



Retrograde Intramedullary Nail for Tibiototalcalcaneal Fusion as a Limb Salvage Procedure for Landmine Foot Injury

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ABSTRACT

The authors report the case of a 25-years-old officer, a victim of an anti-tank mine explosion. The initial lesional assessment revealed an open fracture of the left foot associated with a complex closed fracture at the middle third level of the ipsilateral tibia and fibula. The treatment was conservative, combining, at a first stage, a surgical act with connection of the talar, tibiotalar and subtalar joints with exo-fixation of the tibia. Followed, at the second stage, by a latissimus dorsi flap coverage of the loss of cutaneous substance secondary to infection. The evolution was marked by the skin healing and malunited ankle fractures. However, the patient had some residual pain in the ankle accompanied by disorders of walking was settled by the use of retrograde intramedullary nail. The evolution was marked by bone healing and resumption of walking. The functional score was at 72 at the last check. This result was highly satisfactory with 25 points of functional score improvement.

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1. Introduction

The mine injures, mutilates or kills regardless of race color, and regardless of the person who operates it. It causes lesions mainly in the lower limbs that can be closed or open in most cases. [1] In the 90s, the "Landmine feet" were essentially treated by amputation. [2] Currently the development of surgical techniques offers the possibility to increasingly rescue members.

2. Clinical Case

The patient is a 25-years-old officer who was victim, by blast effect, of multiple fracture of the left lower limb due to an explosion of an "anti-tank mine" while riding a vehicle; The initial lesions assessment was an open fracture of the ankle classified as Gustilo IIIB with strong comminution and enucleation of the left talus, and complex closed fracture of the middle third of the tibia and fibula. The initial management of the case in a "Level I" hospital, which was near the scene of the accident, consisted of a patient conditioning, disinfection, parenteral antibiotics, tetanus prophylaxis and analgesics. Eight hours after the accident, he was admitted at the "level III" military hospital of Rabat. The treatment was conservative and included surgical debridement, a fusion of the talar comminution, of the talonavicular and calcaneofibular talocrural joint, and exo-fixation of the tibia and also bridging the ankle (Fig. 1).

The follow-up has been marked by the installation of a local sepsis protected by iterative dressings in the operating room, under coverage of a targeted antibiotic therapy and hyperbaric oxygen therapy. After drying and standardization of C-reactive protein (CRP) the patient has received coverage of the loss of soft tissue by the latissimus dorsi flap. For a period of eight months, the patient has had pain while walking associated with lameness, a varus talus and talar malunion objectified in conventional radiography. We have adopted, for the evaluation of this result, SFMCP score (Score of French Society of Medicine and Surgery of the

Foot) that is composed of 100 points and of which the value was 47 for our patient. Arthrodesis of the ankle by retrograde intramedullary nail with corticospongious autologous graft was indicated.



Figure 1. Lateral radiograph showing external osteosynthesis of tibial shaft and ankle bridging and multiple broaching the tarsal bone.

3. Results

Radiological bone healing was achieved after a period of 19 weeks after arthrodesis (Fig. 2).



Figure 2. Lateral radiograph showing the ankle arthrodesis by retrograde nail.

Full weight bearing was possible two months after the surgery although the patient had a shortening of two centimeters compensated by suitable footwear (Fig. 3). Walking was performed occasionally with a single cane with no abnormalities of walking on rough ground or walking up and down stairs.



Figure 3. Clinical result after ankle arthrodesis.

The patient was evaluated according to the SFMCP score; the value was 72 after 36 months which represents a gain of 25 points after arthrodesis. Furthermore, functional re-education ensured recovery of functional autonomy in daily life activities through the maintenance of knee mobility and metatarsophalangeal joints mobility.

4. Discussion

The landmine foot has been described since the Second World War; it is characterized by an etiological-pathogenetic uniqueness and serious injuries of the lower extremities. It is often considered as the prerogative of soldiers, but according to the records of the International Committee of the Red Cross, half the victims of mine explosion recorded between 1991 and 1996 were civilians, a quarter of which were children [1]. According to the literature, amputation was systematic for decaying lesions classified Gustillo IIIB C. The studies of generic scores and quality of life show that physical scores were similar between radical and conservative treatment which is however more psychologically accepted [3]. For others, amputation may be a satisfactory solution due to the fragile network of care and case management conditions that did not allow coping with the complications of conservative treatment [4]. In general, and in order to quantify the severity of injury there are, in the literature, predictive scores proposed by several authors[5] to justify the indication of amputation or conservative treatment, among which we note the score of MESS (mangled extremity severity score). LSI (limb salvage index) .and PSI (predictive salvage index).

According to a prospective study of 26 patients; Johansen et al [6] proposed the MESS score based on four clinical criteria: the bone injuries and soft tissue damage, the limb ischemia, the age and the presence of shock.

A point system was developed according to the degree of severity of each of the four criteria and concluded that a MESS score that is less than 7 predicts conservative treatment and a score that is equal to or above 7 predicts amputation.

For a series of 58 patients [7] with severe trauma of the lower limb, the authors concluded that MESS is a powerful predictive score with sensitivity of 91% and specificity of 98%;

In our case, the patient presented an injury classified Gustillo IIIB with a MESS score that is less than 7 which could justify conservative treatment; subjectively, the patient was satisfied with the intervention by net decrease of pain and ankle stability on clinical examination. Secondly, arthrodesis

by retrograde intramedullary nail was a satisfactory solution in terms of function and pain. It remains the treatment of choice in major ankle injuries, with a reduced time of immobilization and weight bearing from the second month, despite the development of prosthetic surgery [8]. According to the literature, the results after arthrodesis by retrograde nail are encouraging with consolidation ratios of 90 to 93% ; associated with a lower rate of pseudarthrosis [9]

The literature is plentiful with regard to arthrodesis indication of the ankle by retrograde nail in degenerative pathology (Charcot's arthropathy, osteoarthritis, infectious polio) but very limited regarding acute traumatic pathology of the ankle [10]. In our observation, the retrograde intramedullary nail is a good alternative in the conservative treatment of landmine foot with complete satisfaction concerning pain and walking despite the fact that consolidation is achieved after a period of 19 weeks. This result can be explained by the fact that the nail provides better stiffness in all aspects due to its locking system, reducing the risk of migration and promoting weight bearing and consolidation. However, it is not always easy to position the foot when the bone damage is important.

5. Conclusion

The management of the landmine foot is delicate and depends on the severity of the injuries. It can oscillate between conservative treatment and amputation. It is a real challenge when one opts for conservation until achieving a painless functional foot by arthrodesis by retrograde intramedullary nail with very satisfactory results.

6. Conflict of interest

The authors declare no conflict of interest.

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