Case Report

Atraumatic Femoral Insufficiency Fracture in Postmenopausal Women Taking Bisphosphonate

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Abstract: The patient was 85-year-old woman. Five years and 8 months previously, bisphosphonate was prescribed for osteoporosis at a local clinic. Deformity of the thigh occurred when she tried to stand after sitting. X-ray findings revealed a transverse fracture of the right femoral diaphysis. Intramedullary nailing of the right femur was performed. Bone union was slightly delayed, but it was eventually achieved. Bisphosphonates have been reported to severely suppress bone turnover, resulting in the occurrence of fractures at the diaphysis or metaphysis of the femur. This type of fracture is characteristically induced by minor trauma and usually shows a simple transverse fracture. Bone union is delayed and these patients complain of prodromal symptoms. Because our case met all of the above criteria, it was concluded that the cause of her fracture was severely suppressed bone turnover (SSBT). We treated a patient who had a pathologic fracture associated with bisphosphonate therapy. Careful follow-up will be required, because it has been reported that such fractures can also occur on the contralateral side.

Key words: insufficiency fracture, bisphosphonate, severely suppressed bone turnover (SSBT), osteoporosis, atypical femoral fracture

Introduction

It has been reported that bisphosphonates, a class of drugs used for the treatment of osteoporosis, inhibit bone fracture1). However, it has also been reported recently that these drugs can occasionally cause pathologic fracture by severely suppressing bone turnover2,3). We treated a patient with a transverse fracture of the femoral diaphysis after 5 years and 8 months of bisphosphonate therapy, although she had no history of injury.

Case Report

The patient was an 85-year-old woman who was 143 cm tall and weighing 38 kg. Hypertension and arrhythmia were treated with oral amlodipine besilate (2.5 mg/day) and

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apridene hydrochloride (20 mg/day). Five years and eight months previously, alendronate sodium (5 mg/day) was prescribed for osteoporosis at a local clinic. It was replaced by risedronate sodium (2.5 mg/day) from 2 years previously, and minodoronate (1 mg/day) had been administered orally from 1 month previously. The patient had been using poultices because she felt pain in the right thigh from approximately 1 month before the occurrence of fracture. She was brought to the emergency department of our hospital because pain and deformity of the thigh occurred when she tried to stand after sitting. Because X-ray films revealed a transverse fracture of the right femoral diaphysis (Fig. 1), she was admitted for surgery.

The following laboratory data suggested hyperthyroidism (Table 1) Her parathyroid glands were not abnormal. Since cervical ultrasonography revealed a multinodular goiter,
Basedow’s disease was diagnosed. Bone mineral density (BMD) was 0.996, 0.627, and 0.312 g/cm² at the lumbar spine (dual photon x-ray (DPX), L2-L4), femoral neck, and distal 1/3 of the radius, respectively. On the day after admission to our hospital, intramedullary nailing of the right femur was performed (Fig 2). Histopathological examination of bone tissue collected during surgery revealed nothing abnormal. As a result of rehabilitation after surgery, it became possible for the patient to walk with a cane, and she was discharged from hospital to home. Bone union was slightly delayed (Fig. 3), but it was eventually achieved. Retrospective evaluation
of left side X-ray film showed in the femoral shaft a “simple with thick cortices pattern” (Fig. 4).  

Discussion

Bisphosphonates have been reported to severely suppress bone turnover, resulting in the occurrence of fractures at the diaphysis or metaphysis of the femur\(^2\)\(^-\)\(^5\). This type of fracture is characteristically induced by minor trauma and is a simple transverse fracture (with a small jagged peak on the medial side)\(^2\),\(^4\),\(^5\). Bone union is delayed and these patients complain of prodromal symptoms. Because our case met all of the above criteria, it was concluded that the cause of her fracture was severely suppressed bone turnover (SSBT).

Rizzoli et al reported that more than five years of alendronate therapy increases the risk of atypical subtrochanteric fracture and the number of these fractures in association with bisphosphonates is an estimated one per 1,000 per year\(^6\). But no randomized control study has been reported to show the relationship between long-term treatment of bisphosphonate and low energy femoral fracture.

As far as we are aware, no reports have been published concerning the detection of abnormal thyroid function in patients with pathologic bone fracture. The relationship between our patient’s fracture and her thyroid dysfunction is still unclear, but this case clearly met the requirements for fracture due to SSBT. Because it was only detected by complete work-up after surgery, the thyroid dysfunction of our patient was not treated
before the onset of fracture. At present, she is under treatment with thiamazole.

**Conclusion**

We treated a patient who had a pathologic fracture associated with bisphosphonate therapy. Careful follow-up will be required, because it has been reported that such fractures can also occur on the contralateral side.

**References**


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