# BILATERAL PATHOLOGIC FEMORAL NECK FRACTURE AS A CONSEQUENCE OF RENAL OSTEODYSTROPHY: REPORT OF TWO CASES AND REVIEW OF THE LITERATURE

*Tunç Cevat ÖĞÜN*, Recep MEMİK**, Mustafa YEL*, Abdullah ŞARLAK****

## SUMMARY

Pathologic femoral neck fracture secondary to renal osteodystrophy is uncommon. Bilateral occurrence is even rarer. Thus, the treatment is controversial. We presented two cases with bilateral femoral neck fractures. The etiology and the way of treatment is discussed under the light of current literature.

**Key Words:** *Bilateral, Femoral Neck Fracture, Renal Osteodystrophy.*

## ÖZET

RENAL OSTEDİSTROFİYE BAĞLI BİLATERAL PATOLOJİK FEMUR BOYNU KIRIĞI: 2 OLGU SUNUMU VE LİTERATÜRÜN GÖZDEN GEÇİRİLMESİ

Renal osteodistrofiye sekonder gelişen femur boyun kırığı nadir olarak görülür. Bilateral olması ise daha nadirdir. Bu sebeple, tedavisi de tartışmalıdır. Biz, burada kronik böbrek yetmezliğine sekonder ortaya çıkan iki bilateral femur boyun kırığı olgusu bildirdik. Renal osteodistrofiye bağlı patolojik kırık sebeplerini gözden geçirerek, uyguladığımız tedavi şeklini literatür ışığında tartıştık.

**Anahtar Kelimeler:** *Femur Boyun kırığı, Bilateral, Renal osteodistrofi.*

## INTRODUCTION

Advances in the management of renal failure and the success of renal transplantation have lessened the severity and frequency of renal osteodystrophy and improved both the long term survival and the quality of life[1-4]. Unfortunately, there are still a number of people who, despite treatment, develop skeletal problems. These problems include osteonecrosis, osteochondritis dissecans, "brown tumors", gout , pathological fractures and several types of developmental problems of the children[5-8]. However, bilateral spontaneous fracture of the hip is extraordinary, and this combination imposes an increased morbidity and mortality on these patients[2,6,9]. We report the cases of two patients one of whom had been receiving hemodialysis treatment, and developed simultaneous, bilateral pathologic fracture of the hip.

## CASE REPORT

*Case 1*

A forty-five year old man with the diagnosis of renal amyloidosis for four years, had a convulsive attack while he was at home, after he had been discharged from the hospital following a renal biopsy operation. His wife related that he had been supine at the time and that he had no trauma other than that of the convulsion itself. The patient was admitted to the renal service with the diagnosis of chronic renal failure. When he was seen by the orthopedic service the next day, he could not actively move either of his legs, which were tender and painful with any motion. Laboratory work on admission showed the following abnormal values: sodium, 131 milliequivalents per liter; calcium, 7.0 milligrams per 100 milliliters; alkaline phosphatase, 129 international units per liter; creatinine 12.5 milligrams per 100 milliliters; and blood urea nitrogen 86 milligrams per 100 milliliters. Roentgenograms revealed bilateral fracture through the neck of the femur of Garden type-3. Treatment consisted of open reduction and internal fixation with three cannulated hip screws (Figure 1a, b). No complications were observed after the operation. At four years postoperatively, he had no complaints and was walking and sitting without help. X-rays showed complete union.

* Ass., Prof. Selçuk University Faculty of Medicine, Department of Orthopedics and Traumatology, Konya.
** Prof. Selçuk University Faculty of Medicine, Department of Orthopedics and Traumatology, Konya.
*** Res. Selçuk University Faculty of Medicine, Department of Orthopedics and Traumatology, Konya.

(a)

(b)

**Fig. 1a, b:** Preoperative and postoperative x-rays of the first patient.

*Case 2*

A thirty-five year old man with chronic renal failure secondary to renal stones, developed bilateral hip pain while he was staying at the renal service. It was four months before, when he got the diagnosis of renal insufficiency, and he had been receiving hemodialysis since that time. Laboratory values were as follows: sodium, 138 milliequivalents per liter; calcium, 7.5 milligrams per 100 milliliters; creatinine, 5.5 milligrams per 100 milliliters; and blood urea nitrogen, 107 milligrams per 100 milliliters. There was no history of convulsion. Roentgenograms revealed bilateral hip fractures of Garden type-3. He was treated with open reduction and internal fixation with three cannulated hip screws (Figure 2a, b). At the third month follow-up, he had stiff hips due to the lack of rehabilitation because of his worsened general condition, but, there was not any loss of reduction.

## DISCUSSION

Osteodystrophy develops in most patients with chronic renal failure. With hemodialysis, patients who have chronic renal failure live longer and the

(a)

(b)

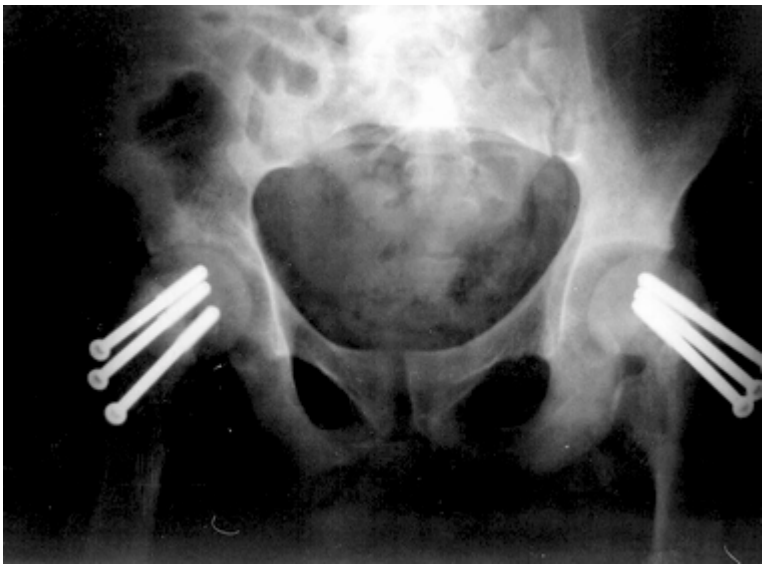

**Fig. 2a, b:** Preoperative and postoperative x-rays of the second patient.

incidence of bone disease increases. Renal transplantation seems to have lessened the severity and frequency of renal osteodystrophy[1-5,7]. However, transplantation also has its own drawbacks, such as increased rates of osteonecrosis due to steroid and immunosuppressive therapy, with incidence showing considerable variation between 0 and 25%[2]. Although implications of steroid dosage are controversial, the incidence appears to be less if steroid dosage is reduced[2]. Transplant rejection and long term dialysis have also been implicated. There is a high incidence of avascular necrosis of the hip and bilaterality and most occur within 2 years of transplantation[1-5,7,10].

Seizure induced bone fractures in patients with renal osteodystrophy are uncommon. Fractures (most commonly of vertebral bodies) have been reported to occur during convulsive seizures in uremic bone disease during hemodialysis and are most commonly associated with transient hypotension secondary to hypovolemia[6]. Although it is uncommon, patients who undergo

ultrafiltration may become hypovolemic-hypotensive with no manifestations other than seizures and shock syndrome which can be corrected by rapid fluid replacement[6].

Mathews et al.[6] reported a case having multipl fractures that occurred shortly after hemodialysis. Schaab et al.[7] reported a case of a chronic renal patient who had bilateral hip fractures during grand mal convulsions. Berman et al.[2] reported a central acetabular fracture-dislocation secondary to an epileptic seizure in a chronic renal patient which he treated conservatively. Zingraf et al.[12] reported a patient who had bilateral fracture of the femoral neck complicating uremic bone disease prior to hemodialysis. In the first of our patients, as there was no history of hemodialysis, the possibility of convulsive seizures due to hypotension can be eliminated. The second patient had had hemodialysis treatment but, he did not have convulsive attacks prior to his fracture episode.

Pathological fractures of the hip have also been reported by Hay and Mahony[4], to occur due to amyloidosis. They believed renal transplantation prevented further deposition of amyloid, but, the long term complications of dialysis related amyloidosis might still occur. Case-1 in our report, had been treated for renal amyloidosis for four years, and this could be the facilitating factor besides his convulsive attack, to sustain bilateral hip fractures.

Gerster et al.[3] reported of two patients with moderate renal failure who sustained bilateral hip fractures after 11 and 21 months of treatment with fluoride for osteoporosis. Histologic examination showed severe fluorosis which was considered to be the consequence of excessive retention of fluoride due to renal insufficiency. As bilateral femoral neck fractures are very rare, these data suggest a causal link between fractures and fluoride in patients with renal failure.

Aluminum induced bone disease in uremic patients receiving dialysis was first described in 1980's. The epidemic form of the disease was seen in centers where there was a high aluminum content in the water dialysate. Sporadic form of the disease continue to be noted, which causes multipl nontraumatic fractures. Sundaram et al.[9], reported 4 such cases having hip, rib and cervical vertebra fractures. Healing was not seen in any of these fractures. He claimed that, spontaneous fractures of patients receiving dialysis, should raise the possibility of aluminum induced osteomalacia. In case-2, long term hemodialysis treatment seems to be the suspect, whether the etiology is due to excessive fluoride or aluminum retention, and/or uremic bone disease.

In the treatment of skeletal problems due to renal failure, early reports favored nonoperative management because of the risk of precipitating uremia and because internal fixation was considered ill-advised, but more recently, operative treatment has been advocated for a variety of skeletal disorders[1,6,8,9,11].

Schaab et al.[7], studied morbidity and mortality rates in his series of 11 femoral neck fractures and compared the results of operative and non-operative management of these fractures. All fractures occured in older man and were unilateral. He found operative management superior to conservative treatment as far as complications and mortality rates are concerned.

Pathologic fracture of the hip due to renal osteodystrophy is rare and bilateral occurence is all the more uncommon. We described two such cases which we treated operatively. The results are encouraging, but, it is apparent that such injuries deteriorate the general condition of the patient.

**REFERENCES**


1. Berman AT, Metzger PC, Chinitz JL. Central acetabular fracture-dislocation secondary to an epileptic seizure in a chronic renal failure. J Trauma 1981; 21 (1): 66-7.
2. Cheng EY, Klibanof JE, Robinson HJ, Bradford DS. Total hip arthroplasty with cement after renal transplantation. Long term results. J Bone Joint Surg 1995; 77-A: 1535-42.
3. Gerster JC, Charhon SA, Jaeger P et al. Bilateral fractures of femoral neck in patients with moderate renal failure receiving fluoride for spinal osteoporosis. Br Med J 1983; 287: 723-5.
4. Hay NM, Mahony JF. Pathological hip fracture due to amyloidosis occurring after succesful renal transplantation. A case report. Int J Artif Organs 1994; 17 (2): 74-5.
5. Schaab PC, Murphy G,T zamaloukas AH et al. Femoral neck fractures in patients receiving long term dialysis. Clin Orthop 1990; 260: 224-31.
6. Tierney GS, Goulet JA, Greenfield ML,Port FK. Mortality after fracture of the hip in patients who have end stage renal disease. J Bone Joint Surg 1994; 76-A: 709-12.
7. Zingraf J, Drueke T, Roux JP et al. Bilateral fracture of the femoral neck complicating uremic bone disease prior to chronic hemodialysis. Clin Nephrol 1974; 2(2): 73-5.
8. Barret IR, Papadimitriou DG. Skeletal disorders in children with renal disorders. J Pediatr Orthop 1996; 16: 264-72.
9. Mankin HJ. Rickets, osteomalacia and renal osteodystrophy: An update. Orthop Clin North Am 1990; 21-81.
10. Sundaram M, Dessner D, Ballal S. Solitary spontaneous cervical and large bone fractures in aluminum osteodystrophy. Skeletal Radiol 1991; 20 (2): 91-4.
11. Slatopolsky E, Coburn JW. Renal osteodystrophy. In: Avioli LV, Krane SM (eds) Metabolic bone disease, 2nd edition WB Saunders, Philadelphia 1990.
12. Mathews RE, Cocke TB, D'Ambrosia RD. Scapular fractures secondary to seizures in patients with osteodystrophy. Report of two cases and review of the literature. J Bone Joint Surg 1983; 65-A: 850-3.