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Bilateral intertrochanteric and femoral diaphyseal fractures with unilateral proximal tibial fracture: A case report and review of the literature



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ABSTRACT

INTRODUCTION: Bilateral intertrochanteric femur fractures are relatively rare injuries. This study aims to present a case of a patient with simultaneous bilateral intertrochanteric femur fractures and femoral diaphyseal fractures and proximal tibial fracture with his twelve years follow-up.

PRESENTATION OF CASE: A 44-year-old man presented to emergency department after a motor vehicle accident. Bilateral intertrochanteric femur fractures (OTA classification – 31A.1.2) and bilateral femoral diaphyseal fractures (OTA classification – 32A.2) and nondisplaced right proximal tibial fracture (OTA classification – 41B.1) were determined in radiographs. Following closed reduction, fractures were fixed with intramedullary nails bilaterally. Proximal tibial fracture was fixed with cannulated screws following open reduction. At twelfth year follow-up he was able to do his daily activities with minimal limitation.

DISCUSSION: High energy traumas, stress fractures, systemic disorders (osteomalacia, chronic renal failure), steroid treatments, seizures and electric injuries are possible causes for bilateral hip fractures. However bilateral femoral diaphyseal fractures are mostly due to high energy traumas. Long-term bisphosphonate use may also cause bilateral fractures. Single-stage surgery should be performed in order to avoid secondary damages of surgical interventions. All fractures of our patient were fixed in a single session. This prevented further deterioration of patient's status and made rehabilitation easy.

CONCLUSION: Careful evaluation of all systems should be performed in multi-trauma patients to find out concomitant injuries. Single staged surgical treatment may decrease morbidities.

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1. Introduction

Intertrochanteric femur fractures and femoral diaphyseal fractures are frequently seen in emergency departments in daily practice. Simple falls are main causes of these fractures in elderly patients but high energy traumas are leading causes in young population.¹ Although bilateral femoral diaphyseal fractures are relatively common problem, bilateral intertrochanteric fractures are rare.

This article aims to report a patient with simultaneous bilateral intertrochanteric femur fractures with bilateral femoral diaphyseal fractures and unilateral proximal tibial fracture and his 12 years follow-up. To our knowledge there is no such a case in literature.

2. Presentation of case

A 44-year-old man was presented to emergency department after a motor vehicle accident. On physical examination local tenderness and swelling was present over both thighs and right knee. His vital signs were 90/60 mmHg blood pressure and 130/min pulse rate. The hemoglobin level was 10.2 g/dl initially. Bilateral intertrochanteric femur fractures (OTA classification – 31A.1.2) and bilateral femoral diaphyseal fractures (OTA classification – 32A.2) and nondisplaced right proximal tibial fracture (OTA classification – 41B.1) were determined in radiographs (Fig. 1). He was operated on the fifth day of admission after hemodynamic stabilization. Transtibial skeletal tractions were applied for both sides up to surgery. In a single session, locked intramedullary nails were used for the fixation of intertrochanteric and diaphyseal femoral fractures after closed reduction for both extremities. Open reduction and internal fixation with cannulated screws were performed for right proximal tibial fracture. Four units of packed red blood

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Fig. 1. Radiographs show fractures of both femur.

cells and two units of fresh frozen plasma were given to the patient totally. A rehabilitation program was started immediately after surgery. One week after surgery seropurulent discharge was observed from the incision of right tibia. *Staphylococcus aureus* was cultivated. Infection was treated with oral antibiotics. Patient was discharged 12 days after operation. Weightbearing was allowed 6 weeks after surgery for both sides. Dynamization of both nails were performed at 4th month due to delayed union. (Fig. 2) Complete union of fractures were showed with radiographs at 8th month follow up. Implants were removed three years later. Patient had mild pain, especially in his right hip, and limp at 12th year control. Degenerative changes were observed at right hip on radiographs. (Fig. 3) Although movements of right hip were restricted, he was able to do his daily activities with minimal limitation and without medication (Fig. 4).

3. Discussion

Although proximal femoral fractures are frequently seen in daily practice, bilateral fractures are rare. Case reports in literature are mostly related with bilateral femoral neck fractures or fractures



Fig. 2. At postoperative 4th month complete union was not achieved and dynamization of nails were performed bilaterally.



Fig. 3. Degenerative changes were observed in right hip at 12th year control radiograph.

with mixed patterns. Only few papers are reporting simultaneous bilateral intertrochanteric femur fractures. Our case is the first for simultaneous bilateral intertrochanteric and femoral diaphyseal fractures.

High energy traumas, stress fractures, systemic disorders (osteomalacia, chronic renal failure), steroid treatments, seizures and electric injuries are possible causes for bilateral hip fractures.^{2–7} However bilateral femoral diaphyseal fractures are mostly due to high energy traumas. Long-term biphosphonate use may also cause bilateral fractures.⁸

Grisoni et al.¹ reported 8 bilateral cases (0.3%) in 2426 hip fractures and only two patients had simultaneous bilateral intertrochanteric fractures. The mechanism of injury was motor vehicle accident for a patient and simple fall for the other. First patient was a 53-year-old male and had additional tibia and patella fractures. Second patient was a 88-year-old woman without additional injury. Both patients were operated in a single session and dynamic hip screws (DHS) were preferred for fixation. Younger patient was discharged to home but elder one was dead at post-operative seventh day.

Dendrinios et al.⁹ reported three cases with simultaneous bilateral hip fractures. One of these patients was a 53-year-old guy with bilateral comminuted pertrochanteric fractures. Mechanism of injury was a motor vehicle accident. Due to the visceral injuries both hips were fixed with sliding screw-plate system five days after laparotomy. Mild pain in right hip and slight limp was noted at the 26th month follow-up. Other two patients had bilateral subtrochanteric fractures.

Panagopoulos et al.² reported a 44-year-old patient with bilateral intertrochanteric femur fractures. He had additional left acetabular and left distal radius fractures. Patient was treated with proximal femoral nailing in single session. Distal radius fracture was operated at the same time. Conservative treatment was chosen for acetabular fracture. Authors gave 18 months follow-up with good results.



Fig. 4. Despite degenerative changes in the radiographs patient was able to do his daily activities with minimal restriction.

Harshvardhan³ reported a 40-year-old man with bilateral intertrochanteric femur fractures without additional injury. The mechanism of injury was a motor vehicle accident. Patient was treated with two-stage internal fixation with DHS in one side and Dynamic Condylar Screw in the other. Postoperative follow-ups were not included in the text.

Bali et al.⁴ reported a patient with bilateral pertrochanteric fractures with bilateral patellar fractures and unilateral medial talar process fracture. Hip fractures were treated with DHS and bilateral patellar fractures with ORIF in a single staged surgery. At the end of the one and half year-follow-up patient returned to his daily activities with minimal difficulties.

Suh et al.⁵ reported a patient with bilateral femoral neck fractures secondary to hypocalcemic convulsion. Patient was treated with multiple cannulated screws. During postoperative rehabilitation patient admitted to hospital after convulsion and bilateral intertrochanteric femur fractures were diagnosed. The authors preferred revision of one side with DHS and conservative treatment for other side. Complete union of fractures without avascular necrosis of femoral heads were reported at his postoperative 2.5 years follow-up.

Optimal timing for surgery of polytrauma patients are decided according to “Damage Control Orthopaedics” principles.¹⁰ Our patient was operated five days after trauma. Bringing patient to optimal level for surgery was the cause of delay. It is accepted that polytrauma patients with hemodynamic stability could be operated early. Operations of patients in borderline, unstable and extremis group should be delayed. Injury severity score of our patient was $3^2 = 9$ points and he was in stable group. He would be operated early.

Despite exceptions in literature,³ if it is possible single-stage surgery should be performed in order to avoid secondary damages of surgical interventions. All fractures of our patient were fixed in a single session. This prevented further deterioration of patient’s status and made rehabilitation easy.

Although the primary goal of hip fracture treatment is fixation in acceptable position with closed reduction, it cannot be achieved always. In such cases open reduction should be performed. Intramedullary nails, dynamic hip screws, proximal femur plates and external fixators can be used in the treatment of intertrochanteric femur fractures. Due to ipsilateral femoral diaphyseal fractures intramedullary nails were our choice in this case. In order to prevent hemodynamic deterioration of patient, fractures were reduced in closed manner but femoral diaphyseal fractures made reduction difficult. Fixation in varus malposition was the end result for both hips. The aim of intramedullary nailing was to allow early weight bearing. Without proper fracture reduction nail caused varus angulation of fracture. Application of nail after open

reduction or fixation of hip and femoral diaphysis with dynamic hip screw with long plate after open reduction would be better.

At final control, arthrotic changes were observed in radiographs. Patient was able to do his daily activities with mild pain and without painkiller. Harris hip score was 81 points with good result. If open reduction was performed, such a complication would not be observed and better functional outcome would be got.

4. Conclusion

Bilateral hip fractures are very rare. Careful evaluation of other systems should be performed in such cases to find out concomitant injuries. Single staged surgical treatment may decrease morbidities. Open reduction should be kept in mind if closed reduction could not be performed.

Conflict of interest

The authors declare that there is no conflict of interest

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Ethical approval

Written informed consent was obtained from the patient for publication of this case report. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

Ali Seker, study concept or design, data collection, writing the paper; Adnan Kara, data collection; Mustafa Faik Seckin, data collection; Mesut Sonmez, data collection; Erden Erturer, writing the paper; Irfan Ozturk, writing the paper.

Key learning points

- Bilateral intertrochanteric fracture with bilateral femoral diaphyseal fracture is very rare.
- Management of such injuries is challenging.
- The quality of reduction and fixation are going to affect the final results.

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