

The radiolucent property of new devices permits to study tumor evolution in cases of pathological humeral fractures

Pietro Maniscalco¹, Marco Caforio¹, Giulia Groppi¹, Daniele Vallisa², Luigi Cavanna³



¹ Department of Orthopaedics and Traumatology, Piacenza, Italy

² Department of Hematology, Piacenza, Italy

³ Department of Medical Oncology, Piacenza, Italy



INTRODUCTION

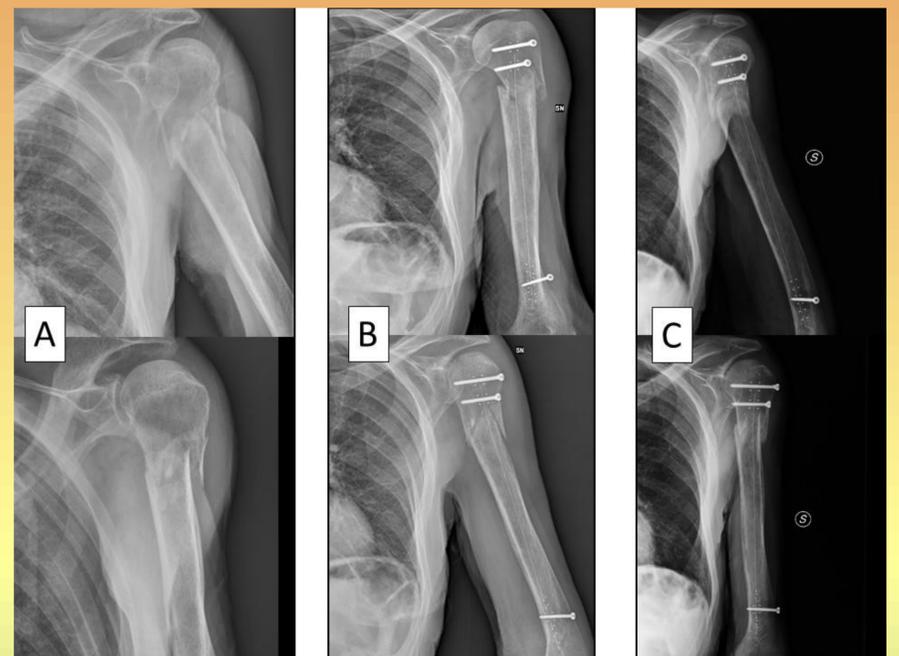
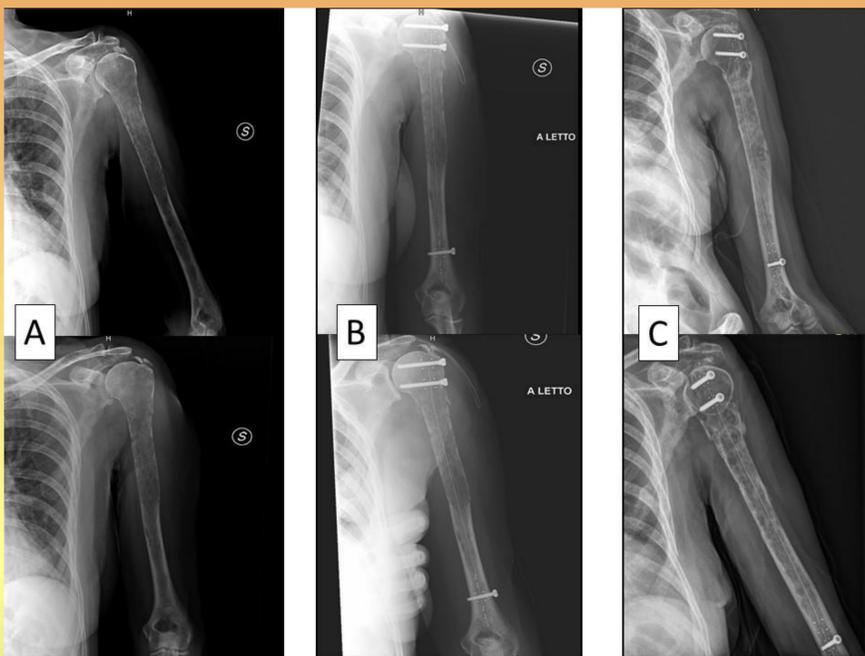
Pathological humeral shaft fractures are about 1/4 of all pathological fractures. Primary tumors of this long bone are rare and usually pathological humeral shaft fracture occur after metastasis or systemic diseases like Multiple Myeloma. The tumors most likely to metastasize to bone are prostate (32%), breast (22%), kidney (16%), lung and thyroid. The treatment of these diseases is very debated, especially to establish which kind of synthesis is better considering the bone tumor pathology study.

MATERIALS AND METHODS

We describe our preferred choice of treatment in cases of pathological humeral shaft fractures showing 3-months follow-up results according to Musculo-Skeletal Tumor Society (MSTS) and Constant Scoring Systems (CSS). The current literature shows the actual validity of the nailing technique with radiopaque nails but few Authors experienced the use of nail with radiolucent material. Two clinical cases of patients with pathological humeral shaft fractures were described. In both cases a surgical fixation of humeral shaft using CarboFix "Piccolo" Humerus Nails, a carbon-fiber-reinforced polyether-ether-ketone (CFR-PEEK) radiolucent humeral intramedullary nail were performed.

The first patient was a 53-year-old female who presented a stage IIIA Salmon-Durie micromolecular multiple myeloma; after two autologous bone marrow transplantations a radiographic evaluation revealed multiple lytic bone lesions throughout the skeleton.

The second patient was a well-appearing 85-year-old male patient with past medical history of prostatic cancer with a malignant invasion of humeral diaphyseal site.



RESULTS

The postoperative evolution was good in both cases: at the first month follow-up control MSTS scoring system was 18, and at the third month was 28 (no pain, a little restriction of her shoulder function with a range of motion in elevation of 160°, she was enthused, an intermediate hand position in the space, an intermediate dexterity with a limitation only when she did a fine work and a normal load about lifting ability). The CSS were 68 and 87 at one month and three months follow-up after surgery, with a good improvement of function and no pain. At three-months follow up the radiographic evaluation showed a complete consolidation of fracture site.



CONCLUSION

The property of CarboFix "Piccolo" Humerus Nails allows better visualization of the pathological site or the fracture on X-ray plain films, on computed tomography scan or magnetic resonance imaging, after the nail is in place. The advantages using this material in the pathological fractures are the radiolucent property, to permits a better postoperative monitoring of fracture union or tumour evolution through radiographic studies, and the possibility of subsequent radiotherapy with best result. The disadvantages of the CFR PEEK nails are the impossibility to pass over a guide wire (in fact these are uncannulated nails) and the placement of the distal interlocking screws: the distal screw holes are found with radiopaque markers. Being this radiolucent nail the surgical technique is more complicated and surgical time is longer than other humeral nailing systems. The surgical procedure using it must be carried out by expert hands, to limit the amount of ionizing radiation, especially at the beginning: it is longer for the distal locking because the nail is radiolucent.