

# Central dislocation of the hip secondary to insufficiency fracture

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## Abstract

We present a case report of a 45-year old man who sustained a central dislocation of the hip secondary to an insufficiency fracture of the acetabulum. At the time of presentation he was on alendronate therapy for osteoporosis which had been previously investigated. CT scanning of the pelvis was useful for pre-operative planning which confirmed collapse of the femoral head but no discontinuity of the pelvis. The femoral head was morcellized and used as bone graft for the acetabular defect and an uncemented total hip replacement was performed.

## Introduction

Insufficiency fractures occur more commonly in elderly female patients suffering from osteoporosis. The incidence of fragility fractures in the UK is increasing due largely to the rising average age of the population, despite the advent of newer anti-osteoporosis drugs such as the bisphosphonates.

Discussion of side-effects associated with the use of bisphosphonate therapy has focused on the question – can inhibition of bone turnover be harmful? The consequences of bone turnover inhibition include an increase in mineralization and an accumulation of micro-damage. With this increase in bone mineralization, the bone becomes more brittle and it may be more susceptible to fracture. This has been shown by biomechanical studies of a variety of bone samples that show a wide range of mineralization.<sup>1</sup> Regular physical stresses may cause micro-damage to normal bone; however, osteocytes initiate bone remodeling whereby they dissolve the damaged bone and allow osteoblast activity to continue. This daily damage cannot be repaired if osteoclast activity is inhibited. High doses of bisphosphonates given to animal models have shown an accumulation of micro-damage.<sup>2</sup> This report presents an unusual case of a 45-year old male with known osteoporosis who sustained a central dislocation of his left hip secondary to a stress fracture of the acetabulum.

## Case Report

A 45-year old male was initially referred to the clinic for increasing lower back pain. Examination showed inability to comfortably weight bear on the left side with posterior hip pain, an irritable hip with a mild reduction in the range of movement and equal leg lengths, and multilevel lumbar spine tenderness with poor straight leg raise. He was known to have chronic lower back pain. He was not on any other regular medications. Initial MRI scan of the spine (Figure 1) in 2006 revealed significant crush fractures to L2 and L4 vertebrae. Consequently, he was investigated for osteoporosis and myeloma with the latter being firmly excluded. A diagnosis of osteoporosis was confirmed and treatment commenced with alendronate, vitamin D and calcium supplements. Risk factors for osteoporosis in this gentleman included smoking (10 cigarettes per day) and alcohol consumption (40 units of alcohol per week). The pain relating to the vertebral fracture improved but his left hip pain and mobility significantly deteriorated. The patient represented acutely to the fracture clinic. There was no history of trauma at the time of presentation. A plain X-ray of the pelvis revealed marked abnormality at the left hip joint with central dislocation of the femoral head and possible subchondral collapse (Figure 2). A CT scan was performed to further delineate the anatomy of the fracture and aid in pre-operative planning (Figure 3A, Figure 3B) which revealed no pelvic discontinuity. An uncemented total hip replacement was performed and the femoral head was morcellized and used as bone graft to reconstruct the acetabulum (Figure 4). He was advised against weight bearing for six weeks and then progressed to full weight over a further six weeks. On X-ray the bone graft had consolidated at last follow-up and he was able to fully weight bear without pain.

## Discussion

Osteoporosis is characterized by a reduction in bone mass, leading to increased bone fragility and risk of fracture. It is usually a disease of the elderly, in particular in post-menopausal women. Common risk factors include smoking, alcohol, low body mass index, long-term corticosteroids and hypogonadism. Moderate quantities of alcohol on a chronic basis have been clearly identified as a risk factor for the development of osteoporosis in young women and men.<sup>3</sup> Acetabular fractures rarely occur in young patients in the absence of high energy trauma. There are reported cases of bilateral central dislocation of the hips in young patients who have had grand mal seizures,<sup>4</sup> and patients undergoing electro-

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convulsive therapy.<sup>5</sup> There are also cases of acetabular fractures in the elderly due to osteoporosis in the absence of any trauma.<sup>6</sup>

This case is unusual in view of the young age of the patient. We believe he developed an insufficiency fracture of the left acetabulum in the absence of any precipitating trauma which rapidly progressed to a central hip dislocation.

Pre-operative CT scanning with reconstruction format was helpful in the delineation of the fracture pattern and subsequent planning of the hip reconstruction. There was no evidence of pelvic discontinuity and, therefore, the defect was filled with morcellized bone graft from the left femoral head. It is pertinent to note that a solid peripheral fixation was possible with a metal acetabular shell and supplemented with acetabular screw fixation. On X-ray the bone graft was subsequently consolidated and the patient now is able to fully weight bear without pain. There are still questions regarding the side-effects of alendronate.<sup>7,8</sup> Like all bisphosphonates, it acts by inhibiting the action of osteoclasts, and has been shown to reduce vertebral fractures by up to 47% and hip fractures by 51%.<sup>9</sup> However, the inhibition of normal bone turnover can lead to the accumulation of stress fractures that do not heal.<sup>8</sup> Goh *et al.* reported 9 out of 13 patients who had sustained low energy subtrochanteric femoral fractures over a period of ten months and who were taking long-term alendronate.<sup>7</sup> They postulated that alendronate was a contributing factor. Furthermore, Odvina *et al.* published a report on 9 patients who sustained spontaneous non-spinal fractures while on alendronate therapy, 6 of whom displayed delayed fracture healing for three months to two years during therapy.<sup>2</sup> Another case report by Cheung *et al.*, provides an example of an 82-year old woman on alendronate therapy for ten years who presented with two episodes of non-traumatic femoral shaft fracture. A bone biopsy performed suggests adynamic bone disease consistent with suppressed bone turnover.<sup>10</sup>

The effects of bisphosphonate on bone remain



Figure 1. MRI lumbar spine showing vertebral fractures at first presentation to clinic.



Figure 2. X-ray showing a fracture of the left acetabulum with central dislocation of the femoral head.

uncertain. Profound suppression on the bone formation together with its long half-life can lead to negative effects with its usage.<sup>11</sup> Moreover, studies have shown the continuing effects of bisphosphonate on bone turnover on discontinuation five years previously.<sup>12</sup> However, Liberman *et al.* argue that there are no significant side effects on bone health from bisphosphonate therapy.<sup>13</sup> There are studies which suggest bisphosphonate prevents local bone loss after total hip replacements.<sup>14,15</sup> Data from other clinical trials demonstrate that bisphosphonates are beneficial to the bones during the first five years of use.<sup>16</sup> We cannot firmly associate the acetabular pathology with the use of bisphosphonates and, therefore, have continued to treat him with alendronate under multidisciplinary care.

In conclusion, in this unusual case, we did not



Figure 3. CT 3D reconstructions showing a fracture of the left acetabulum with central dislocation of the femoral head.



Figure 4. Post-operative X-ray showing an uncemented total hip replacement.

know whether alendronate contributed to the development of the central dislocation or whether it was simply due to minor trauma occurring in severely osteoporotic bone.

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