Simultaneous Fracture of Both Femoral Necks Secondary to a Hypocalcemic Seizure

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We report a rare case of simultaneous fracture of both femoral necks caused by hypocalcemic fit secondary to chronic renal failure. The case was successfully treated by bilateral bipolar arthroplasties.

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Bilateral fracture of humerus and femurs, fracture dislocation of shoulders and hips are recognized to occur in epileptic fits[1-3]. Before 1957, such injuries were common among psychiatric patients treated by drug induced convulsion, or electroconvulsive therapy[4-8]. After 1957, these injuries were reduced significantly among these patients due to the use of muscle relaxant as an adjuvant to the previous treatment[2]. Fracture and fracture-dislocation of hips have also been reported after water–soluble mylographgy[9].

Two reports of bilateral hip injury resulting from hypocalcemic convulsion were found in the literature. However, one case occurred after parathyroidectomy, and the other was secondary to dietary vitamin D deficiency[10,11].

THE CASE

A forty-six-year-old Bahraini Gentleman is known to have systemic hypertension and long standing type two diabetes mellitus. His diabetes is complicated with diabetic nephropathy resulting in Stage V chronic kidney disease with severe renal osteodystrophy. He was not compliant with treatment of his renal disorder.

He was brought to Salmaniya Medical Complex by ambulance after sustaining his first and the only generalized tonic-clonic seizure.

On examination, he was drowsy but oriented with no evidence of uremic encephalopathy. Both legs were externally rotated with extremely painful restricted movements.

Radiography (Figure 1) revealed bilateral fractures of femoral neck (Garden type IV). A skeletal survey revealed overall decreased bone density.

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Figure 1: Pre-operative Radiography, Showing Bilateral Femoral Neck Fractures

His initial laboratory investigations were consistent with severe hypocalcaemia Corrected serum Calcium was 1.3 mmol/L (2.13-2.63). The rest of his blood investigations were as follows:

Phosphate: 2.6 mmol/L (0.8-1.4), Urea: 29.9 mmol/L (3-7), Creatinine: 1030 mmol/L (62-140), Alkaline Phosphatase: 307 u/L (50-135), PTH level-82.8 pmol/L (0.99-6.06), Hb 9: G/dL with normal indices and the random blood glucose: 10.5 mmol/L. His hypocalcaemia was treated with a combination of intravenous calcium gluconate (10%), one alpha hydroxyl cholecalciferol and calcium carbonate.

Blood glucose level was adjusted and he underwent hemodialysis. On the sixth day of admission, cemented bilateral bipolar arthroplasties (Exeter) were performed in one sitting, Figure 2.

Figure 2: Postoperative Radiography Showing Bilateral Bipolar Hemiarthroplasty

He had a good postoperative recovery. On the 11th postoperative day he was discharged ambulating with a frame. He was walking with no aid during his last follow-up in the clinic ten months after the surgery; he is on regular hemodialysis, and waiting for renal transplantation.

DISCUSSION

Bilateral simultaneous fracture of the femoral neck is rare and its late diagnosis is a common fact that may worsen its outcome[1,12-14]. The fact that these factures are usually associated with metabolic diseases or other pre-existing pathology has been increasingly recognized and reported in the literature[1,14].

A progressive renal osteodystrophy in advanced renal failure predispose the femoral neck to fracture[15-19]. A seizure increases the possibility of fracture, and attending physician should be aware of this condition. Bone and joint pain in a patient with chronic renal failure may also signify a vascular necrosis or septic arthritis, these conditions make radiographic assessment mandatory[20].

We reviewed the literature and found two cases of bilateral femoral neck fracture due to hypocalcemic fit. One occurred after parathyroidectomy, and the other was secondary to dietary vitamin D deficiency[10,11]. In contrast, our case is due to sever hypocalcemic fit because of end stage renal failure (stage V). The patient was not regularly taking his medication prescribed by his physician. His medications were phosphate binders, calcium and one alpha hydroxy cholecalciferol. As a result, he developed sever renal osteodystrophy and sever hypocalcaemia. This was evident by his high level of PTH. The second important feature in the presented case is the early recognition of the fracture and the early surgical intervention which resulted in favorable outcome.

Treatment of this patient depends on several issues; among them, the time between the fracture and the surgery[12]. Morrey and O'Brien performed subtrochanteric valgus osteotomy with fixation using plate and screws in a patient three weeks after the fracture[9]. Nada and Mohanti treated one patient one week after the fracture with Smith-Peterson plate and nail[12]. Atkin opted for Knowles pins[12]. Talyor used internal fixation with compression and Madhok performed bipolar hip arthoplasty[11,14].

As can be noticed, there are several types of treatment for this injury. In renal osteo-dystrophic patients, total or partial replacement is advisable, since the chances of healing of this fracture are usually poor with screw fixation and avascular necrosis is higher, 11-18%, than in normal patients[14,16,18,21].

We used cemented bipolar hemiarthroplasty due to good acetabulum despite generalized osteoporosis. In addition, the conversion to total hip replacement arthroplasty is feasible if indicated at a later stage.

CONCLUSION

Aggressive management of chronic kidney disease is warranted. In addition, a high prediction and early recognition of femoral neck fractures in these patients after any seizure is crucial for the treatment and outcome. As the healing process of these fractures are very slow, and according to the patients' general condition, we recommend hemiarthroplasty or total hip arthroplasty.

A rare case of simultaneous fracture of both femoral necks caused by hypocalcemic fit secondary to chronic renal failure; the case was treated by bilateral bipolar arthroplasties.

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