


Conservatively Treated Femoral Intertrochanteric Fracture With Early Asymptomatic Novel Coronavirus Disease 2019 (COVID-19): A Case Report

Geriatric Orthopaedic Surgery
& Rehabilitation
Volume 11: 1-4
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DOI: 10.1177/2151459320969380
journals.sagepub.com/home/gos



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Abstract

Introduction: The ongoing outbreak of novel coronavirus disease 2019 (COVID-19) is a worldwide problem. Although diagnosing COVID-19 in fracture patients is important for selecting treatment, diagnosing early asymptomatic COVID-19 is difficult. We describe herein a rare case of femoral intertrochanteric fracture concomitant with early asymptomatic novel COVID-19. **Case presentation:** An 87-year-old Japanese woman was transferred to our emergency room with a right hip pain after she fell. She had no fever, fatigue, or respiratory symptoms on admission and within the 14 days before presenting to our hospital, and no specific shadow was detected in chest X-ray. However, chest computed tomography (CT) was performed considering COVID-19 pandemic, and showed ground-glass opacities with consolidation in the dorsal segment of the right lower lung field. Then, qualitative real-time reverse-transcriptase-polymerase-chain-reaction (RT-PCR) was carried out and turned out to be positive. She was diagnosed right femoral intertrochanteric fracture with concomitant COVID-19 infection. Conservative treatment was applied to the fracture due to infection. After admission, fever and oxygen demand occurred but she recovered from COVID-19. Throughout the treatment period, no cross-infection from the patient was identified in our hospital. **Conclusion:** This case highlights the importance of considering chest CT as an effective screening method for infection on hospital admission in COVID-19-affected areas, especially in trauma patients with early asymptomatic novel COVID-19.

Keywords

geriatric trauma, femoral intertrochanteric fracture, coronavirus infection disease 2019 (COVID-19), asymptomatic COVID-19, chest CT, real-time reverse-transcriptase-polymerase-chain-reaction (RT-PCR)

Submitted August 11, 2020. Revised October 7, 2020. Accepted October 08, 2020.

Introduction

Since December 2019, novel coronavirus disease 2019 (COVID-19) has spread worldwide. Japan was one of the first countries affected by COVID-19, and the situation remains concerning.

COVID-19 infection has caused nosocomial infections and medical collapse, indicating the necessity for careful precautions regarding this threatening disease. The most common signs of COVID-19 are fever, dry cough, fatigue, dyspnea and lymphopenia.¹ COVID-19 patients, including asymptomatic carriers, currently remain the main source of infection. Given

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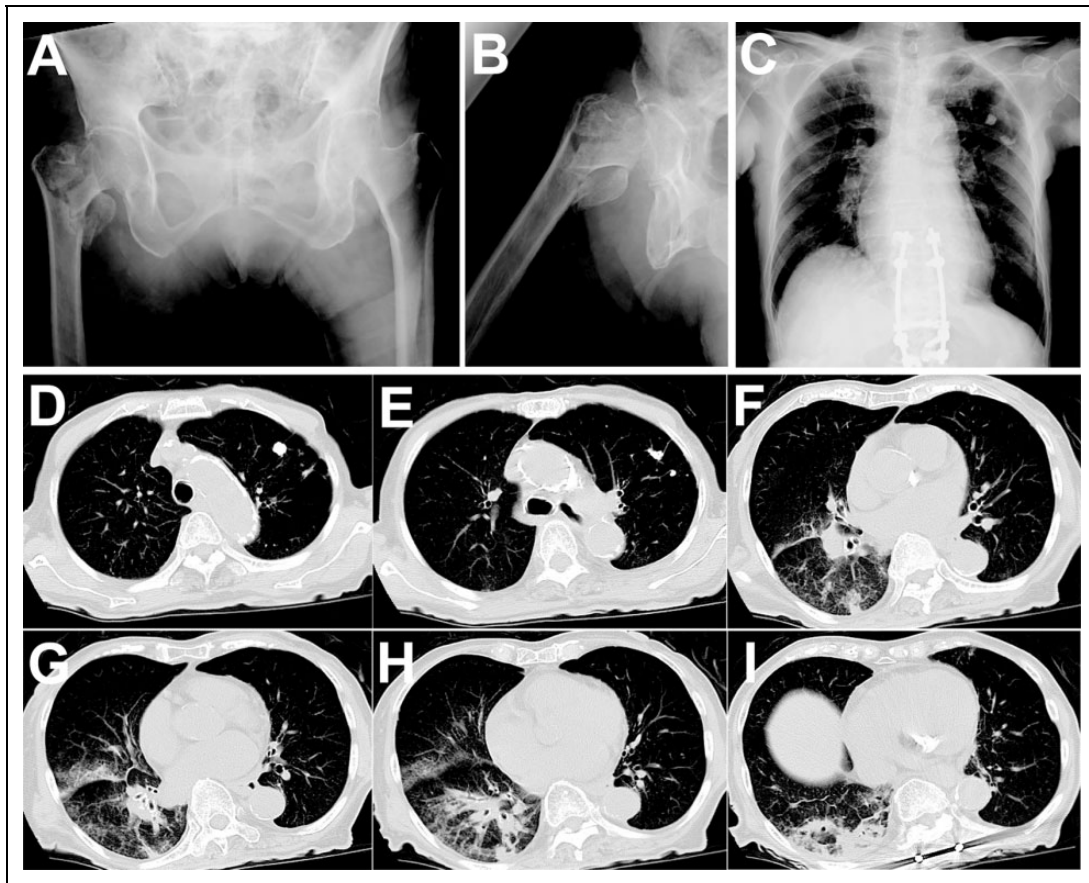


Figure 1. Radiography of the hip, showing right femoral intertrochanteric fracture on hospital admission. Anteroposterior (A) and lateral view (B). Chest radiograph (C) and computed tomography (CT) images (D-I) on hospital admission.

this characteristic, orthopaedic surgeons play a challenging and important role in preventing COVID-19 cross-infection especially when treating fracture patients.

In this report, we describe a case of femoral intertrochanteric fracture with early asymptomatic COVID-19. Fortunately, COVID-19 was successfully diagnosed and further treatment was performed without spreading the infection.

Case Presentation

An 87-year-old Japanese woman was transferred to our emergency room with a right hip pain after she fell in her nursing home in April 2020. In Japan, up to 5000 patients were COVID-19 positive, the beginning of COVID-19 outbreak, and one-fifth of patients were from our province at the time. She had past history of controlled arrhythmia and had no dementia. She had no history of fever, fatigue, or respiratory symptoms within the 14 days before presenting to our hospital. Physical examination on admission revealed: body temperature, 36.8°C, peripheral oxygen saturation (SpO₂), 94% under room air; respiratory rate, 16 breaths/min; blood pressure, 169/66 mmHg; and heart rate, 57 beats/min. Tenderness was noted in the right Scarpa's triangle and greater trochanter of the femur, accompanied by limited range of hip motion due to pain.

Blood testing showed elevations in C-reactive protein (0.55 mg/dL) and white blood cell count (12,000 cells/mm³) with neutrophilia (80.3%) and lymphopenia (14.3%). Radiography showed right femoral intertrochanteric fracture (AO/OTA classification: type 31-A2.3) (Figure 1A,B), and only 2 nodular shadows in the upper lobe of the left lung (Figure 1C). Given the global COVID-19 pandemic, chest computed tomography (CT) was performed on admission and showed ground-glass opacities with consolidation in the dorsal segment of the right lower lung field. From this CT image, aspiration pneumonia was speculated as a diagnosis (Figure 1D-I). However, to confirm whether the pneumonia was due to COVID-19, qualitative real-time reverse-transcriptase-polymerase-chain-reaction (RT-PCR) assay testing for severe acute respiratory syndrome coronavirus (SARS-CoV-2) from nasopharyngeal swabs was carried out, yielding a positive result. Femoral intertrochanteric fracture with concomitant COVID-19 infection was thus diagnosed.

Because of the infection, conservative treatment was applied to the fracture and delayed operation was planned. Rehabilitation under partial weight-bearing was started after hospital admission. On day 2, temperature increased to 37.4°C, and low SpO₂ (<90%) appeared, required supplemental oxygen (1 L/min) by day 5. The patient recovered from the

disease and was free of oxygen by day 10, and RT-PCR testing yielded negative results on both day 14 and day 16. Full weight-bearing was permitted from day 14. At this moment, the patient was able to ride a wheelchair and she had no hope for surgical treatment. Therefore, conservative treatment was continued. No recurrence of positive RT-PCR was seen on day 28, and she was returned to her welfare facility, able to use a wheelchair as she had before. Treatment was ongoing and she showed no other complications such as infection, dementia or deep vein thromboses. Throughout the treatment period, no cross-infection from the patient was identified in our hospital.

This case report was produced in accordance with the CARE reporting guidelines.²

Discussion

According to the guidelines during the COVID-19 pandemic period, treating trauma patients has become the main role for orthopaedic surgeons during the period.^{3,4} However, surgical treatment should be performed with caution or nonoperative treatment should be selected for patients with fracture in COVID-19-affected areas, particularly among elderly individuals with hip fracture,^{1,5} given the high mortality rate among patients with COVID-19.

In Japan, hospitals treating COVID-19 are limited to designated institutions, because of the role, capacity and ability to treat COVID-19. Some of those facilities might not be able to afford performing surgical treatment, due to the risk of spreading the infection and limited medical resources. It is also worth noting that postoperative pulmonary complications and high mortality rates have been identified perioperatively in COVID-19-infected patients.⁶ For these reasons, conservative treatment of the fracture was selected for this case. Not only surgical treatment, but also nursing care and rehabilitation risk exposing health personnel to infection. Screening for COVID-19 on hospital admission is thus extremely important.

In the present case, the patient was not symptomatic for COVID-19, presenting instead with right hip pain. Abnormalities on chest CT and lymphopenia were the only signs of COVID-19. Neither sign is necessarily specific for COVID-19, and we first thought that the changes on CT might be due to aspiration pneumonia. Identification of COVID-19 was relatively difficult. Lymphopenia has been reported as a characteristic and prognostic factor for COVID-19, but it's not sufficiently helpful for diagnosis, as bacterial infection also leads to neutrophil-predominance and relative lymphopenia.⁷ One previous paper on the characteristics of COVID-19 in fracture patients reported that both neutrophil count and D-dimer level were higher than the upper normal limits, which might be helpful laboratory characteristics for COVID-19 fracture patients.¹ However, making use of such data for identifying potential COVID-19 patients may be difficult, as fracture patients without COVID-19 infection can present with similar findings.

Chest CT was effective for identifying early asymptomatic COVID-19 infection in our case. No specific changes were

observed on chest radiography. If not for results of chest CT, RT-PCR testing might not have been performed. Of note, the changes on CT appeared well before any symptoms in our case, followed by fever and apparent respiratory symptoms after hospital admission. Concerning the wide changes on CT, initial CT changes might have been apparent earlier. Mi et al reported that chest CT showed a higher prevalence of findings typical of viral infection than RT-PCR for COVID-19 in fracture patients with COVID-19.¹ Our case indicates that early changes on CT, sometimes prior to symptoms, might thus be a specific characteristic of COVID-19 pneumonia.

While CT is highly sensitive, CT findings for COVID-19 pneumonia are not specific.⁸ Such imaging should thus be accompanied by RT-PCR, a highly specific test for COVID-19. Parvizi et al recommends the usage of RT-PCR testing for universal screening in elective surgery.⁹ However, RT-PCR testing requires time to obtain a result, and thus is not effective as a first-line investigation for emergency admissions or during operations for trauma patients. Delaying admission of patients until the results of RT-PCR become available is clearly not possible. CT might be helpful for deciding the necessity for patient isolation on admission during this waiting period, which enables further systemic evaluation over time.

Regarding the non-specific characteristics of COVID-19, orthopedic surgeons play a challenging and important role in identifying COVID-19-infected trauma patients. No previous reports have described screening and management of early asymptomatic COVID-19 infection in trauma patients. Our institution now applies chest CT routinely for all patients on hospital admission, and no cross-infection has occurred from infected patients to date. Repeated radiation exposures for both patients and radiologists should be taken into account and low-dose scanning methods may be adopted on recruiting chest CT as the first-line investigation, instead of high-resolution CT. Chest CT might be an effective modality and recommended in screening for infection on emergency hospital admission, especially in early asymptomatic trauma patients, in COVID-19-affected areas.

In conclusion, we have reported a rare case of femoral intertrochanteric fracture with early asymptomatic novel COVID-19. This case highlights the importance of considering chest CT as an effective method in screening for infection on hospital admission, especially in early asymptomatic trauma patients in COVID-19-affected areas.

Authors' Note

Written informed consent was obtained from patient for publication of this case report with any accompanying information and images. Ethics approval and consent to participate: This case report was produced in accordance with our institutional ethics policy.


Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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