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Case Report

Thoracic limb salvage by fibular free flap

Rodrigo Banegas Ruiz[1], Alan I. Valderrama Treviño[2], Francisco Fabián Gómez Mendoza[3], Rodrigo A. Mendoza Aceves[4], Rigoberto Roman Hernández[5], Ismael Vejar Alba[6], Fernando Gómez Verdejo[7], José Antonio Rivas Montero[8], Karolina Ortega López[9], Yuri Jiménez Caprielova[10], Leonel Dalain Hernández Arteaga[11], Emilio Pérez Ortega[10], Baltazar Barrera Mera[12]*

[1]Department of Traumatology, Rehabilitation Hospital, Luis Guillermo Ibarra Ibarra, CDMX, Mexico
[2]Laboratory of Experimental Immunotherapy and Tissue Engineering, Faculty of Medicine, UNAM, CDMX, Mexico
[3]Department of Hand Surgery, Central Military Hospital, CDMX, Mexico
[4]Department of Anesthesiology, Angeles del Pedregal Hospital, CDMX, Mexico
[5]Department of Peripheral Vascular Surgery, [6]Department of Maxillofacial Surgery, Central Military Hospital, CDMX, Mexico
[7]Resident of the Articular Surgery Subspecialty, Rehabilitation Hospital, Luis Guillermo Ibarra Ibarra, CDMX, Mexico
[8]Service of Hand Surgery and Microsurgery, Rehabilitation Hospital, Luis Guillermo Ibarra Ibarra, CDMX, Mexico
[9]Medical Intern, Central Military Hospital, CDMX, Mexico
[10]Faculty of Medicine, UNAM, CDMX, Mexico
[11]Faculty of Medicine, Autonomous University of Quteretaro, Mexico
[12]Department of Physiology, Faculty of Medicine, UNAM, CDMX, Mexico

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***Correspondence:**
Dr. Baltazar Barrera Mera,
E-mail: baltazar.barrera.mera@gmail.com

ABSTRACT

The treatment of most fractures of the ulna and radius is usually performed by anatomical reduction and internal fixation, when damage is extensive and local soft tissue cannot provide a complete wound coverage, locoregional flaps present a suitable reconstructive benefit. A 35-year-old male patient suffered an exposed diaphysio-metaphyseal fracture with multi-fragmented distal radius. The patient was evaluated during a 10-day period at the National Institute of Rehabilitation, where the osteosynthesis material and a severe infectious process with necrosis were identified. Necrosectomy of the posterior compartment and removal of the osteosynthesis material was performed, a skin defect of approximately 22x16 cm was observed with a bone gap of 6 cm of radius and ulna. a fibula-free flap is placed to correct the skin defect and an external fixative used for bone alignment. The fibular free flap presents an excellent therapeutic alternative in the resolution of bone gaps with extensive skin defect. Whenever a trained microsurgery team is available, current scales of limb injury should be considered but not utilized for therapeutic approach, always trying to shift amputation as the first option, to the very last one of them.

Keywords: Amputation, Complex trauma, Fibular free flap, Fracture, Microsurgery, Microvascular flap

INTRODUCTION

The upper limb is of vital importance in performing everyday activities, with every anatomical region being responsible for several duties. The forearm can be both

protective for trunk and head trauma and also provides the pronation and supination for the hand. With the ulna and radius having a syndesmosis, forearm fractures are usually associated with high energy trauma such as traffic accidents and height falls while performing sports.[1,2]

From a phylogenetic point of view the upper limb can carry out multiple activities and enjoys great mobility, so when injured, failure in achieving the best anatomical repair can have a serious negative impact to perform the many functions for which it was intended, in comparison to the lower limb, that contributes mostly to support and locomotion.[3]

In complex trauma, damage control surgery takes a priority; fracture stabilization, vascular and bleeding control along with necrotic tissue debridement being the most important steps.[4,5] Initial coverage with temporary gauze, bandages and/ or negative pressure systems allow for improvement of the patient's general condition and planning a future evaluation guiding the definitive therapeutic attitude.

The treatment of most fractures of the ulna and radius is usually performed by anatomical reduction and internal fixation, being pseudo arthrosis, infection, neurovascular lesions, compartmental syndrome, ulnar radio synostosis and poor union or vicious consolidation the most common complications.[6-8]

When damage is extensive and local soft tissue cannot provide a complete wound coverage, locoregional flaps present a suitable reconstructive benefit.[9]

The fibular free flap has been described in an extensive number of procedures, it's versatily can be used for head and neck reconstruction surgeries, making it the most commonly used bone or osteocutaneous microvascular flap.[10,11]

CASE REPORT

A 35-year-old male patient, with a history of schizoid psychiatric disorder, suffered an exposed diaphysio-metaphyseal fracture with multi-fragmented distal radius, after falling from the second floor at home.

After going to a private hospital where surgical lavage and osteosynthesis using plates and screws with plaster splint placement is performed, poor clinical evolution results in necrosis of the posterior compartment of the upper right limb, ultimately exposing of the osteosynthesis material. The patient was evaluated during a 10-day period at the National Institute of Rehabilitation, where the osteosynthesis material and a severe infectious process with necrosis were identified (Figure 1).

Necrosectomy of the posterior compartment and removal of the osteosynthesis material was performed, a skin defect of approximately 22x16 cm was observed with a bone gap of 6 cm of radius and ulna (Figure 2). The first step was to use sub atmospheric pressure system as temporary coverage along with osteodesis using a Steimann nail (Figure 3).

Figure 1: Exposure of osteosynthesis material with severe infection and necrosis of the posterior compartment of the right arm.

Figure 2: Traumatic hand: Skin defect is observed, with bone gap and loss of the muscles of the entire posterior compartment: (after surgical cleaning).

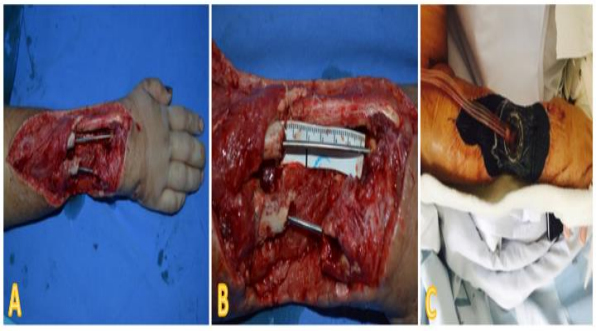

Figure 3: A). Steimann nail osteodesis, B). Measurement of the bone gap after surgical cleaning, C). Placement of subatmospheric pressure system as temporary coverage.

Figure 4: Fibular free flap with skin island and external fixative.

The following week a fibula-free flap is placed to correct the skin defect and an external fixative used for bone alignment (Figure 4).

DISCUSSION

Injuries causing a disruption between forearm and hand anatomical structures, present an important cause for significant disability, specially when not treated in a timely manner. Cutaneous and soft tissue replacement is essential for the wound recovery and as it provides a source of vascularization for the fracture site and favors its consolidation. The selection of the reconstructive coverage procedure depends on the location and magnitude of the defect to be reconstructed.[12]

Although the development of prostheses and technological innovation provide a wide rage state of the art; anatomical, comfortable and functional alternatives, the overall satisfaction is greater in patients who underwent surgery for limb salvage versus amputation procedures and use of prostheses.[13,14]

With the recent development of multiple reconstructive surgery techniques, especially microsurgery and tissue transfer, it is possible to expand the therapeutic options, achieving more refined, aesthetic and safe procedures that allow complex reconstructive problems to be resolved. The structural characteristics of the fibula, such as strength, shape, length and limited morbidity of the donor site, make it an excellent tool for reconstruction of large limb bone defects.[11]

CONCLUSION

The fibular free flap presents an excellent therapeutic alternative in the resolution of bone gaps with extensive skin defect. Development of advance microsurgery and reconstructive surgery techniques calls for a more extensive evaluation of complex traumas such as the one presented in this case report. Whenever a trained microsurgery team is available, current scales of limb injury should be considered but not utilized for therapeutic approach, always trying to shift amputation as the first option, to the very last one of them.

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