

# Images in Medicine - Bisphosphonate Induced Atypical Fracture

RIDDHI DAS GUPTA<sup>1</sup>, SAHANA SHETTY<sup>2</sup>, HESARGATTA SHYAMSUNDER ASHA<sup>3</sup>, SANDEEP ALBERT<sup>4</sup>, THOMAS VIZHALIL PAUL<sup>5</sup>

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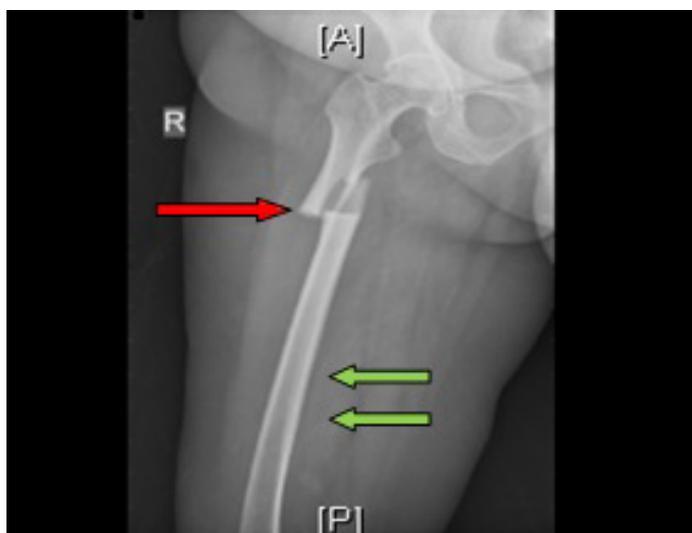
## INTRODUCTION

Bisphosphonates are the first line therapy for treating post menopausal osteoporosis. Usually, they are well tolerated and have good efficacy in decreasing fracture risk with few adverse effects. The common side effect is upper gastrointestinal tract irritation like oesophagitis especially seen with oral bisphosphonates. One of the less commonly encountered adverse effect is atypical fracture of femoral shafts. Physicians who are prescribing bisphosphonates should be aware of this rare adverse effect. We report a case who presented to us with an atypical fracture.

## CASE PRESENTATION

A 58 year old lady, post menopausal for 10 years, presented with the complaints of pain and restricted mobility of right lower limb following slip and fall from standing in her home. There was no pain preceding the fall. Her medical history was largely unremarkable except for use of bisphosphonates (oral ibandronate at the dose of 150 mg monthly) for the last 18 months for post menopausal osteoporosis. In addition, patient was also on 1000 mg of elemental calcium and 800 IU of cholecalciferol. Clinical examination was normal except for tenderness over the right thigh. Her corrected serum calcium was 8.8 mg/dl (8.5-10.2 mg/dl), phosphate was 3.2 mg/dl (2.5-4.5 mg/dl), alkaline phosphatase was 45 U/L (40-125 U/L) and 25-OH vitamin D was 38 ng/dl, parathyroid hormone was 42 pg/ml (8-50 pg/ml). X-Ray femur (right and left) shown as [Table/Fig-1 and 2] were characteristic of bisphosphonate associated bilateral atypical femoral shaft fractures.

Bone Mineral Density showed osteoporosis of the lumbar spine (T score: -2.8) and femoral neck (T score: -2.6).



**[Table/Fig-1]:** An anteroposterior left femur radiograph showing a transverse shaft fracture, with a localized periosteal beaking (red arrowhead) and generalized cortical thickening (green arrows)



**[Table/Fig-2]:** An anteroposterior right femur radiograph showing an incomplete atypical shaft fracture with a periosteal reaction of the lateral cortex

## DISCUSSION

Bisphosphonates, though widely approved as the mainstay of treatment of osteoporosis, are associated with a rare subset of atypical subtrochanteric and femoral shaft fracture. The inherent property of bisphosphonates to accumulate in sites of microfracture repair and suppress bone turnover inadvertently leads to accumulation of microdamage and, increased mineralization homogeneity resulting in reduced toughness and increased brittleness of bone with susceptibility to fracture [1,2]. Possible alterations in non enzymatic collagen cross linking and femoral biomechanical differences [3] further augment the fracture risk in these patients. Non-comminuted, low-energy trauma, bilateral, transverse or oblique femoral fractures distal to lesser trochanter with poor callus formation with a localized periosteal reaction in lateral cortex and generalized cortical thickening are the diagnostic hallmarks [4]. These atypical fractures have been described with most bisphosphonates and it is not known when these fractures occur after the initiation of therapy [5,6]. The occurrence of these fractures warrant immediate cessation of bisphosphonate therapy. Intramedullary nailing remains the surgical modality of choice, along with calcium and vitamin D supplementation. The use of teriparatide [7] may offer a promising mode of treatment for these atypical shaft fractures.

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**PARTICULARS OF CONTRIBUTORS:**

1. Registrar, Department of Endocrinology, Diabetes & Metabolism, Christian Medical College, Vellore – 632 004, Tamil Nadu, India.
2. Registrar, Department of Endocrinology, Diabetes & Metabolism, Christian Medical College, Vellore – 632 004, Tamil Nadu, India.
3. Associate Professor, Department of Endocrinology, Diabetes & Metabolism, Christian Medical College, Vellore – 632 004, Tamil Nadu, India.
4. Assistant Professor, Department of Orthopedics – Unit I, Christian Medical College, Vellore – 632 004, Tamil Nadu, India.
5. Professor, Department of Endocrinology, Diabetes & Metabolism, Christian Medical College, Vellore – 632 004, Tamil Nadu, India.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**

Dr. Thomas V. Paul,  
Professor, Department of Endocrinology, Diabetes & Metabolism,  
Christian Medical College, Vellore – 632 004, Tamil Nadu, India.  
Phone: 09566920379, +91-0416-228-3118, E-mail: thomasvpaul@yahoo.com

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