

# Surgical approach for management of Pertrochanteric fractures of proximal femur or hip in patients with COVID-19

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## Abstract

**Background:** Since the onset of the COVID-19 pandemic, adverse outcomes in patients with orthopaedic surgery have become a major concern for surgeons. In other words, the question remains whether surgery should be postponed until the patient is fully recovered or whether early surgery should be performed.

**Objectives:** The present study sought to answer the above questions by examining the consequences of pertrochanteric fractures of the proximal femur or hip surgery in COVID-19 patients and comparing the findings with non-COVID-19 patients.

**Methods:** The present study reports the experience of orthopaedic surgeons on patients with pertrochanteric fractures of the proximal femur or hip candidates for surgery admitted between May and July 2020, who were divided into two groups of patients with COVID-19 (n=12) and non-COVID-19 patients (n=24). The outcomes of the surgery were determined based on the duration of surgery, time interval between surgery to complete recovery, and duration of hospitalization in the intensive care unit (ICU).

**Results:** Comparing the postoperative outcomes across the two groups with and without COVID-19 showed no significant difference in mean time required for the patient to recover after surgery (p=0.160) or mean operation time (p=0.648). However, the length of ICU stay in those who were infected with SARS-CoV-2 was significantly longer than that observed in the non-COVID-19 group (p = 0.018) due to the need for more care and not because of postoperative complications.

**Conclusion:** Surgical approach on fractures in patients with COVID-19 can be performed with high confidence and safety, and therefore, such surgeries should not be delayed in these patients.

**Keywords:** COVID-19, Pertrochanteric fractures, Hip fractures.

## Introduction

In the present century, humankind has been confronted with a terrible viral pandemic called COVID-19 disease, which has had detrimental effects on societies in a short time. Few expected the virus to spread like wildfire to all parts of the world from its source, the Wuhan of China.<sup>1</sup> In sum, the rate of spread of the disease and its bitter consequences is much faster than the measures taken by humans to prevent or immunize the disease.<sup>2</sup> In this regard, the management of common diseases and injuries during the corona pandemic has become a major and important problem and challenge for physicians.<sup>3</sup> The issue becomes more interesting when, in the shadow of the spread of COVID-19 disease, even less attention is paid to other diseases.<sup>4</sup> In fact, resolving the issue of how to deal with any of the diseases and medical injuries

caused during the COVID-19 pandemic has become very controversial. For example, the choice between treating diseases through surgery or the need for medical and non-invasive management during this period remains an unanswered question.<sup>5</sup> This is especially highlighted for severe skeletal injuries leading to fractures that will be indicated for surgery.<sup>6</sup> In other words, there are still many questions about the safety and security of orthopaedic surgery during the COVID-19 epidemic. According to some recommendations, even invasive treatments during this period are not recommended because of the susceptibility of injured people to the infection.

However, some have taken the courage to perform aggressive fracture management procedures during the epidemic, and more interestingly, have had favourable

surgical outcomes.<sup>7</sup>

Therefore, we still do not know how to deal with such injuries requiring surgical interventions during this period and how to manage injured patients. This will be even more complicated, especially in COVID-19 patients, and it is unclear whether surgery for complex fractures in these patients may have far worse consequences.<sup>8</sup> In other words, is it necessary to delay these surgeries in patients with this disease, or is it expedient for them to have surgery as soon as possible?

### Objectives

The present study sought to answer the above questions by examining the consequences of intertrochanteric fracture surgery in these patients and comparing the findings with non-COVID-19 patients.

### Materials and Methods

The present study is a report on the experience of orthopaedic surgeons on patients with pre-trochanteric fractures of the proximal femur or hip candidate for surgery admitted between May and July 2020 in Taleghani Hospital (Iran-Tehran), who were divided into two groups of patients with COVID-19 (n=12) and non- COVID-19 patients (n=24). The diagnosis of COVID-19 was confirmed by a positive posterior oropharyngeal saliva SARS-Cov-2 RT-PCR test as well as high-resolution CT scanning, which was described by a radiologist.

Those patients with a history of surgery on femur or hip, fracture in other limbs, types II or III of inter-trochanteric fractures, or underlying systemic disorders were excluded from the study. Also, none of the patients had a history of ICU admission before surgery.

All background information such as demographic characteristics, date of hospitalization and surgery, and characteristics related to the preoperative vital signs were retrospectively collected from patients' records.

All patients were scheduled for surgery with the same spinal anaesthesia protocol. Also, all subjects underwent the Gamma Nail procedure. Surgery was performed on patients with COVID-19 in full protective clothing. All patients in the COVID-19 group were admitted to ICU postoperatively. The outcome of the surgery was determined based on three characteristics of the surgery duration, the time interval

between surgery to start the patients walking, and duration of hospitalization in the intensive care unit in two groups and compared with each other. The ultimate goal of this study was to answer whether proximal femoral, hip, and Pertrochanteric fractures surgery is safe in patients with COVID-19 or whether such surgeries should be postponed as much as possible.

The patients were followed up for two weeks after discharge through a visit to the clinic.

The results were presented as mean  $\pm$  standard deviation (SD) for quantitative variables and were summarized by absolute frequencies and percentages for categorical variables. The normality of data was analysed using the Kolmogorov-Smirnoff test.

Categorical variables were compared using the chi-square test or Fisher's exact test when more than 20% of cells with an expected count of less than five were observed. Quantitative variables were also compared with t-test, or Mann U test. The statistical software SPSS version 16.0 for windows (SPSS Inc., Chicago, IL) was used for the statistical analysis. P values of 0.05 or less were considered statistically significant.

### Results

A total of 12 COVID-19 patients and 24 non-COVID-19 patients who underwent surgery on Pertrochanteric fractures of the proximal femur or hip were included in our analysis. Regarding baseline variables (Table-1), we showed no difference in gender (p=0.157), average age (p=0.627), and vital signs on admission including systolic blood pressure (p=0.210), diastolic blood pressure (p=0.331), pulse rate (p=0.086), arterial oxygen saturation (p=0.445), and body temperature (p=0.157).

Comparing the postoperative outcome across the two groups with and without COVID-19 (Table-2) showed no significant difference in mean time required for the patient to recover after surgery (p=0.160) or mean operation time (p=0.648). However, the length of ICU stay in those who were infected with SARS-CoV-2 was significantly longer than that observed in the non-COVID-19 group (p=0.018). No other complications such as local infection or deep vein thrombosis were detected in both groups. In the follow-up time, all patients in both groups survived, and there was no difference in morbidity and mortality rate.

**Table-1.** Baseline characteristics of study population

Characteristics	COVID-19 group	Non- COVID-19 group	P value
Male gender	6 (50.0)	6 (25.0)	0.157
Mean age, year	79.75±6.45	78.50±7.56	0.627
Mean systolic BP	141.50±7.02	153.25±31.26	0.210
Mean diastolic BP	86.00±4.73	90.25±14.45	0.331
Oxygen saturation	92.75±4.12	93.75±3.42	0.445
Mean heart rate	91.67±10.40	85.58±9.38	0.086
Mean temperature	37.12±0.41	36.93±0.19	0.157

**Table-2.** Postoperative outcome in study population

Characteristics	COVID-19 group	Non- COVID-19 group	P value
Mean time for operation, min	72.50±15.45	75.00±15.32	0.648
Mean time for walking recovery, d	1.25±0.45	1.50±0.51	0.160
Mean time for ICU stay, d	0.75±0.45	0.33±0.48	0.018

## Discussion

Since the onset of the COVID-19 pandemic, occurring severe adverse surgical outcomes in patients with orthopaedic surgery has become a major concern for surgeons. In other words, is it necessary to postpone such surgeries until the patient is completely healed, or should the treatment approach be completely changed for these patients? Several studies have been conducted to answer such a question, some of which have focused on performing aggressive surgeries as before, and some of which have completely warned surgeons. This is especially important for very old people with complex fractures. According to our findings, the presence of COVID-19 had no significant effect on the consequences of fracture surgery. In other words, with respect to time of recovery or operation time, no difference was revealed between the two groups with and without COVID-19; patients suffering COVID-19 suffered longer duration of ICU stay probably because of concerns about the need for receiving more care, especially cardiopulmonary care, or cares related to increasing the likelihood of massive bleeding. Therefore, according to our observations, orthopaedic surgeries, even inter-trochanteric fracture surgery in patients with COVID-19, can be performed with high confidence and safety.

Reviewing the literature on the papers with a focus on fracture management among patients with COVID-19 can result in paradoxical results.<sup>9-12</sup> According to the statistics, two-third of fractures requiring invasive procedures were managed by surgery and others with medical approaches. Of course, it seems that the postoperative outcome is directly

associated with some baseline factors such as the fracture pattern and patient comorbidity. Also, regarding the need for intensive cares, almost all patients required oxygenation supports by using Venturi mask and even mechanical ventilation, but these preparations did not affect the overall postoperative outcome.<sup>13</sup> In fact, these same measures in the intensive care unit have effectively reduced the risk of mortality or postoperative complications.

## Conclusions

Our study showed that orthopaedic surgery in patients with COVID-19 is completely safe with no more complications and has good consequences if the hemodynamic status stabilizes; and therefore such surgeries should not be delayed in these patients compared with non-COVID patients.

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None.

## Authors' Contribution

All authors pass the four criteria for authorship contribution based on the International Committee of Medical Journal Editors (ICMJE) recommendations.

## Conflict of Interests

The authors declared no potential conflict of interests with respect to the research, authorship, and/or publication of this article.

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