

Spontaneous Bilateral Femoral Neck Fracture Secondary to Vitamin D Deficiency in a Young Patient; Case Report

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Abstract

Vitamin D is playing a pivotal role in stabilizing serum calcium level and maintaining bones integrity. So, its deficiency is a major cause for the pathological fracture. A 28 years old housewife was presented to the orthopedic clinic with a moderate to severe back pain. Medical history was only significant for chronic back pain, examination revealed Trendelenburg gait. Antero-posterior pelvis radiograph was obtained showing up fracture of both neck of femur and blood investigations showed vitamin D deficiency and secondary hyperparathyroidism. Bilateral rare fractures can be a warning sign of a systemic disease related to bone metabolic processes.

Keywords: vitamin d; femoral neck fracture; pathological fracture; case report

Introduction

Vitamin D is a secosterol having fundamental roles inside our body such as stabilizing serum calcium along with phosphate ranges so as to promote multiple physiologic roles transcription regulation and bone metabolism [1]. Hussain et al. reported that more than 80% of Sudanese women have vitamin D deficiency [2].

Fractures at hip region are frequent particularly in old population young victims involved in high energy trauma or sporting competition may also experience it every year up to 16 million fractures at hip took place and critically rises with aging with elderly female commonly affected[4].

On presentation, patients often present with history of trauma, which may not indicated in cases of memory affection or cognitive impairment. However, it is important to determine whether the cause was low or high energy trauma, and other important medical history point [5].

Complete neurovascular assessment of injured limb, preceded by radiographic evaluation; anterior-posterior (AP) pelvis, lateral hip, AP and lateral femur, AP and lateral knee. Computed Tomography (CT) scan might give more details and classification of fracture, MRI usually confirm the presence of Avascular necrosis (AVN). Completion of assessment then with complete blood count, metabolic assessment, and electrocardiogram with risk assessment for surgery especially in elderly lady [6].

Fracture neck of femur can be classified into four types by Garden classification; *type I* being incomplete fracture _ valgus impacted and non-displaced, *type II* being complete fracture _ non displaced, *type III* being complete fracture _ partially displaced and *type IV* complete fracture _ fully displaced [7].

Seldom, patients having metabolic illnesses such as osteomalacia, renal osteodystrophy, after epileptic seizures, electric shock or trauma will experience synchronic femoral neck fractures. Few documents of case reports of synchronic traumatic bilateral fractures neck femur caused by low energy trauma, however all cases were aged [11-13] years old.

In this case, we present a case of 28 years old female was presented with a moderate to severe back pain that was indicative to bilateral femoral neck fractures.

Case presentation

A 28 years old female, house wife and mother of three kids was presented to orthopedic clinic with a moderate to severe back pain for two years, that started severe in the morning and improves throughout the day radiating to the buttocks and both thighs, aggravated by walking and physical activities and relieved by rest and analgesia. In the past, the patient sought medical advices and diagnosed as disc prolapse case. She was managed accordingly

without improvement. Otherwise, she denied any complaints, there was no history of lower limb weakness or sphincter disturbance. Physical examination showed bilateral Trendelenburg gait (waddling gait) with positive Trendelenburg test, normal ranges of motion (120 degrees flexion, 10 degrees extension, 30 degrees abduction, 20 degrees adduction, 10 degrees internal rotation and 40 degrees external rotation) in both lower

limbs. There were normal tone, power and reflexes with intact sensory and vascular status. The laboratory studies showed serum calcium (8.5 mg/dL) (reference range: 8.4 – 10.2 mg/dL), 25 dihydroxy _ vitamin D (25_OH D) level (6.9ng/mL) (reference range: 25-80ng/mL), and parathyroid hormone (PTH) (348.9 pg/mL) (reference range: 10-55pg/mL). [table 1] Rheumatology screening was negative.

| | Results | Normal |
|-----------|-------------|-----------|
| ACTH | 14.13 pg/ml | 10- 60 |
| Calcium | 8.5 mg/ml | 8.4-10.2 |
| FT3 | 4.3 pmol/l | 3.1- 6.8 |
| FT4 | 18.3 pmol/l | 12- 22 |
| TSH | 0.6 uIU/ml | 0.27- 4.2 |
| Magnesium | 2 mg/ml | 1.2- 2.6 |
| PTH | 348.1 pg/ml | 10- 55 |

Table 1: Laboratory investigations of endocrine functions showing the results and normal ranges

AP pelvis radiograph is obtained revealing both neck femur fracture [figure1]. Magnetic resonance imaging (MRI) showing both neck femur fracture without evidence of avascular necrosis (AVN) [figure 2].

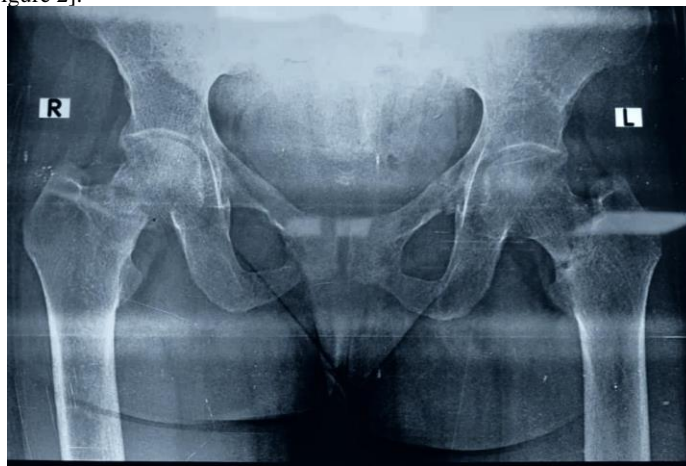


Figure 1: X-Ray- AP pelvis radiograph showing bilateral femoral neck fracture



Figure 2: MRI scan showing bilateral femoral neck fractures without evidence of avascular necrosis (AVN); transverse and coronal sections

The case was diagnosed with bilateral neck femur fracture due to vitamin D deficiency and was referred to endocrinologist to seek medical treatment of secondary hyperparathyroidism. Bearing full weight during walking was intended as soon as possible, and so our case underwent closed reduction and

internal fixation on her right hip via a cannulated screws size (6.5 mm) and open reduction and internal fixation on her left hip via Dynamic Hip Screw (DHS) [figure 3; intraoperative radiograph (A & B)].



Figure 3 (A): Intraoperative radiograph showing closed reduction and internal fixation of the right hip via a cannulated screws size (6.5 mm).

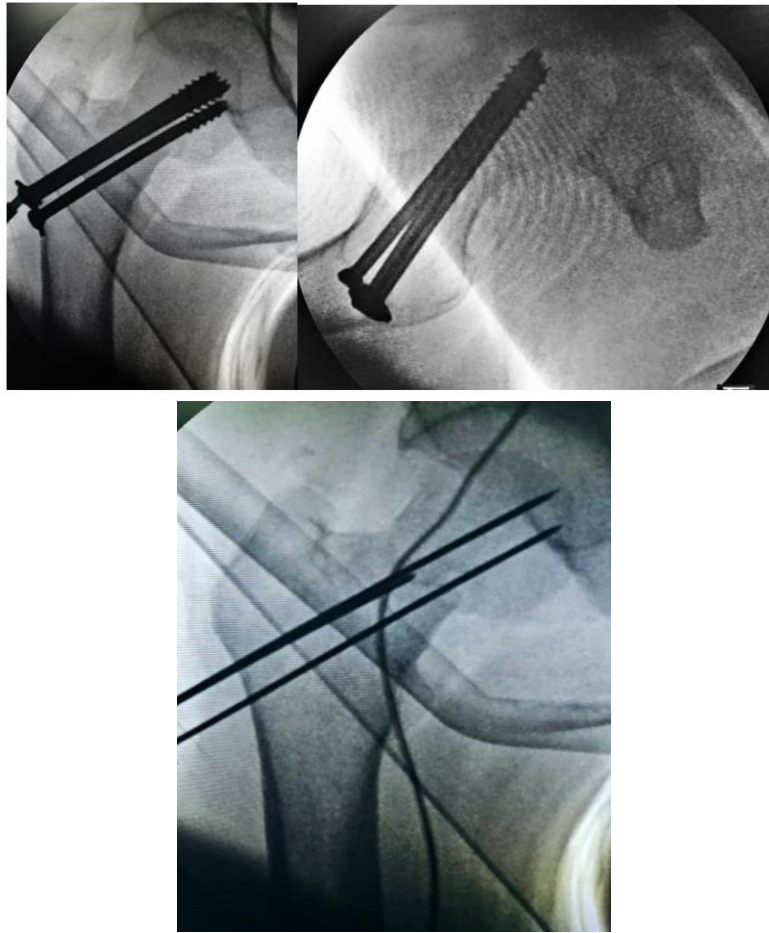
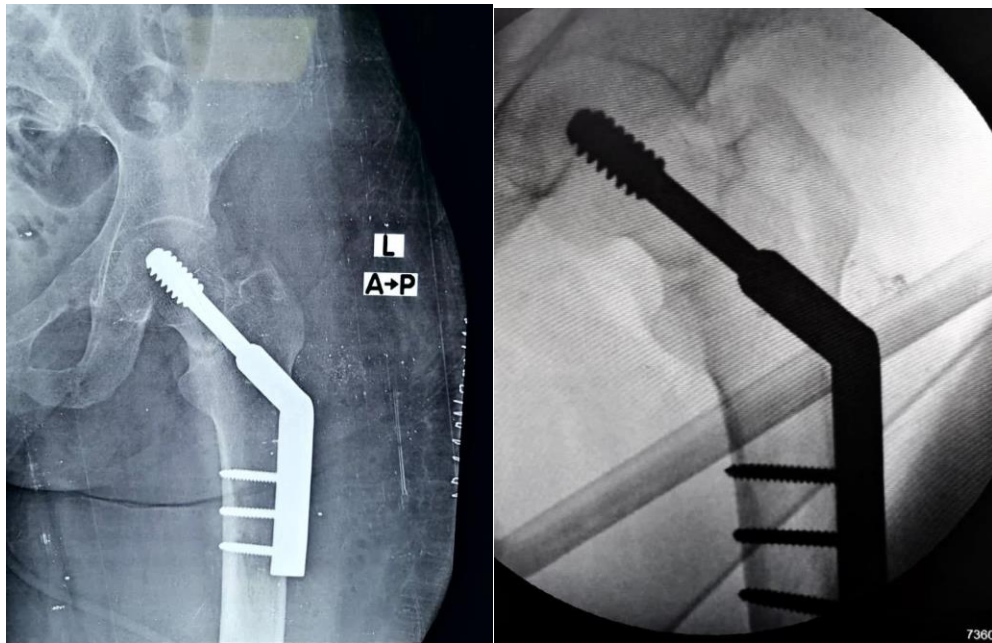
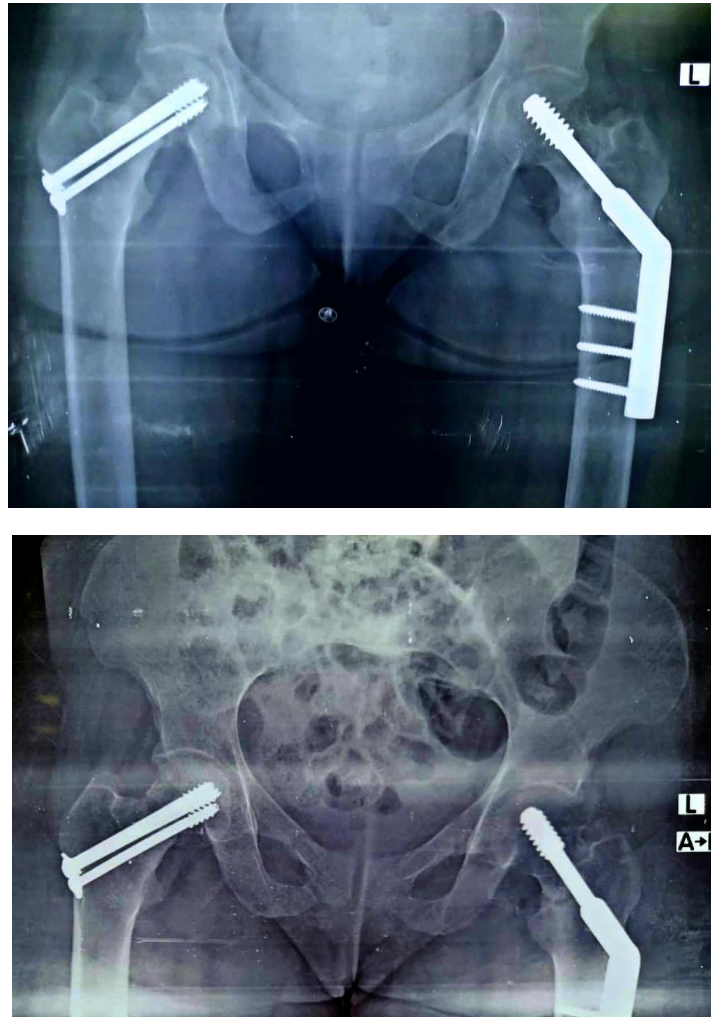


Figure 3 (B): Intraoperative radiograph showing open reduction and internal fixation on her left hip via Dynamic Hip Screw (DHS)





The operation passed smoothly uneventful, and the patient discharged free of pain and able to bear her full weight without walking aids. Regular adequate activated vitamin D was prescribed weekly.

Discussion

Fractures at hip are the commonest injuries in elderly population, young population may have such fracture following high energy trauma [3]. Spontaneous fracture neck of femur is rare and so spontaneous bilateral fractures even more rare; little documented case reports concerning spontaneous bilateral fracture neck femur caused by low energy mechanism, however all cases were of old age (11-13) years old.

This case being a 28 years old female was unique as she was presented walking with pain. Arisumi et al. reported similar fracture presentation in young male who was only complaining of growing discomfort [14]. Both cases have not sustained any trauma and the fracture diagnosis was only made after radiological assessment with no recent suspicion. In contrast recent reported cases were in old patients; Sood et al announced a patient who developed both neck femur fractures following low energy trauma. [12]. Vijayvargiya et al presented an above 60 years old lady who fell at her house and fractured her both neck femur intracapsularly [13]. In both cases fracture is suspected as patients sustained trauma although it were minor and patients were old with neck femur commonly fractured in such a population.

Clinical examination was non-significant apart from positive Trendelenburg test. Similar to the case that Arisumi et al reported whom examination was

not significant except for pain with movement [14]. Sood et al. and Vijayvargiya et al. announced pain on external rotation and pain on movement of both hips.

The underlying etiology was investigated and metabolic panel revealed normal calcium level, low 25 dihydroxy-vit D and high parathyroid hormone., reflecting osteomalacia from secondary hyperparathyroidism. 25 hydroxy vit D being the storage for of the vitamin has an inverse relation with PTH, which means that when 25 hydroxyvitamin D levels are below normal, then the parathyroid gland make a response by raising the production and secretion of parathyroid hormone and this will maintain the serum calcium level within normal level. [15] Arisumi et al reported, that their case showed osteoporosis with only low 25 hydroxyvitamin D in the metabolic panel.

Our case was operated case underwent closed reduction and internal fixation on her right hip via a cannulated screws size (6.5 mm), being the suitable options for young patients and discharged on vitamin supplement so PTH then return to normal level.

Conclusion

In conclusion our case is a rare condition of spontaneous atraumatic bilateral neck femur fracture in young female. The presentation wasn't suspicion for both neck femur fracture. However, diagnosis was made radiologically and metabolic panel was conclusive.

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