 8mg IV BID for 7 days. Almost 1 year after recovery from COVID-19, the patient started experiencing pain in the bilateral groin, lower back pain, and difficulty in walking. The pain was mild to moderate aggravated on walking, pain is progressive.

Examination
Leg roll was +ive in B/L hips. Range of movements (ROM) of B/L hips is normal but painful flexion is up to 90 and abduction is 40.

Investigation
X-rays



MRI hip joints After 4 months in Dec 2022 MRI for b/l hip was done which shows b/l hip AVN.



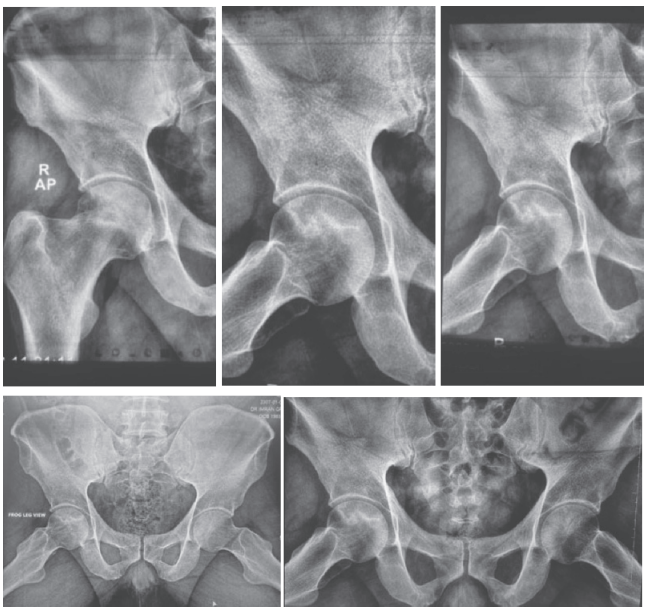
Treatment
B/L core decompression.

Case No. 4

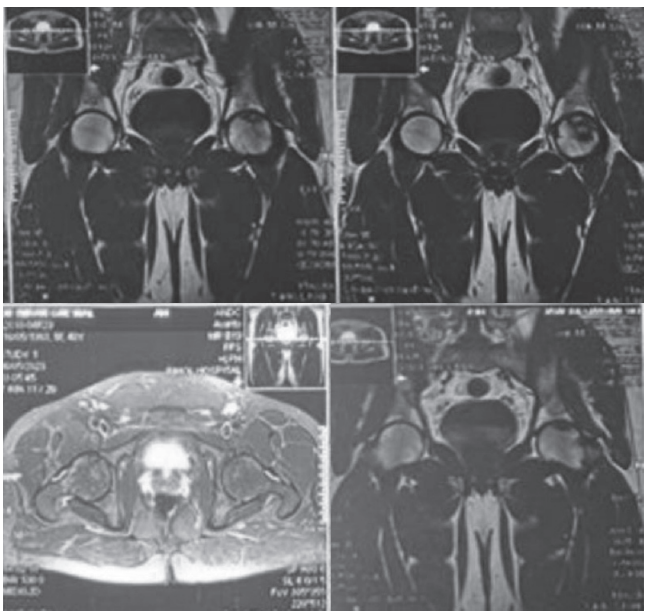
History
A 35y/M doctor by profession has been suffering from COVID-19 disease in March 2021 and was diagnosed with COVID-19 PCR. He was admitted to the hospital for 7 days and put on Inj Solumedrol (methyl prednisone) 80mg IV once daily for 10 days. He was put on empirical antibiotics (ceftriaxone) and symptomatic treatment. He developed B/L hip pain in May 2022 almost 1 year after the COVID-19 attack and after 1 week with hip pain, he visited OPD with a chief complaint of pain in bilateral hips which was mild to moderate and aggravated with walking and relieved with medication.

Examination
B/L hip ROM painful but normal.

Investigation
Xrays



- Mri hip joints



Treatment
B/L core decompression.

DISCUSSION

Osteonecrosis of the femur head, or AVN of the hip, is a condition that primarily affects younger people and has a wide range of etiological variables. There is no precise dosage or duration pattern of corticosteroid therapy required to elicit the effect of avascular necrosis in the hip region, despite the long-standing history of correlation between corticosteroids and risk for AVN. Patients with COVID-19 may be affected by several concurrent causes, including endothelial dysfunction, clot formation, and corticosteroid use, all of which increase the risk of osteonecrosis or bone infarction.[3,11]

In 2015, Mont et al. did a meta-analysis which found that the development of AVN required a cumulative dose of 2000 mg of prednisone or similar steroids. A cohort research conducted by Chan et al. revealed that the development of osteonecrosis was 9.9% common after more than 18 days of methylprednisolone (>2000 mg) intake.

Although the precise pathophysiology underlying steroid-induced avascular necrosis is not fully understood, several mechanisms have been proposed, including viral invasion linked to the release of inflammatory cytokines, hypercoagulable state, abnormal bone marrow stem cell, hypoxia, fat hypertrophy, and dysfunctional vascular endothelium. In our cases, the patients got not more than 10 days of steroid therapy implying that cumulative dosage is less than required for AVN.

Agarwala et al.'s dataset on post-COVID AVN necrosis, however, revealed that osteonecrosis can occur between 46 and 67 days, with a mean of 58 days. Similarly, the first symptom appeared in our patients during the first 15 to 30 days of steroid treatment. Due to the participation of the viral inflammatory response and hypoxia over the femoral head, the susceptibility to develop AVN is considerable even with a low cumulative dosage of corticosteroids. Patients experiencing hip joint discomfort should be monitored closely, particularly if they are using steroids for an extended period and are at high risk of developing osteonecrosis. The main objective of delaying AVN development is early identification, which can be achieved via MRI.

Early on, conservative treatment with bisphosphonates and core decompression surgery is recommended but for the end-stage illness, joint replacement surgery is the preferred surgical course of action. It is advantageous to use calcium and vitamin D supplements in addition to bisphosphonates for treatment.

CONCLUSION

In our study, we came to conclude that COVID-19 is a possible cause of hip osteonecrosis and also there is the synergistic effect of steroids and COVID-19 on osteonecrosis of the hip and other bone, which underlying bone pathology should be explored. We followed our patient for 12 months which are doing well after treatment either with core decompression or THR. As far as the molecular level of COVID and hip AVN concerns need to be explored through further research work.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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REFERENCES

1. Sinha P, Mallick N, Sahu R. **Avascular necrosis of the hip after the COVID-19 pandemic.** J Pharm Bioallied Sci. 2023 Jul 1; 15(5):661-4.

2. Disser NP, De Micheli AJ, Schonk MM, Konnaris MA, Piacentini AN, Edon DL, et al. **Musculoskeletal Consequences of COVID-19.** Journal of Bone and Joint Surgery - American Volume. Lippincott Williams and Wilkins; 2020. 102:1197-204.

3. Nejadhosseinian M, Haerian H, Tabatabaie Nejad M, Sadeghi K, Aghaghazvini L, Alikhani M, Loghman M, Faezi ST. **Who is the convict; COVID-19 or corticosteroid? Late onset avascular necrosis of hips after COVID-19. A case report with literature review.** International Journal of Rheumatic Diseases. 2023 Oct;26(10):2069-72.

4. Griffith J. **Musculoskeletal complications of severe acute respiratory syndrome.** Semin Musculoskelet Radiol. 2011 Nov 11; 15(05):554-60.

5. Leung TW, Wong KS, Hui AC, To KF, Lai ST, Ng WF, et al. **Myopathic changes associated with severe acute respiratory syndrome.** Arch Neurol. 2005 Jul 1; 62(7):1113.

6. Parikh S, Gomez O, Davis T, Lyon Z, Corces A. **Avascular Necrosis as a Sequela of COVID-19: A case series.** Cureus. 2023 Feb 23;

7. Siddiqi HK, Libby P, Ridker PM. **COVID-19 – A vascular disease.** Trends Cardiovasc Med. 2021 Jan; 31(1):1-5.

8. George G, Lane JM. **Osteonecrosis of the Femoral Head. Vol. 6, Journal of the American Academy of Orthopaedic Surgeons Global Research and Reviews.** Wolters Kluwer Health; 2022.

9. Feng Y, Yang SH, Xiao BJ, Xu WH, Ye SN, Xia T, et al. **Decreased in the number and function of circulation endothelial progenitor cells in patients with avascular necrosis of the femoral head.** Bone. 2010 Jan; 46(1):32-40.

10. Sulewski A, Sieroń D, Szyluk K, Dąbrowski M, Kubaszewski Ł, Lukoszek D, et al. **Avascular necrosis bone complication after active COVID-19 Infection: Preliminary results.** Medicina (B Aires). 2021 Nov 30; 57(12):1311.

11. Panin MA, Petrosyan AS, Hadjicharalambous KK, Boiko AV. **Avascular necrosis of the femoral head after COVID-19: A case series.** Traumatology and Orthopedics of Russia. 2022 Jan 15;28(1):110-7.

12. Banerjee I, Robinson J, Sathian B. **Corticosteroid induced avascular necrosis and COVID-19: The drug dilemma.** Nepal J Epidemiol. 2021 Sep 30; 11(3):1049-52.

13. Dhanasekararaja P, Soundarrajan D, Kumar KS, Pushpa BT, Rajkumar N, Rajasekaran S. **Aggressive presentation and rapid progression of osteonecrosis of the femoral head after COVID-19.** Indian J Orthop. 2022 Jul 1; 56(7):1259-67.

14. Annam P, Manda A, Myneni UK, Sahar AN, Prasad N, Sam KK, et al. **Corticosteroids induced avascular necrosis of hip, a "long COVID-19" complication: Case report.** Annals of Medicine and Surgery. 2022 Oct 1; 82.

15. Agarwala S, Banavali SD, Vijayvargiya M. **Bisphosphonate Combination Therapy in the Management of Postchemotherapy Avascular Necrosis of the Femoral Head in Adolescents and Young Adults: A Retrospective Study from India.** J Glob Oncol. 2018 Dec; (4):1-11.

AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Awais Nawaz Khan:** Literature review, Manuscript writing.
2	**Zubair Khalid:** Manuscript writing.
3	**Wajeeha Riaz:** Proof reading, paper designing.
4	**Bilal Zaib:** Literature review.
5	**Sabir Khan Khattak:** Proof reading, data collection.