**Management of the elderly patients with hip fracture during the COVID-19 Pandemic**

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**Abstract:**

The outbreak of COVID-19 has caused a great impact on China and the global world, and it is still continuing. Older patients are in relatively serious condition. Under the COVID-19 pandemic, elderly hip fracture patients need special attention. Both the effective prevention of SARS-CoV-2 infection and rational treatment of hip fracture are extremely important. We believe that standardized diagnosis and treatment workflow for elderly patients with hip fractures combined with COVID-19 can help in individual evaluation and would provide effective triage for the treatment and management of individual patients.

**Keywords:** COVID-19, hip fracture, surgery

The COVID-19 that has swept into at least 212 countries and regions with more than 225,000,000 confirmed cases and killed more than 4,600,000 people is now officially a pandemic.1,2 Many countries and regions have successively introduced epidemic prevention measures, including controlling the flow of people in entertainment venues, suspending commercial places such as bars, and restricting residents' travel. However, untimely consultation, shortage of medical resources and other factors have led to an increase in the undiagnosed rate, delayed diagnosis and treatment, and even increased mortality in the elderly hip fracture patients. Symptoms of COVID-19 such as fever, fatigue, muscle soreness, headache, and dyspnea increase the risk of falls in the elderly, and may correspondingly increase the risk of hip fractures in the elderly. When elderly hip fractures are combined with COVID-19, COVID-19 may delay the timing of hip fracture treatment. It will obviously increase the difficulty of treatment, and the risk of death. Hence, it is imperative to develop a reasonable and standardized diagnosis and treatment workflow to provide safe and effective protection for elderly hip fracture patients and medical staff.

Even during the pandemic, we still recommend that if the pain continues or worsen after a fall, the elderly need to visit a medical institution. For patients who need hospitalization, we need to query their trajectories in detail and verify their trajectories through big data analysis. All patients should be admitted to a single ward for medical isolation. Patients with suspected or confirmed SARS-CoV-2 infection should be transferred to the designated hospital for further treatment.

Hip fracture patients without COVID-19 could be treated according to the guidelines.3 Although, surgery is the most common and effective treatment for elderly hip fractures, patients with severe type of COVID-19 should not be operated until the infection is fully controlled or clinically cured. For patients with confirmed COVID-19, a preoperative multidisciplinary assessment should be carried out to ensure that COVID-19 condition would not worsen due to anesthesia and surgery. Patients cannot undergo surgery until passing the preoperative evaluation.

Strict protection is very important during surgery. The surgery should be performed in a COVID-19 specific negative pressure operating room. A disposable filter should be placed between the tracheal intubation and the breathing passage to reduce the pollution of the breathing circuit. The electrosurgical equipment should be avoided as much as possible during the operation. If necessary, the smokeless surgical electrosurgical equipment could be applied to prevent aerosols from infecting medical personnel. The intraoperative suction device should be separated from the anesthesia suction device. Surgical participants should strictly implement personal protection.

From February 3, 2020 (the end of the Chinese Spring Festival) to April 27, 2020, a total of 68 elderly hip fracture patients have been admitted in our hospital (Age: 65-98). Since the second week, the elderly hip fracture patients were permitted to accept surgery. Before surgery, negative results from nucleic acid testing and radiologic examination excluded SARS-CoV-2 infection in all patients. All patients received surgery. The average time before surgery decreased from 13±4.5 days to 5.5±2.1 days (Figure 1A). However, the average time before surgery has not yet reached the 48 hours recommended by the guidelines. The average length of stay also decreased from 21±5.1 days to 8.5±2.1days (Figure 1B). Fortunately, under the strict screening strategy and protective measures, none of the patients had been diagnosed with SARS-CoV-2 infection or suffered from hip fracture related complications.

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*Figure 1. The average time before surgery (A) and average length of stay (B) of elderly hip fracture patients from February 3, 2020 (the end of the Chinese Spring Festival) to April 27, 2020.*

Under the COVID-19 pandemic, elderly hip fracture patients need special attention. Both the effective prevention of SARS-CoV-2 infection and rational treatment of hip fracture are extremely important. We believe that standardized diagnosis and treatment workflow (Figure 2) for elderly patients with hip fractures combined with COVID-19 can help in individual evaluation and would provide effective triage for the treatment and management of individual patients.

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*Figure 2. The recommended diagnosis and treatment workflow for elderly hip fracture patients during the COVID-19 pandemic.*

**Declarations**

**Ethics approval and consent to participate**

The study was approved by the Committee on the Ethics of Animal Experiments of The First Affiliated Hospital of Soochow University (Suzhou, China).

**Consent for publication**

Not applicable.

**Availability of data and materials**

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

**Competing interests**

The authors declare no potential conflicts of interest.

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**Authors' contributions**

Jun Lin, Huilin Yang designed the research; Jun Lin analyzed the data; Jun Lin, Jinxi Wang, and Huilin Yang wrote the paper. All authors approve of the final version to be published.

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