SUBTROCHANTERIC FEMORAL STRESS FRACTURES IN PATIENTS ON BISPHOSPHONATE THERAPY

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BACKGROUND

Bisphosphonates are a class of antiresorptive agents that are currently used to treat osteoporosis, Paget’s disease, and tumor-associated bone diseases. Bisphosphonates modulate bone resorption at the level of the osteoclast. Although the mechanism of action is not fully understood, multiple randomized clinical trials have shown both a significant decrease in osteoporotic fractures and a significant increase in bone mineral density in patients taking bisphosphonates.

Here we report on a series of patients with antecedent thigh pain that suffered subtrochanteric femoral stress fractures. Each patient was treated with bisphosphonate therapy for osteoporosis for at least six years. Each patient sustained a low energy subtrochanteric femur fracture through a clear region of chronic stress reaction in the bones. It is our concern that long-term bisphosphonate use negatively impacts normal metabolic bone turnover and may increase bone susceptibility to stress fractures.

MATERIALS & METHODS

After IRB approval was obtained, we retrospectively reviewed the charts and radiographs of all patients over the past two years with low-energy subtrochanteric femoral fractures. All patients were seen, examined, and cared for at a level I trauma center. Patients were excluded if they had a history of malignancy, metabolic bone disease, or a high energy mechanism.

We collected patient age, sex, fracture mechanism, length of bisphosphonate use, length of follow-up, prodromal symptoms, and recent bone density on all patients. All patients who sustained fractures were taken for closed, antegrade intramedullary nailing of the fractured femur once medically stabilized (Figure 1). Postoperative weight-bearing status was determined by the attending surgeon.

RESULTS

Seven patients met our criteria for low-energy subtrochanteric femur fractures. However, two of these patients were excluded due to co-existing metastatic bone disease. All of the patients identified with subtrochanteric stress fractures had been on long-term bisphosphonate therapy.

There were six fractures among the five patients. All patients in our series were female. The average age of these patients was 68.4 years (57 - 75) and the average duration of bisphosphonate therapy was 7.6 years (6 - 10). All patients in our series had prodromal symptoms but we were unable to accurately quantify the duration. All patients sustained their fractures from a fall from standing. The average duration of follow-up was 12.6 months (1 – 18). All fractures went on to union during this time period. Only one patient needed a secondary procedure to achieve union.

A variety of imaging studies, both pre and postoperatively, were available for each of the patients. Each patient had clear radiographic evidence of a transverse subtrochanteric fracture through a sclerotic region of the femur. In every case, there was a thickening of the lateral femoral cortex at the level of fracture site (Figure 2 and 3). One patient who reported thigh pain had an MRI done which was consistent with bilateral subtrochanteric femoral stress fractures (Figure 4a and b). She refused operative intervention at the time only to present days later with a displaced fracture through the ride side. She subsequently sustained a complete fracture through the same area on the contralateral side twelve months later. Another patient sustained a displaced fracture and a subsequent bone scan (Figure 5), show an area of increased uptake in the contra-lateral subtrochanteric region. She was asymptomatic on this side and was treated conservatively. Three of the five patients also had radiographic evidence of contralateral subtrochanteric femoral stress reaction.

CONCLUSIONS

There may be an association between long-term bisphosphonate use and subtrochanteric femoral stress fractures. We believe that treating physicians should have a high index of suspicion for any patient on bisphosphonates presenting with lower extremity complaints of pain or dysfunction. Imaging with a bone scan or MRI to also include the contralateral extremity should be mandatory in this patient population with an equivocal plain radiograph. Further prospective, randomized studies need to be performed to evaluate the interaction of bisphosphonate therapy and stress fractures

DISCLOSURES

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