

Locked intramedullary nailing technique of the femur without brilliance amplifier at the trauma and orthopedics department of the university hospital of peace series on 35 cases during 1 year

Abstract

Femoral fractures increase the length of hospital stay for our patients for several reasons such as lack of blood, economic resources, and lack of infrastructure. The use of a C-arm has been shown to reduce patient morbidity due to early functional recovery and reduced hospital stay.

Objective: To develop an intramedullary nailing technique without c-arm with a closed focus to reduce the duration of hospitalization of its patients as well as the cost related to the equipment used for follow-up.

Methodology: prospective study on 35 patients for 1 year August 2020 to August 2021

Results: We followed 35 patients in which the mean age was 37.83 years with extremes of 18 and 78 years. The male sex predominates 21 against 14 women or 60% against 40% respectively. The sex ratio is 1.5. A total of 19 diaphyseal fractures (54.3%) were nailed, 9 supracondylar (25.7%) and 7 subtrochanteric (20%). Twenty-seven were closed fractures (71.1%), and 8 were open fractures (22.9%). The length of hospitalization was less than 3 days for 30 patients (85.7%), and more than 3 days for 5 patients (14.3%).

Conclusion: We recommend that we promote this closed-hearth technique because it improves the postoperative follow-up of patients. Additionally, it would reduce exposure to radiation from c-arm in hospitals that have this equipment.

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Introduction

High-energy trauma is the main mechanism for the occurrence of femoral shaft fractures. Faced with this type of fracture, locked intramedullary nailing has over time become the treatment of choice.¹ In fact, the surgical treatment of these fractures is done either with open focus, or with closed focus, by antegrade or retrograde approach.²⁻⁴ In addition, the intraoperative use of C-arm in orthopedic surgery has become an important arsenal in most orthopedic procedures.⁵ Its use has been shown to improve the skill of the surgeon and reduce morbidity for patients due to minimal soft tissue devitalization, early functional recovery and reduced hospital stay.⁶ However, the University Peace Hospital's C-arm has been non-functional for over a year. Also, the costs of the material used for the management of the operative wound as well as the drugs are under the responsibility of the patients. Femoral fractures increase the length of hospital stay in our ward for several reasons: lack of blood, economic resources, lack of infrastructure. Because of this, we were forced to ask ourselves how to develop a technique of intramedullary nailing without c-arm with closed focus in order to reduce the duration of hospitalization of our patients as well as the cost related to the material used for follow-up.

Methodology

This is a prospective study carried out over a 6-month period on 35 patients who underwent closed intramedullary nailing by antegrade or retrograde route without brilliance enhancer. The progress of the patients was followed for 1 year postoperatively. We used the SPSS

data processing software and the PubMed search engines using the keywords "intramedullary nailing of the femur", "open vs closed reduction", "<<C-arm>>" for the review. Our objective was to assess the impact of this technique, firstly on the reduction in the use of blood transfusion during and after the operation, secondly, on the evolution of these patients after surgery and lastly, on the reduction in the cost of follow-up postoperative until social reintegration.

After approval by the department's ethics committee, a consent sheet was required to be signed by the study participants explaining to them the risks resulting from this technique, as well as the advantages. A code was assigned to patients to respect confidentiality.

We included all proximal, diaphyseal, and/or distal femoral fractures in patients at least 18 years of age whose trauma date does not exceed 2 weeks. We excluded patients with a trauma date greater than 2 weeks or who had an open fracture classified as Gustillo et al.² The patients received 1g of cephazolin approximately 1 hour prior to the incision.

Antegrade technique

The patient was positioned in lateral decubitus, the greater trochanter was located, through 3 fingers above a 3 cm incision is made, a plane-by-plane dissection is carried out until the piriform fossa is located. The entry point was achieved with the pigtail and the canal with Rimmer at N+2. We used a SIGN type locked nail for fastening. After preparing the canal, we introduced the nail while the assistant did a slight traction accompanied by an abduction of the thigh to promote reduction. Sometimes a 6mm screw applied to an

American handle was introduced on the distal fragment allowing us to look for the “vis-à-vis” of the two ends of the fracture (Figure 1).



Figure 1 Locked intramedullary nailing by antegrade approach on a closed subtrochanteric fracture.

Retrograde technique

The patient was placed supine with Alaska triangle in place. A 1 cm incision was made opposite the patellar tendon, dissection until the tendon was incised in the direction of its fibers. Rimmer channel was N+2. Then, a nail was inserted. The assistant then pulled gently, and the main surgeon introduced the nail into the canal, looking for it opposite both fracture ends. A 6mm plug can also be used on an American handle to be able to play with the bone ends in all directions seeking the reduction (Figure 2).



Figure 2 Retrograde closed intramedullary nailing on a closed segmental femoral fracture.

Results

We followed 35 patients whose average age was 37.83 years with extremes of 18 and 78 years. The male sex predominates 21 against 14 women or 60% against 40%. The sex ratio is 1.5. We nailed 19 diaphyseal fractures (54.3%), 9 supracondylar (25.7%) and 7 subtrochanteric (20%). Twenty-seven had a closed fracture (71.1%), while 8 had an open fracture (22.9%). The length of hospitalization

was less than 3 days for 30 patients (85.7%), and more than 3 days for 5 patients (14.3%). We performed 18 ECMV in retrograde (51.4%) and 17 in antegrade (48.6%). The outcome is satisfactory for 33 patients; we had 2 infections in the surgical sites corresponding to the points of location of the screws. Two patients had less than 7g of hemoglobin preoperatively (5.7%), 13 patient (37.1%) between 7g and 10g of hemoglobin, and 20 (57.1%) patients had more than 10g. No patient was transfused intraoperatively.

Discussion

Our study population is relatively composed of adults. Patients under the age of 18, whose decision is made by parents were also excluded. Another reason for this was to ensure bone growth development. The male gender predominates, most likely because men in our culture are more exposed to trauma than women. Although controversial over time, within 6 hours of the date of trauma, we nailed open fractures Gustillo et al. The duration of hospitalization is less than 3 days for most patients. This reduces the cost of postoperative care for the patient because the latter spends less time in the service, and also allows us to manage a greater patient volume also given the rapid availability of beds. This technique promotes early emergence. We believe the retrograde technique is easier to perform because of the Alaskan Triangle which already reduces the antero-posterior mobility of the fracture. So we will seek the reduction of the fracture by directing the Rimmer then the nail internally for the action of the adductors. However, the antegrade technique seems to be more difficult because there is more mobility of the fragment in all directions. We recommend to block one of the axes of movement either with a 6mm plug mounted on an American handle applied to the distal end of the fracture, or to apply a support between the thighs during the reduction of the fracture. This is a minimally invasive technique, so we have not really had to recourse to transfusion. Additionally, the SIGN nail which is based on the principle that between two parallel straight lines, any perpendicular to one is also to the other and gives the advantage of being 100% sure that the nail is locked in the canal which explains why we have no re-dos.

Conclusion

In developing countries, the weakness of hospital infrastructure increases the cost of health care. In our context, we do not have a C-arm available, which is why we are recommending that we promote this closed-hearth technique because it improves the postoperative follow-up of patients. But also, it would reduce exposure to radiation from c-arm in hospitals that have it. In addition, another multicenter study should be encouraged to better understand this technique.

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None.

Conflicts of interest

The authors do no declare no conflicts of interest.

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