

Original research article

## To Evaluate the Outcome of Neck of Femur Fracture Treated by Bipolar Hemiarthroplasty in COVID-19-positive patients :- A Retrospective Study

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### Abstract

**Background:** Orthopaedic trauma surgery focused mainly on femoral fragility fractures in the elderly, since the “lockdown” began on March 23, 2020 in our country. Proximal femur fractures carry a high mortality rate due to the age and complications. Thus, orthopaedic surgeons face the daily dilemma of performing life-saving surgery on patients who, have severe respiratory compromise, have a higher risk of peri-operative death. The optimal surgical treatment of displaced femoral neck fractures is still debated. Hemiarthroplasty<sup>4</sup> contributes to early ambulation and good functional recovery. Determining mortality and risk factors for adverse outcomes for patients with COVID-19 and a concurrent hip fracture is of great importance, as it can improve clinical pathways, perioperative management, and resource allocation.

**Methods:** This was a retrospective study of 10 patients  $\geq 60$  years of age with a neck of femur fracture and COVID-19 who underwent hip hemiarthroplasty. Clinical characteristics and early postoperative outcomes were reported.

**Results:** Seven out of the 10 COVID-positive hip fracture patients in our series were asymptomatic on admission with no clinical signs or symptoms of COVID-19 infection. One of the patients had cough and other 2 patients presented with hypoxia. 7 patients were given supplemental oxygen postoperatively which includes the patient presented with hypoxia. 7 patients required post op blood transfusion. None of the patients were put on mechanical ventilation. There was no case of surgical site infection. Average Harris hip score was 80 with good outcome. The average length of inpatient stay was 15 days.

**Conclusions:** Our study shows that neck of femur fracture patients who present with asymptomatic or mild COVID-19 who underwent hip hemiarthroplasty had a good functional outcome with few post op complications .

**Keywords:** hemiarthroplasty , neck of femur , covid 19

## Introduction

The novel coronavirus first emerged in China in December 2019 [1]. COVID-19 was regarded as a public health emergency of international concern in the world by mid-February 2020 [2]. The first case of COVID 19 in india was reported on 30<sup>th</sup> January 2020 (3). As the number of cases increased to around 500, the Government of India (GOI) announced the nationwide lockdown from midnight of 24 March 2020. It was continued in four phases until 31 May 2020 (67 days)(4). There was significant decrease in in out patients and emergency cases in orthopaedics department due to significant travel restrictions .Most of the old aged people are restricted to home during lock down .Neck of femur fractures are common in old age people with history of fall . Hip fracture patients with underlying comorbidities, such as hypertension, diabetes, chronic lung disease, and cardiovascular and cerebrovascular diseases, are particularly vulnerable to developing complications from COVID-19 infection, even death (5) Therefore, the appropriate treatment of femoral neck fractures is mandatory. For elderly patients with low functional demands, unipolar or bipolar hemi-arthroplasty is the preferred treatment for displaced intracapsular fractures instead of total hip replacement(6). There have been no studies specifically examining outcomes in patients with neck of femur fractures and COVID-19 infection who undergo surgical intervention in our country.

## METHODS

This research was approved by our internal Institutional Research Board. A retrospective cohort study was performed of 10 patients  $\geq 70$  years of age who had positive COVID-19 diagnostic testing and underwent primary hip hemiarthroplasty for neck of fracture at our institution during period of march 2020 to September 2021 . All patients at our institution who were hospitalized during the COVID-19 outbreak underwent COVID-19 diagnostic testing with a real-time reverse transcription polymerase chain reaction (RT-PCR) assay for the qualitative detection of nucleic acid from SARS-CoV-2 in nasopharyngeal swabs. Inclusion criteria :Patients > 70 years of age presenting to our causality with neck of femur fractures without any other associated fractures and covid rtPCR test positive. Exclusion criteria: open fractures, previous surgery on proximal femur, patients with arthritic changes in hip joint, head injury, chest injury ,pathological fractures. Patient demographics were collected, including age, gender, and medical comorbidities. Evidence of COVID-19 infection was recorded, including clinical signs and symptoms, as well as laboratory testing and chest radiograph findings. The administration of any COVID-19-specific medical treatments were noted. The injured limb was immobilised using skin traction till day of surgery. Patients underwent hip bipolar cemented hemiarthroplasty once fitness is obtained .Post operatively patient is shifted to ICU for observation till 1 day. Post operative investigations includes white blood cell (WBC) count, hemoglobin (Hgb), hematocrit (Hct), platelets, sodium, potassium, creatinine. Outcomes of interest were oxygen demand on postoperative days 1 through 3, length of stay (LOS), and death.

Inpatient complications included blood transfusion, venous thromboembolism (VTE), cardiac complication, respiratory complication, acute kidney injury (AKI), and surgical site

complication. Patients were followed up at an interval of 6 weeks, 3 months and 6 months. with pelvis x-ray with both hips antero posterior view. Functional assessment of patients was done with harris hip score. Radiological evaluation is done by looking for loosening of femoral component, femoral stem position, vertical subsidence.

## RESULTS

Our study had 10 patients with study number of ten hips. Of the patient 6 were female and 4 were males. All 10 patients had history fall at residence following sustained injury to hip . All ten patients were covid positive on admission and was referred from other hospitals.

Seven of the patients presented with no symptoms on admission .Only 1 patient presented with obvious signs of COVID-19 infection on presentation, with hypoxia and an oxygen saturation of 85% on room air. Another patient presented persistant cough and fever .

Pre operative xray showed pneumonia changes which HRCT chest was taken for 4 patients demonstrated COVID findings .Same patients was treated with antivirals and steroids .

All patients underwent cemented hip hemiarthroplasty under spinal anesthesia . Postoperatively, 7 out of the 10 patients required supplemental oxygen. 5 of these patients were successfully weaned off 2 L per minute (L/min) nasal cannula after postoperative day 1. Another 2 patient (Case 4) was weaned off nasal cannula after postoperative day 2. None of the patients were put on mechanical ventilation. Perioperative blood transfusion was done for 6 patients .There were no in-hospital cardiac complications or surgical site complications. All the patients were discharged within 10 days of post op period . Average hospital stay period was 15 days.

Follow was done during the period of 6 weeks , 3 months and 6 months. We had follow upto 6 months for 6 patients .Mean harris hip score at 6 months was 80 with good functional outcome. There was no case of loosening of femoral component, femoral stem position, vertical subsidence for the period of 6 moths during our follow up. One patient died during the follow up at 4 months due to cardiac arrest.

## DISCUSSION

In our retrospective study, we presented the clinical characteristics and early outcomes of 10 COVID-positive patients who underwent hip hemiarthroplasty surgery at our institution during the COVID-19 outbreak for neck of femur fracture patients. COVID-19 symptoms vary substantially among patients, ranging from no symptoms to respiratory failure(7).

Therefore, elderly patients who are bedridden with fracture neck of femur for a long time are more likely to suffer from serious complications, such as some diseases such as urinary tract infection, lung inflammation, and bed sore leading to a high disability rate and mortality rate.

Neck of femur fracture patients represent a high-risk population, as they are generally older with multiple medical comorbidities. Extensive literature has consistently demonstrated the benefits of early hip fracture surgery for elderly patients, which include reducing bed rest, promoting early mobilization, controlling pain, improving function, and reducing mortality(8,9).

COVID-positive patients were transported directly from their hospital room to a designated COVID-specific operating room without passing through the usual preoperative holding area. Only essential staff were permitted in the operating room, all of whom had appropriate personal protective equipment (PPE), including N95 masks, face shields, gowns, and gloves. Mi et al. published one of the first reports on the characteristics and early prognosis of patients

with a fracture and COVID-19 infection in China.<sup>7</sup> In their series of 10 patients, 6 had sustained hip fractures and only 3 underwent surgery. These 3 patients did not present with any severe symptoms on admission or have any clear evidence of COVID-19 infection on CT scans, and thus, proceeded with surgical intervention. All 3 patients were observed to have fever and cough postoperatively, and 2 of the patients had symptoms of dyspnea. One of the 3 patients died on postoperative day 11, while the other 2 patients remained in the hospital for further treatment<sup>(10)</sup>.

Another study by Catellani et al.<sup>(11)</sup> reported on a series of 16 COVID positive patients with proximal femoral fractures in northern Italy, of which 13 underwent surgical treatment.<sup>8</sup> All of the patients in this series reported symptoms of fever and dyspnea prior to admission, and had signs of oxygen desaturation on room air upon presentation to the emergency room. The majority of patients in this study demonstrated significant improvements in oxygen saturation and respiratory function following surgery. However, 4 out of the 13 patients (30.8%) died with the first week after surgery. High early mortality rates in COVID-positive hip fracture patients were also reported in another study in Italy by Maniscalco et al.<sup>(12)</sup> In this cohort, 32 COVID-positive hip patients were treated surgically, and there was a 43.8% (14/32) mortality rate within 21 days. These early reports from China and Italy suggested a higher rate of mortality in the early postoperative period for patients with a hip fracture and COVID-19 infection.

In our study all 10 patients were covid positive on admission. Seven of the patients presented with no symptoms on admission. Only 1 patient presented with obvious signs of COVID-19 infection on presentation, with hypoxia and an oxygen saturation of 85% on room air. Another patient presented persistent cough and fever. Postoperatively, 7 out of the 10 patients required supplemental oxygen. 5 of these patients were successfully weaned off 2 L per minute (L/min) nasal cannula after postoperative day 1. Another 2 patient (Case 4) was weaned off nasal cannula after postoperative day 2. None of the patients were put on mechanical ventilation. Perioperative blood transfusion was done for 6 patients. There were no in-hospital cardiac complications or surgical site complications. All the patients were discharged within 10 days of post op period. Average hospital stay period was 15 days. Mean Harris hip score at 6 months was 80 with good functional outcome.

Our study has several limitations. First, we had a small sample size of COVID-19-positive patients who underwent hip hemiarthroplasty for neck of femur fracture. Second, we limited our inclusion criteria to patients who underwent neck of femur. This excluded patients with other hip fractures and COVID-19 infection. Therefore, our findings should not be extrapolated to hip fracture patients with severe presentations of COVID-19 infection. Third, the short follow-up period may have resulted in an underestimation of the mortality rate. Longer term follow-up will be needed to assess morbidity and mortality beyond the early postoperative period.

## **CONCLUSION,**

Our study described the clinical characteristics and early outcomes after hip hemiarthroplasty surgery in patients who presented with asymptomatic or mild COVID-19 infection. Although the post operative oxygen need for patients was higher. There was no mortality during the follow period. Our findings suggest that Neck of femur fracture patients who present with asymptomatic or mild COVID-19 infection may have temporarily increased oxygen demands postoperatively, but they can safely undergo hemiarthroplasty after appropriate medical optimization.

## DECLARATIONS

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*Ethical approval:* IRB approval was obtained for the submitted work at our institution.

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