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Orthopedic Surgery

Treatment of Septic Pseudarthrosis of Leg by Induced Membrane Technique and Reamer Irriogator Aspirator: About ACase

Mohamed Ben-Aissi[1*], Mohammed Kadiri[1], Redouane Hani[1], Arthur Rakotonarivo[2], Paolo Palmari[2], Mohamed Kharmaz[1], Moulay Omar Lamrani[1], Mohamed Ouadghiri[1], Ahmed EL Bardouni[1], Mustapha Mahfoud[1], Mohamed Saleh Berrada[1]
[1]Orthopedic surgery and traumatology department, IbnSina Hospital, Rabat
[2]Orthopedic surgery and traumatology department, Robert Ballanger Hospital, Paris

Case Report

***Corresponding author**
Mohamed Ben-Aissi

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Abstract: The device called R.I.A (Reamer-Irrigator-Aspirator) combines a bore, a continuous irrigation and a suction system connected to a filter to collect the bore product.Here we present the case of a young patient who presented septic pseudarthrosis in his right leg, treated by the induced membrane technique, followed by the establishment of a graft obtained the RIA system from the contralateral femur, with very good postoperative results.
Keywords: Reamer-Irrigator-Aspirator, Pseudarthrosis.

INTRODUCTION

The most commonly used sampling sites for performing bone grafts are the iliac crests which have the drawbacks of providing a limited amount of bone, and which are not without complications.

The device called R.I.A (Reamer-Irrigator-Aspirator) combines a bore, a continuous irrigation and a suction system connected to a filter to collect the bore product.

OBSERVATIONS

This is a 21-year-old pedestrian struck by a car, with isolated impact in the right leg resulting in a closed mediodiaphyseal fracture of the 2 bones of the right leg, with a 3rd fragment in the butterfly wing at the level of the right leg (Figure 1).

The patient benefited from intramedullary closed nailing of the tibia with double distal locking and proximal locking. Walking with contact support was allowed. The early postoperative course was simple (Figure 2).

At 6 months postoperatively, the patient presented an anterior fistula with respect to the fracture site, returning a seropurulent flow, in the presence of a non-union of the tibia (Figure 3).

Resection of the fistulous tract with removal of the osteosynthesis material was decided, associated with tibia boring. In view of the persistent mobility of the fracture site, a resection of the septic pseudarthrosis focal point was performed, allowing 2 cm of fistula to be carried on both sides, followed by the placement of an external fixator and a cement spacer (Figure 4). The bacteriological samples showed the presence of 2 germs: Pseudomonas aeruginosa and Staphylococcus aureus, for which the patient was put under a bi-antibiotic therapy.

The evolution was marked by a complete drying up of the nonunion center. 2 months later, the patient was admitted in the operating room to replace spacer cement with a bone graft collected from the contralateral femur using a system of "Reamer Irrigator Aspirator".

Initially, the patient was placed on an orthopedic table, a borehole of the greater trochanter followed by the placement of a guide pin and a bore of the left femur were performed with interlocking irrigation and suction during boring, thanks to an RIA system, this allowed the recovery of a spongy graft 2 cm in diameter and 4 cm in length. In a second step, the patient was installed on a normal table; the files of the external fixator were removed. After whitewashing and grazing, a mediodiaphyseal external approach, followed by an opening of the membrane induced with an anatomical knife, allowed the removal of the cement, then the filling of the void with cancellous graft already recovered by the RIA system. The compression was performed by an osteosynthesis using an anatomic plate with locked screws (Figure 5).

The postoperative course was simple, and oral bi-antibiotic therapy was continued for six weeks postoperatively. After a follow-up of 10 months, the patient resumed a normal and painless walking, the control x-rays were used to objectify a consolidation of the tibia with fusion (Figure 6) and corticalization of the graft (Figure 7).

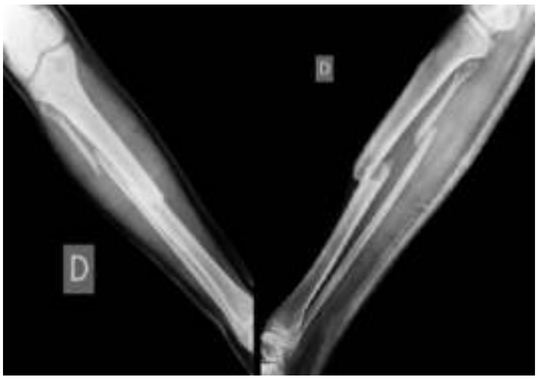

Fig-1: Radiography of the leg showing a mediodiaphyseal fracture of leg bones.

Fig-2: Intramedullary closed nailing of the tibia with double distal locking and proximal locking

Fig-3: Radiography of control realized in 6 months in post-operative objectifying a pseudarthrose of the tibia

Fig-4: Ablation of the centro-medullary nail with resection of the infected bone, followed by a fixation by external fixator and put by a spacer in the cement

Fig-5: Replacement of the cement by a bone graft obtained by the system RIA at the level of the contro-side thighbone and fixation interns by a screwed plate

Fig-6: Radiological control in 6 months objectifying a consolidation of the site of pseudarthrosis

Fig-7: Radiological control at 10 months objectifying a corticalisation of the graft

DISCUSSION

The intramedullary nailing popularized by Küntscher [1] in 1940, is one of the essential techniques in the management of diaphyseal fractures of long bones [2, 3].

The bore is an integral part of the nailing technique and allows the introduction of nail diameter greater than that of the intramedullary cavity. However, we must not ignore the complications related to the bore described in the literature [4] such as fat embolism, ARDS, bone necrosis related to overheating, some of which may lead to perioperative death [5, 6]. This is why some teams have been studying the development of an alternative reamer system whose interest is to reduce the intra-medullary pressure during reaming [7, 8].

R.I.A is an intramedullary bore system combined with a physiological saline aspiration and irrigation device. It allows increasing the diameter of the intramedullary cavity of a long bone in view of a possible nailing while decreasing the intramedullary pressure compared to a traditional reamer through the suction system. The irrigation system allows him to reduce the phenomenon of bone heating. However the main interest of this device is to be able (thanks to the combined action of the bore, the irrigation, and the aspiration) to collect the product of bore in the form of corticospongious bone [9, 10].

Danckwardt-Lillieström [11], a Scandinavian surgeon, imagined the principle of boring combined with irrigation and aspiration, and it was in 1986 that Stürmer and Tammen developed the technique [12]. But it is only much more recently that the osteoinductive potential of the boring product [13, 14], and its use as a bone autograft in orthopedic and traumatological surgery, but also in maxillofacial surgery has been studied. and in neurosurgery.

According to the literature [15, 16], engraftment by boring can recover a large volume of autologous bone with low morbidity compared to the iliac crest.

The RIA system provides a graft volume of 30 to 90 cc. The volume is therefore more important than a crest (13 to 30 cc), however, it is in the form of cortico-spongy debris, and cannot ensure a mechanical role, as can a tricortical graft derived from an iliac crest.

The morbidity of the samples is an established and objective fact. The complication rate varies from 2.5 to 39%. The most optimistic authors report 10% of pain after 1 year or more. The pain is not always very strong but is the consequence of an accessory surgical procedure. Other complications are frequently mentioned: hematoma, scar, seroma, and abscess.

CONCLUSION

Although there are many techniques to deal with the loss of bone substances, they all follow the same pattern of three times, separate or combined: the "flattening" of the focus, the repair of the soft parts, and the bone reconstruction proper. Whatever technique is used, its purpose is to obtain consolidation. It is in this third phase that the technique of R.I.A.

The 'reamer-irrigator-aspirator' (RIA) is an innovation developed to reduce fat embolism and thermal necrosis that can occur during reaming / nailing of long-bone fractures.

Conflicts of interest

The authors do not declare any conflict of interest.

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