

## CASE REPORT

# Bilateral Femoral Neck Fracture due to Electric Shock

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## ABSTRACT

Simultaneous bilateral fractures of the femoral neck are rare injuries in patients without underlying pathological conditions. We report a case of a 50-year-old male, who sustained bilateral femoral neck injury resulting from electric shock with 440 V of direct current. Bilateral femoral neck fracture is rare. Bilateral femoral neck fracture due to electric shock is even rarer. This case report highlights bilateral femoral neck fracture without primary and secondary bone disease. Late presentation and unclassified pattern of fracture are the other features.

**Keywords:** Bilateral adductor tenotomy, Bilateral femoral neck fracture, Electric shock injuries, Violent muscle contraction.

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## CASE REPORT

A 50-year-old male who was a wall painter was working at his job place. He accidentally came in contact with running air cooler and sustained electric shock of 440 V, following which the patient fell on the ground. Afterwards, he fell backwards on his buttocks from standing height and had a snapping sensation in both his hips before falling but did not lose consciousness. He then complained of pain at both hips and was not able to stand or walk.

The patient was conscious, oriented, but unable to stand and walk. Patient came to us after 3 weeks referred from neurology department with complaint of low back-ache with pulse of 76 beats/minute and blood pressure of 136/82 mm Hg. There was one small full-thickness burn each on his both buttocks (Fig. 1), probably the exit wounds of the electrical current. Radiographs revealed femoral neck fractures on both sides (Fig. 1). Detailed cardiac analysis, electrocardiogram, and whole blood chemistry were normal. A complete history and general physical examination showed that there were no risk factors for any pathological fracture. The preanesthetic

checkup of patient was reviewed by anesthesiologists on the day of admission.

On examination, no neurological deficit was found, but range of motion over bilateral hip was painful and restricted and had exit wound of current over buttock region (Fig. 1). On plain radiograph of spine and pelvis showed (Fig. 2) bilateral femoral neck fracture, and blood investigations were normal. Complete history, physical examination, and routine blood investigation showed no risk factors for any pathological fractures. Understanding patient's requirement, demand, financial condition, and type of fracture (Figs 3A and B), both femoral fractures were treated simultaneously with hemiarthroplasty (Austin Moore prosthesis) (Fig. 4) and bilateral adductor tenotomy. After follow-up of 1 month, the patient was



Fig. 1: Bilateral identical exit electric wound over buttock region



Fig. 2: X-ray pelvis showing bilateral femur neck fracture

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**Figs 3A and B:** Femur head having unclassified pattern of fracture



**Fig. 4:** Postoperative radiographic picture

able to walk with a walker. He could perform day-to-day work with restriction of certain activities.

## DISCUSSION

Our patient had bilateral femoral neck fracture not due to fall on standing height, but due to electric shock causing violent muscle contraction, as fracture is bilaterally identical and identical bilateral exit wound over buttock region.

Bone generates the greatest heat during conduction of electric current because it is most resistant to current flow in tissues. Fracture or dislocation results from tetanic contraction. The threshold for damage from direct current is about 50 V. Muscle contraction may result from contact with a direct current of at least 20 mA or alternate current of 10 mA.<sup>1</sup> A review of the literature reveals that electroconvulsive therapy is the major cause of bilateral femoral neck fracture. Accidental electric shock injury as a cause for simultaneous bilateral femoral neck fracture is rarer. In this injury there was a delay in diagnosis for 3 weeks, because there is no direct trauma to musculoskeletal system.

A further review of literature revealed other causes of femoral neck fractures, such as irradiation for malignancy,<sup>1,2</sup> myoclonic seizure,<sup>1,3-5</sup> convulsions, abnormal anatomy,<sup>1,6</sup> renal osteodystrophy,<sup>1,7,8</sup> high impact trauma,<sup>1,9-11</sup> and nutritional osteomalacia.<sup>1,12</sup>

Initial sequelae of electric shock include thermal myonecrosis that leads to acute renal failure which complicates to cardiac arrest or cardiac arrhythmias. Hence, in the emergency room (ER), the patient must be critically screened for cardiac and renal anomalies. Electrocardiogram with renal function tests with 24-hour monitoring is usually sufficient to rule out such complications.<sup>13-15</sup>

Bilateral neck of femur fractures are difficult to treat if not diagnosed early. Hip preservation should be the goal of treatment in young patients, such as in our case. We performed bilateral hemiarthroplasty. Dynamic hip screw can also be used as an alternative to treat such injuries. In older patients with a sedentary lifestyle, bilateral hemiarthroplasty can be performed as a salvage procedure.<sup>2</sup> Anesthetic complications like difficult intubation due to spasm or persisting cardiac abnormalities like arrhythmias are usually encountered. In such cases, surgery is deferred until the patient is stabilized. In our case no such complication was encountered. Complications like nonunion and avascular necrosis are very common if neglected and hence the need to diagnose such injuries at the earliest.<sup>2</sup> At the end of 3 months follow-up, our patient was free of complications. He had reasonable range of movements of the hip, knee, and ankle to continue his life.

## CONCLUSION

We report a very rare case of bilateral femoral neck fracture after electrical injury caused by violent muscle contraction with unclassified pattern of fracture. Orthopedic surgeon, emergency physician, and general practitioner

should be aware of this injury, particularly while managing traumatic injuries in confused patients. A delay in diagnosis is common, therefore a thorough and complete physical examination of musculoskeletal system should be performed in these patients with high index of suspicion. Similar injuries should be diagnosed early and the goal of management should be to preserve both the hip joints. Potential complications like nonunion and avascular necrosis could be avoided by early management. In patients who suffer electric shock, an X-ray of pelvis and dorso-lumbar spine should be considered.

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