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A Case Report

**SURGICAL TREATMENT AND MANAGEMENT OF  
ORTHOPEDIC IMPLANT INFECTION: CASE REPORT AND  
LITERATURE REVIEW****Abdulmalik A Almajed<sup>1</sup>, Omar A Alsultan<sup>1</sup>, Hisham S Alhathloul<sup>1</sup>,  
Abdulkhalq A Al-Qahtani<sup>1</sup>, Hazem W Alhasan<sup>1</sup>, Ammar I Salman<sup>1</sup>**<sup>1</sup> Dammam Of Orthopedic, Dammam Medical Complex, Dammam, Saudi Arabia**Article Received:** October 2022**Accepted:** October 2022**Published:** October 2022**Abstract:**

*Femur is the most fractured long bone in the body that often necessitates surgical fixation. One of the most challenging complications in trauma surgery is infection after fracture fixation (IAFF). Herein we presented A 39 years old male drug addict, he underwent close reduction and internal fixation right femur fracture on 2013 with no follow up in primary hospital. On July 2017 he presented to our hospital with a history of pain in his right thigh, the clinical examination showed a sinus discharge from right thigh, he was controlled by irrigation and debridement and inserting of antibiotics tens nail. He was followed up by X-ray scanning. On August 2018 patient presented with broken plate and fibula graft, after removal of broken plate and application of double plate for right femur fracture the X-ray scan show callus formation.*

**Keywords:** Surgical treatment, Orthopedic, Implant, Infection, Femur, Fracture.

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**INTRODUCTION:**

The femur plays a vital role in weight bearing in the lower extremities and is the most fractured long bone in the body that often necessitates surgical fixation [1]. The incidence of femur fractures is 10 to 37 per 100,000 patients annually, with a peak in young men at age 27 years and in older women at age 80 years [2]. Open fractures, tobacco use, delayed weight bearing, comminution of the fracture site, instability of fracture reduction, non-steroidal anti-inflammatory drugs may intervene in fracture healing and inadequate choice of nail diameter were reported as the risk factors of nonunion and infection after fracture fixation (IAFF) [3]. Traumatic femur fracture is a significant cause of morbidity with an annual incidence between 1.0 and 2.9 million worldwide [4]. Herein we presented a 39 years old addict man with infection after right femur fracture fixation.

**Literature Review:**

A literature review estimated that fracture-fixation device infections comprise <5% of all implant associated infections [5], whereas a single center cohort study at Geneva University Hospital pooling clinical data on orthopaedic infections reported that 24% of all cases involved osteosynthetic material [6]. In general, prevalence data on FRI vary in the literature. For instance, a multi-center study carried out in India included 787 participants with tibia fractures, estimating the incidence of infection as 1.6% for closed fractures and 8.0% for open fracture [7], whereas Metsemakers and colleagues found an infection rate of 3.4% in a cohort of 358 patients with tibia fractures [8]. Blonna et al. reported an infection rate of 4% out of 452 proximal humeral fractures and Ovaska et al. identified 5% of 1923 consecutive ankle fractures to be infected [9]. Additionally, a review on open femoral shaft fractures treated with intramedullary nailing estimated an infection rate of 6%, whereas another review reported infection rates in

the range of 0.9–11.6% comparing outcomes of open tibial fractures [10, 11]. A non-union with bony defects after repeated efforts at surgical repair occasionally occurs and has been reported [12].

**CASE PRESENTATION:**

A 39 years old drug addicted male, he underwent close reduction and internal fixation right femur fracture on 2013 with no follow up in primary hospital. On July 2017 he presented to our hospital with a history of stress dependent pain and swelling in his right thigh, the clinical examination showed a sinus discharge from right thigh. The x-ray scan showed non-union femur fracture and confirmed a sinus discharge from right thigh (Figure 1). The wound culture reported the infection, Patient underwent multiple irrigation and debridement and was started on antibiotics as per culture.

On September 2017 patient underwent irrigation and debridement and inserting of antibiotics tens nail (figure 2). Patient was doing well wound looks better. On October 2017 patient underwent irrigation and debridement and fracture end was refreshed and open reduction internal fixation (ORIF) by plates and screws and application of bone cement mixed with vancomycin. (Figure 3), on February 2018 after resolved of infection there was around 20 cm bone defect gap so open reduction and internal fixation with auto-grafted vascularized fibula graft taken from left leg to filling the bone defect (figure 3).

On August 2018, the patient presented to ER with broken plate and fibula graft X-ray during follow up (Figure 5). After removal of broken plate and application of double plate for right femur fracture for more stability, the fracture showed callus formation (Figure 6). During follow up bone healing well and patient started partial weight bearing with no signs of infection from the wound.



Figure 1: The x-ray showed non-union femur fracture fixed by intramedullary nail .



Figure 2:x ray showed right femur insertion of intramedullary tens nail with antibiotic.

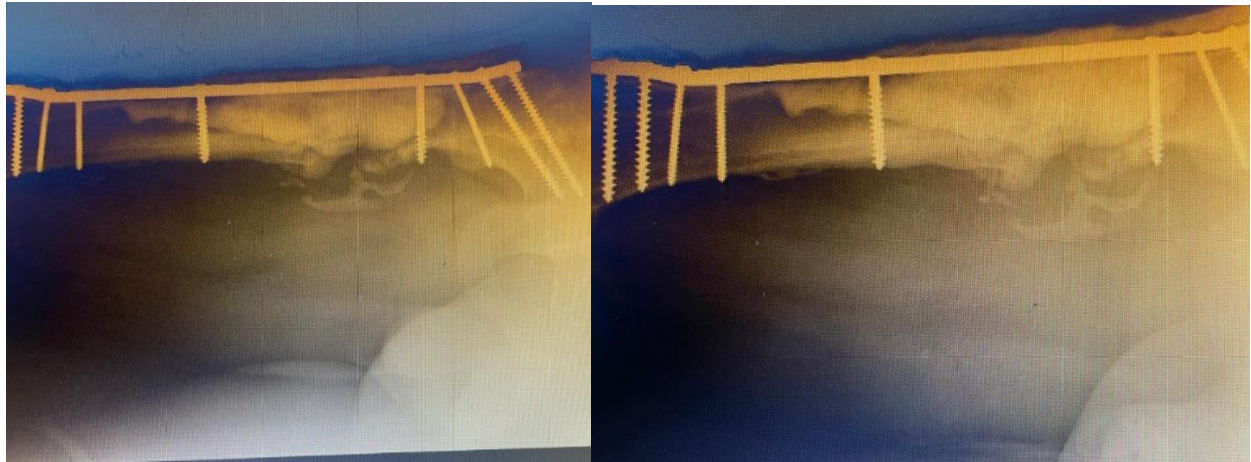


Figure3 : X-ray showed the open reduction internal fixation (ORIF) by plates and screws and application of bone cement mixed vancomycin.

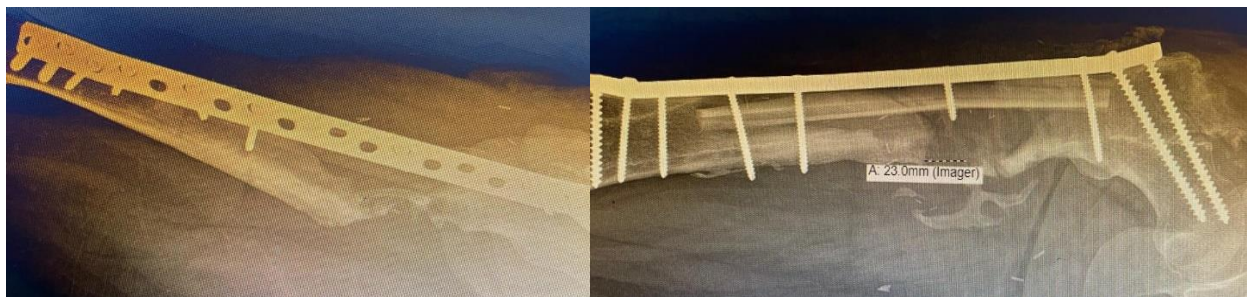


Figure 4 : x ray showed open reduction and internal fixation and vascularized fibula graft taken from left leg.



Figure 5: X-ray scan showed broken plate and fibula graft.

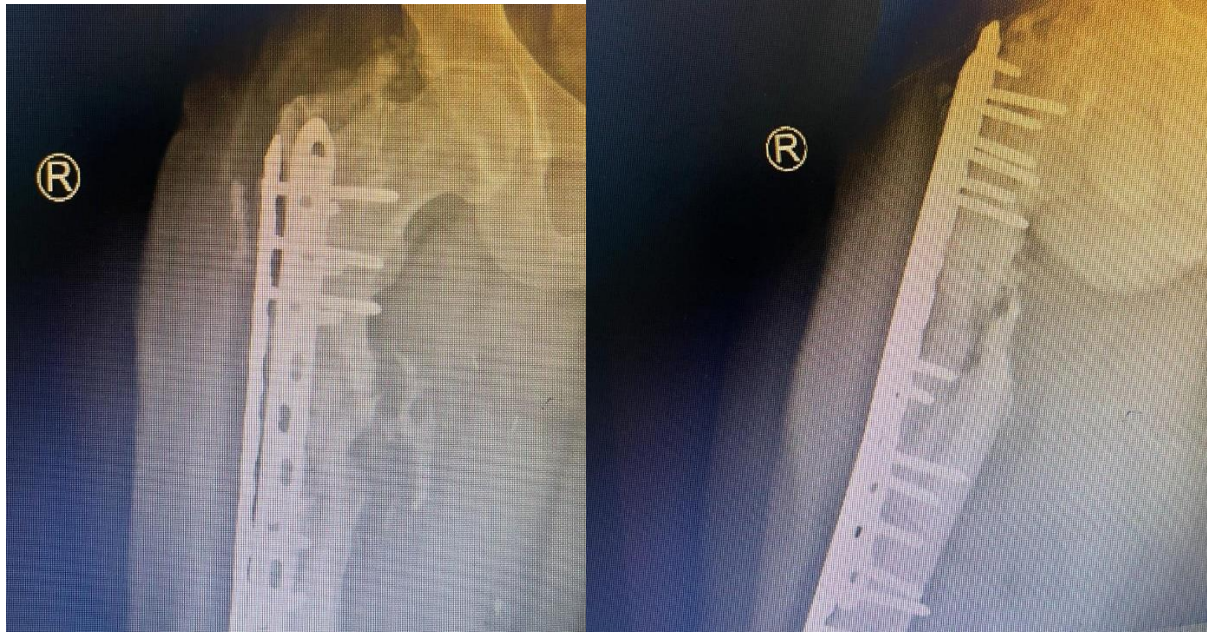


Figure 6: X-ray showed application of double plate for right femur fracture and the fracture showed callus formation.

#### DISCUSSION:

Orthopaedic implants are utilized for joint replacement and bone fixation [13]. Internal fixation devices are only temporarily required and can be extracted after a bone fracture healing. They are highly liable to infection [14]. Our case is a 39 years old drug addicted male with infection after right femur fracture fixation.

Many late infections cases can admit with light symptoms, compromised functionality and stress dependent pain, localized swelling and erythema or a draining sinus tract, mostly lacking systemic manifestation [15]. In cases admitted with compromised functionality and stress dependent pain, infection with low-virulence micro-organisms should always be considered a possible cause (a clinically silent infection) [15]. Regarding our patient, he was admitted with stress dependent pain and swelling in his right thigh, the clinical examination showed a sinus discharge from right thigh, the wound culture reported the infection.

The aim of any medical protocol for the management of orthopaedic and trauma device-related infection (ODRI) should concern the long-term recovery of pain and recuperation of function of the affected joint. Usually this involves a therapeutic way aiming for certain removal of the micro-organisms causing infection, but in some circumstances can entail long-term suppressive antibiotic therapy. Hence, each

treatment must be tailored to the needs and the medical conditions of the individual patient [16]. Antibiotic impregnated nailing is a single stage treatment modality to overcome troublesome infection and achieve stability. It provides stability across the fracture site, unlike cement beads [17]. They allow higher concentration of antibiotic at the local site (including avascular bony fragments) and is associated with fewer side effects. Antibiotic impregnated nail continues eluting antibiotic at the site of fracture for up to three years and thus, having a positive decisive role in refractory infection [18]. The antibiotic impregnation will also stimulate the proliferation of osteoblasts in infection free zone around the fracture site thus, enhancing the rate of new healthy bone tissue formation and strong fixation of the bone [19]. Our patient was firstly controlled by multiple irrigation and debridement and inserting of antibiotics tens nail. Vancomycin bony cement was also effective in second management stage. Patient was doing well wound looks better.

In severe cases, using a free vascularized bone graft and ORIF can be considered as a useful salvage procedure. However, there are few reports in the literature dealing with this surgical technique due to the unclear side effects of fibula harvesting [12, 20]. Regarding our case, open reduction internal fixation (ORIF) with dynamic compression plate (DCP), auto-grafted vascularized fibula graft taken from left leg and Vancomycin bony cement was applied and filling the

bony defect. The plate was broken and replaced by application of double plate for right femur fracture, the fracture showed callus formation. The follow up showed well bone healing and patient started partial weight bearing with no signs of infection from the wound.

### CONCLUSION:

Infection after fracture fixation (IAFF) is one of the most challenging complications in trauma surgery. Our case was 39 years old addict man with infection after right femur fracture fixation. Addiction and tobacco smoking are risk factors of nonunion and IAFF. Antibiotic impregnated nailing is a single stage treatment modality to overcome troublesome infection and achieve stability. Open reduction internal fixation (ORIF) with dynamic compression plate (DCP) and auto-grafted vascularized fibula graft taken from left leg was effective in controlling our case .

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