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## Case Report

### The Unknown Risk of Sub-Radiographic Subtrochanteric Femur Fracture After Cephalomedullary Nail Fixation: Brief Report

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#### ABSTRACT

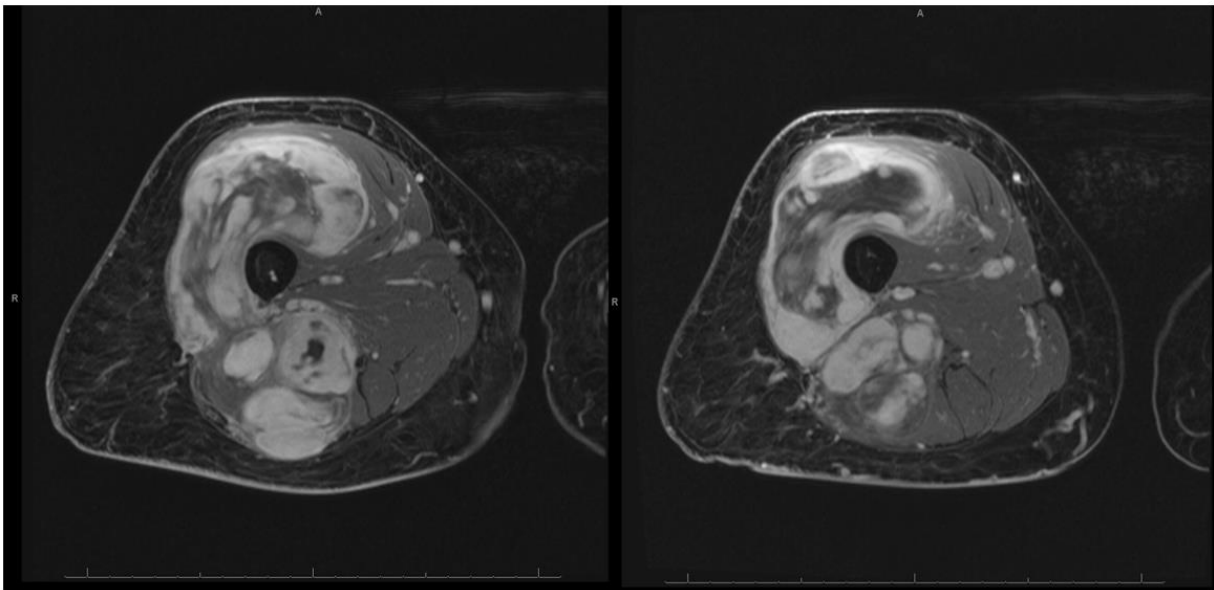
73 years old femur who had right thigh soft tissue sarcoma and had neoadjuvant chemoradiation and scheduled for soft tissue wide resection and prophylactic femur nail in the presence of risks for post operative fracture. During surgery and after tumor wide resection and cephalomedullary nail placement that both went uneventful, noted to have longitudinal subtrochanteric fracture of about 5 cm extended from lag screw down. While the usual placement for nail through radiographic guided, we inserted our nail during open procedure after sarcoma wide resection and would not recognize the presence of fracture if still through minimal invasive radiographic guided. With that, I am raising the fact how many times we instrumented the femur with unknown sequences of sub-radiographic fracture? And what are the implications?

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#### 1. Case Report

This is 73 years female who diagnosed with high grade pleomorphic sarcoma with myxoid features (Figure 1). After multidisciplinary tumor board discussion, she had been started on neoadjuvant chemotherapy of adriamycin and ifosfamide, and completed neoadjuvant radiation as well. The patient then underwent wide resection of the femur with open

placement of prophylactic long cephalomedullary femoral nail. Upon completion of nail fixation and ranging the hip joint, noted to have femoral fracture started just distal to lag screw and extended to about 5 cm distally in longitudinal fashion (Figure 2). The fracture is obvious in open procedure but hard to recognize in the intraoperative images. We fixed the fracture by cerclage wire for further protection and support. The patient did well in post operative recovery.

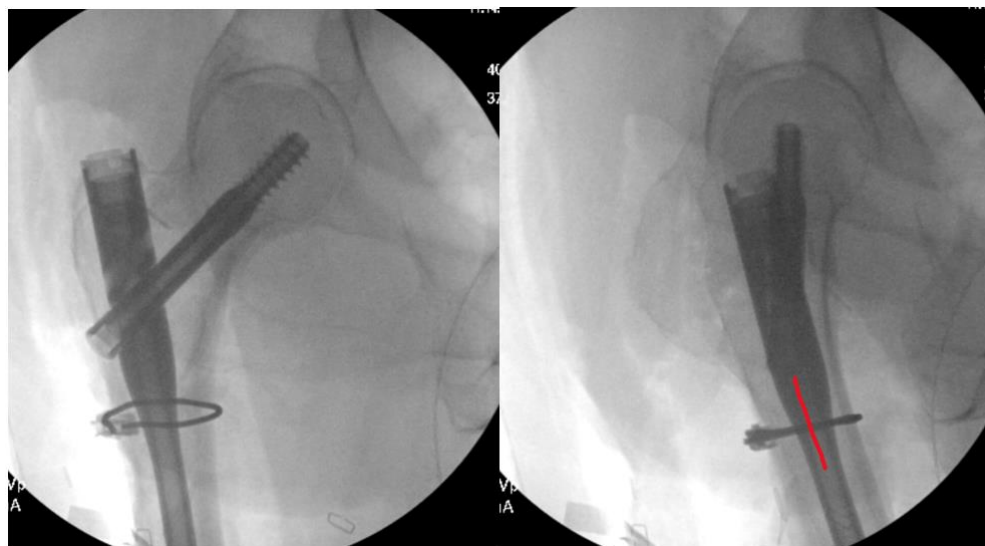


**FIGURE 1:** Two axial cuts in MRI with contrast showed the mass surrounding the femur and involving anterior, lateral, and posterior thigh compartments.

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**FIGURE 2:** AP and lateral views of the hip with cephalomedullary nail and cerclage fixation. The red line represents the fracture line which hard to recognize in this fluoroscopy pictures, however, it was obvious during open procedure.

## 2. Discussion

While there is increasing surge of using cephalomedullary femur implants in the last decades [1], the incidence of associated complications being increased as well and lateral hip pain is considered the most prominent [2-4]. One of indications for prophylactic cephalomedullary nail fixation is impending or complete fracture for metastatic diseases [5], however, sometime indicated once the risk factors are present like in our case which are female, excision of periosteum, and had preoperative chemoradiation [6].

During the procedure, the width of lag screw - the one goes to femoral neck - is about one-third of the femur width which technically put the femur split fracture at risk. However, we usually do not think about it because the procedure is minimally invasive and guided by fluoroscopy. But, because we did the nail fixation after wide resection of the tumor and while almost entire femur was open, it was easy to recognize the fracture once happened. Furthermore, it would be extremely difficult to demonstrate the fracture in intraoperative images for the reasons of the quality of fluoroscopy, fracture pattern of longitudinal split and non-displaced.

In summery and to my knowledge, this is the first report of such case and aiming to open the awareness among orthopedics surgeons for hidden sub-radiographic fracture that we might encounter during cephalomedullary femur nail which neither able to know the incidence nor the implications from this report. I recommended to further investigate such issue with larger well-structured studies to find out more about the incidence and potential needs for post operative advanced 3D images in symptomatic patients after nail placement.

## Funding

None.

## Ethical Approval

The study was not subject to institutional review board approval. Data is available for review. No portions of this work were previously published.

## Acknowledgement

None.

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