ISSN: 2279 - 0594

Journal of Biomedical and Pharmaceutical Research
Available Online at www.jbpr.in
CODEN: - JBPRAU (Source: - American Chemical Society)
Volume 4, Issue 1, 2015, 01-04

CASE REPORT

A CASE OF PATHOLOGICAL FRACTURE OF SHAFT OF FEMUR IN HYPERPARATHYROIDISM - TREATMENT WITH TITANIUM ELASTIC NAILING

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Received 23 December 2014; Accepted 04 January 2015

ABSTRACT

Primary hyperparathyroidism is associated with a significant increase in the risk of pathological fractures. Persistent osteopenia secondary to increased calcium mobilisation from bones makes these patients highly susceptible to multiple fractures. Some authors report only partial correction of bone loss after surgery, such correction occurring only in the first year with restoration of trabecular bone but not cortical bone.(1) Some authors conclude that fractures in PHPT take longer to heal and are prone to malunion unless splinted internally or externally.(2) We present a case of pathological fracture of femur shaft in a patient with PHPT with superadded vitamin D deficiency, which healed adequately in a span of 6 weeks, after fixation with titanium elastic nails and oral Vitamin D supplementation. The rapidity and the normalcy of bony union in a case of pathological long bone fracture, secondary to primary hyperparathyroidism, makes this case worth reporting.

Key words: PHPT-primary hyperparathyroidism, pathological fracture.

INTRODUCTION:

Primary hyperparathyroidism (PHPT) is described as an abnormally increased parathyroid hormone (PTH) production from parathyroid gland(s) in relation to the serum calcium. It results from a disturbance of normal feedback control exerted by serum calcium (3). Increased PTH production leads to hypercalcemia via bone resorption, increased gastrointestinal absorption of calcium, increased production of vitamin D3 and reduced renal calcium clearance.Bone disease is rarely overt. Radiographic manifestations are seen in less than 2% of patients and include subperiosteal erosions, diffuse osteoporosis, cystic lesions ('brown tumours'), pathological fractures, 'salt and pepper' mottling of skull and loss of lamina dura in the mandible, renal calculi are uncommon in this group.(2) Presentation with a pathological fracture is uncommon. Fracture healing is delayed due to persistently elevated parathormone leading to insufficient bone stock. We present a case of pathological fracture shaft femur in a 20 yr old female with primary hyperparathyroidism which showed good healing after fixation with titanium elastic nails.

CASE REPORT

A female patient, aged 20 years, presented with pain over her right thigh after a trivial fall. Clinical examination and roentgenogram revealed a transverse fracture of femoral shaft.(figure 1)

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Figure 1: fracture shaft femur

The patient had a history of multiple fractures in lower limbs. 2 years prior to the present injury, patient had sustained fractures in both legs.(figure 2, 3). The fractures were treated by conservative measures in a long leg cast at a local centre. She had a prolonged period of immobilization for about 9 months, following which xrays revealed inadequate union.

Patient had anterolateral bowing of tibia, more evident on the left side. (figure4)

Figure 2: fracture both bones right leg

figure 3: fractures both bones left leg

Figure 4: anterolateral tibial bowing

Laboratory examination revealed the following biochemical parameters, serum PTH- 80.13 pg/ml(elevated), alkaline phosphatase- 227IU/l (elevated), 25-OH vitamin D- 25.4ng/ml(insufficient), serum calcium 8.2mg%(deficient), serum phosphorus- 2.56mg%(low), All other parameters were normal. Thyroid function tests were normal. Neck ultrasound was negative for parathyroid adenoma. Laboratory findings suggested the diagnosis of primary hyperparathyroidism. Low calcium levels were probably due to superadded vitamin D deficiency as evidenced by insufficient 25- OH vitamin D levels. Low serum phosphorus suggested that

hyperparathyroid state was primary and not secondary to insufficient vitamin D3. The patient was planned for closed reduction and internal fixation with titanium elastic nails. 2 elastic nails were inserted retrogradely crisscrossing in to achieve 3 point fixation. Postoperative period was uneventful; the patient was allowed knee range of movements on the 1st postoperative day. Postoperative xray showed maintainence of length, alignment and rotation of the long bone with 3 point fixation (figure 5). Touchdown weight bearing was allowed from 2nd postoperative day. Patient was discharged on the 5th postoperative day. At discharge patient was started on oral calcium and vitamin D3 50000 IU once a week.

Figure 5: immediate postop xray

At 3 weeks of followup , check xray showed callus formation and signs of union at the fracture site.(figure 6). At 6 weeks, complete fracture union was noted.(figure 7).

Figure 6: 3rd week postop xray

figure 7: 6th week postop xray

DISCUSSION

Primary hyperparathyroidism (PHPT) was considered a rare condition before the advent of automated serum biochemical analysis. A four-fold increase in the diagnosis has been reported following routine screening of a population.[4]

In approximately 85% of cases, primary hyperparathyroidism is caused by a single adenoma. In 15% of cases, multiple glands are involved (ie, either

multiple adenomas or hyperplasia). Rarely, primary hyperparathyroidism is caused by parathyroid carcinoma. The etiology of adenomas or hyperplasia remains unknown in most cases. Familial cases can occur either as part of the multiple endocrine neoplasia syndromes (MEN 1 or MEN 2a), hyperparathyroid-jaw tumor (HPT-JT) syndrome, or familial isolated hyperparathyroidism (FIHPT).[5]The presence of low serum calcium levels in our case as opposed to hypercalcemia of PHPT was significant. It indicated a superadded vitamin D deficiency which probably acted as an additive factor for impaired bone healing.The high incidence of bone disease in patients with PHPT in developing countries has been attributed to associated vitamin D and dietary calcium deficiency and high phytate and phosphate content in the diet in some cultures.[6,7]Two distinct types of bone lesion in PHPT are described- one, the rapidly progressive type, classical osteitis fibrosa cystica is seen. The second, slowly progressive, leads to cortical thinning and osteoporosis.[8] In our case, cortical thinning and osteoporosis was evident in all the xrays, further pointing to the diagnosis of PHPT.Underlying vitamin D deficiency can lead to delayed healing and repeated fractures. Some authors report only partial correction of bone loss after surgery, such correction occurring only in the first year with restoration of trabecular bone but not cortical bone.[1]Some authors report that fractures in PHPT take longer to heal and are prone to malunion unless splinted internally or externally.[2] This was very evident in our case in which bilateral leg bone fractures treated conservatively showed delayed union . The presence of significant anterolateral bowing of tibia was a further evidence of significantly weakened bones.The panel of the Third International Workshop on Asymptomatic Primary Hyperparathyroidism recently recommended measurement of serum concentrations of 25-hydroxy vitamin D (25-OHD)—the best available test of vitamin D nutritional status—in all patients with suspected primary hyperparathyroidism (PHPT), and initiation of vitamin D supplementation in patients with levels below 20 ng/mL.[9]In our case though patient had insufficient vitaminD levels in addition to PHPT, fracture healing was evident as early as 6 weeks which is comparable with normal union times for femoral shaft fractures. We believe that this result was due to proper surgical procedure involving closed reduction with Titanium elastic nailing as well as adequately planned oral calcium and vitamin D supplementation in the postoperative period.

CONCLUSION:

Fractures in primary hyperparathyroidism can be managed satisfactorily with proper internal fixation technique such as Titanium Elastic Nails. Identification of associated vitamin D deficiency and adequately planned vitamin D supplementation is of paramount importance and yields satisfactory results.

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