

# Clinical and surgical approach of severe bone fragility fracture: clinical case of 4 fragility fracture in patient with heavy osteoporosis

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## Summary

**An accurate diagnosis of osteoporosis and a proper treatment are today recognized to be the most important facts for prevention and for a correct arrangement and treatment of fragility fractures. In the text the Authors describe a case of severe osteoporosis aggravated by 2 femur fractures and 2 periprosthetic fractures occurred in 2 months. In such cases the orthopaedic surgeon needs to formulate first a clinical osteoporotic pattern, than its treatment together with a surgery suitable choice, that has to take into consideration of the bone structural characteristics. In the case described one can note that fractures healing occurred thanks to both an improvement in surgical techniques and antiosteoporotic pharmacological support; in the specific case the Authors used strontium ranelate for its osteoinductive capacity. In our opinion is crucial that the treatment used by orthopaedic surgeons is not related only to the "by-hand" treatment but take into consideration both the underlying disease and the possibility of positively affect bone healing with specific drug therapy.**

*KEY WORDS: osteoporosis; periprosthetic fractures; bone healing.*

## Introduction

The bones fragility, typical of osteoporosis, is a main risk factor for the occurrence of first episodes of fractures and re-fractures (1-4).

An accurate diagnosis of osteoporosis (5) and a proper treatment are today recognized to be the most important facts for prevention and for a correct arrangement and treatment of fragility fractures.

In spite of the high incidence of osteoporosis, mainly due to the increase in life expectancy, especially in females, and to the high socio-economic impact of fragility fractures, we are currently often in front of cases of fractures, that repeat in the

same patient who, to the detriment of the clinical picture, was never framed in terms of bone metabolism (6).

In the text the Authors describe a case of severe osteoporosis aggravated by 2 femur fractures and 2 periprosthetic fractures. The incidence of periprosthetic hip fractures is increasing (7-9); so far it is estimated that the incidence is approximately 1% after primary THA and about 4% after revision THA (10). This incidence increase is due both to longer term life expectancy, with serious osteoporosis consequences (11) and to the increase of the number of implants (12, 13).

Periprosthetic fractures in particular affect women in a ratio of 2:1 towards man and the average age is 68 years.

Various risk factor have been identified for the occurrence of these fractures: they can be classified in general risk facts, among them osteoporosis and neurological diseases that alterate the ambulatory pattern, and local risk factors such as periprosthetic osteolysis or cortical iatrogenic intra and perioperative defects.

The Vancouver classification, developed by Duncan and Masri in 1985, is one of the most commonly used classification. It considers the quality of the bone, the fracture site and the implant stability (14).

## Case report

The case describes a female patient of 80 years old with significant comorbidities like atrial fibrillation, heart failure with a high surgical risk (ASA 4).

In 2006 and 2007 the patient had 2 fractures: right and left femoral neck, for which she was submitted to surgery for bilateral hip prosthetization (Figure 1).

In August 2008, after an accidental fall at home, the patient reported a new fragility fracture: a periprosthetic right femur fracture a type C (Figures 2, 3) according to Vancouver classification (15).

For this reason, the patient had a surgery reduction and synthesis of fracture with retrograde intramedullary nail (Figure 4).

The choice of surgical technique was almost forced by patient's general conditions, that required the least invasive and quickest surgical procedure, with the lower risk of blood loss.

During last hospitalization the patient was submitted to first level blood tests to study bone metabolism, which showed a severe condition of hypovitaminosis D (vit D=4 ng/ml), therefore she was injected with 300,000 UI of Vitamin D.

At the moment of discharge the patient was suggested to abstain from any kind of loading for min 30 and was treated with antiosteoporotic therapy based on strontium ranelate (2 g/day), vit D (800 UI/day), calcium (1200mg/day) and magnetotherapy. About 1 month after surgery the patient complained functional inability of right lower limb. The X-ray showed the loss of fracture reduction with mobilization of the two proximal screws (Figure 5).

For this reason, the patient was referred back to surgical reduction and fixation of the fracture with plate and cerclage without removal of the nail and the prosthesis (Figure 6).

In this case the choice was force to the plate, despite the general clinical condition of the patient and high perioperative risk.



Figure 1 - Pelvis X-Ray with bilateral hip prosthesis.



Figures 2, 3 - Periprosthetic fractures of the right femur.



Figure 4 - Post-operative X Ray after fracture fixation with a retrograde nail.



Figure 5 - Femoral refracture.

After surgery a cast was packed to be kept for 30 days with complete abstention to any sort of loading.

The next 30 days x-ray control after surgery showed an initial formation of the bone callus.

The cast was removed and the patient was able to start an active and passive mobilisation, without loading, of the right lower limb; at this moment we recovery the medical therapy with strontium ranelate previously suspended for the immobilization period.

After 3 months x-ray showed fracture healing, with partial and progressing loading, up to total loading.

The radiographic check after 10 months from surgery showed that there was mobilization of a condylar screw that was removed.

After 15 months from surgery, at clinical and radiographic control, the patient was able to walk without crutches and had a range of motion of the lower right arm, with right knee flexion up to 100° and extension up to +10° (Figure 7).



Figure 6 - Fixation of the fracture with plate and cerclage without removal of the nail and the prosthesis.



Figure 7 - Current situation.

## Discussion

Fractures are the most feared osteoporosis complications and often result in disability and loss of autonomy of patients, with socio-economic consequences.

Moreover, in Literature, many studies suggest a negative correlation between age and fracture healing (16) resulting in further difficulties in achieving clinical-radiographic healing of fractures in elderly patients.

The case described is a typical example of a serious osteoporotic pattern, complicated with 4 fractures occurred in 2 months.

In such cases the orthopaedic surgeon needs to formulate first a clinical osteoporotic pattern, than its treatment together with a surgery suitable choice, that has to take into consideration of the bone structural characteristics.

All this in order to optimize the resources available for the fragility fractures treatment: pharmacological resources (anti osteoporotic drugs and adequate calcium and Vit D supplementation), surgical resources (specific osteoporotic bone fixation) and physical resources (use of osteoinductive capacity of magnetic fields) (17, 18). In the case described one can note that fractures healing occurred thanks to both an improvement in surgical techniques and antiosteoporotic pharmacological support, in the specific case the Authors used strontium ranelate for its osteoinductive capacity. In fact there are many studies in Literature, that corroborate strontium ranelate osteoinductive capacity. In our opinion is crucial that the treatment used by orthopaedic surgeons is not related only to the "by-hand" treatment but take into consideration both the underlying disease and the possibility of positively affect bone healing with specific drug therapy.

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