

Atypical Femur Fractures

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KEYWORDS

• Hip fractures • Femur fractures • Atypical • Bisphosphonates • Osteoporosis

KEY POINTS

- Atypical femur fractures have an extremely low incidence and make up a very small subset of femur fractures.
- The fractures are associated with bisphosphonate use but can occur in patients without exposure to bisphosphonates.
- Increasing duration of bisphosphonate use has been associated with increased the risk of an atypical femur fracture.
- Other medications or conditions can increase the risk of an atypical femur fracture, including diabetes, glucocorticosteroid, and proton pump inhibitors.
- Among patients with atypical femur fractures, 30% have bilateral involvement that is located in the same anatomic location on both femurs.
- Risk of an atypical femur fracture is reduced by 70% in the first year after cessation of a bisphosphonate.
- Treatment of patients with atypical femur fractures includes discontinuation of bisphosphonates, normalization of serum calcium and vitamin D levels, activity modification, and possible surgery for complete fractures or those at risk for progression to complete fracture.

INTRODUCTION

Atypical fractures that occur in the subtrochanteric region of the femur represent a unique group of fractures that occur in patients with osteoporosis or other systemic or local metabolic conditions of bone. These fractures have a distinct radiographic pattern and clinical presentation that distinguishes them from other more prevalent types of femur fractures occurring in the subtrochanteric region and along the femoral shaft. Atypical fractures have been associated with bisphosphonate use over the past decade, but they can occur in patients who are naive to treatment with bisphosphonates.¹

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Atypical fractures generally present as either complete or evolving transverse fractures of the subtrochanteric femur region. Patients often present with an associated stress response of the bone in the lateral cortex, which can be seen on a radiograph as a thickening (beaking) of the lateral cortex at the site of the fracture (Fig. 1). The fractures are transverse or short oblique fractures with minimal comminution or fragmentation at the fracture site (see Fig. 2 for nonatypical/standard femur fracture). Approximately 70% of patients have a prodrome of thigh pain prior to development of a complete fracture. When these fractures occur in the setting of bisphosphonate use, it is generally after greater than 5 years of continuous use of the drug. For reasons that are not clear, the distribution of fractures tends to be shifted toward a younger (55–70 years of age) population of elderly patients on bisphosphonates.^{1,2} The incidence is also higher in the Asian women.² The pathophysiology of these fractures and their association with antiresorptive medications for osteoporosis is still being fully elucidated, although understanding of mechanisms at work is gaining.

This article discusses understanding to date of the clinical presentation, epidemiology, pathophysiology, and management of atypical femur fractures.

CLINICAL PRESENTATION

Atypical femur fractures represent a spectrum of a disease entity. These fractures are thought to evolve slowly over time, usually starting out as stress reactions, then forming incomplete laterally based fractures and ultimately complete fractures with displacement. This slow evolution means that patients can present at any point along the spectrum. A typical patient who presents with an atypical femur fracture is a woman over age 40 who in most cases may have other risk factors for osteoporosis. Glucocorticosteroid and proton pump inhibitor use in addition to bisphosphonate use was found in higher incidence among patients who presented with atypical fractures.¹ Other chronic disease entities have also been associated with atypical fracture formation, including rheumatoid arthritis and renal disease.¹ One atypical femur fracture was

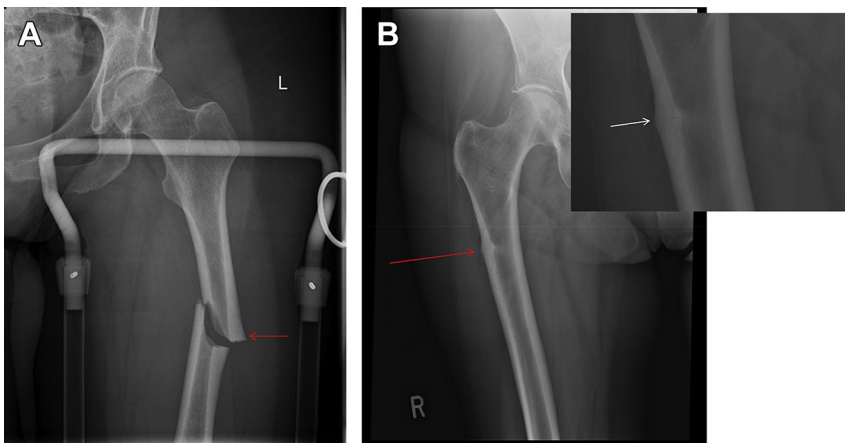


Fig. 1. (A) Completed atypical femur fracture. Note the beaking of the lateral cortex (*arrow*) and short oblique nature of the fracture. There is also minimal comminution noted. (B) Incomplete atypical femur fracture. Note the lateral cortex beaking (*arrow*). Also note the black line that represents the incomplete/nondisplaced fracture of the lateral cortex (*inset, white arrow*).

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