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COMPOUND UNICORTICAL BONE LOSS OF TIBIA TREATED WITH FIBULA AS STRUT GRAFT

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ABSTRACT

compound comminuted fractures of the lower limb are commonly associated with gross loss of soft tissues as well as bone. The nature of these injuries is such that the soft tissue planes after healing of the wounds are difficult to demarcate the tissues to rely on for further planning to use them to fill the soft tissue as well as bone defects. In poly trauma patients the choice for tissues is limited in bilateral limb injuries. Fibula has long been used to fill the bone defects as non vascularized as well as vascularized graft in trauma and tumor treatment. The dimensions of the fibula make it an essential choice to fill the bone defects in long tubular diaphyseal defects.

INTRODUCTION

Compound fractures occur with gross violent forces in high velocity road accidents. In patients of poly trauma involving both lower limbs with type IIIB GA compound fractures, the debridement and further soft tissue coverage procedures leave big defects in the bone as well as soft tissues. Once the compound wounds have healed the bone defects need to be filled with bone grafts or bone transport techniques to fill the bone defects.

In a poly trauma patient of both lower limb injuries any one single procedure may not give sufficient fixation with stability and defect filling. The altered scenario of the soft tissue and fibrotic changes following trauma will change the soft tissue plane to have conventional flaps or transfers in the back drop of scarring that follows wound healing before the facture with bone defect is addressed. The fibula can be source of bone graft to fill such defects. We report a poly trauma case in which the compound bone defect was seen in the Tibia with single cortex bone loss.

CASE REPORT:

a male patient of 25 years of age was brought to the casualty, injured in a road traffic accident. He was assessed for life threatening injuries and found to be in shock because of multiple injuries. He was revived with bolus iv fluids blood transfusion and O2 inhalations. His preliminary assessment revealed deformities at both the thighs with gross swellings , painful abnormal movements, and crepitus at middle thirds. Both were closed fractures.

The leg on the left side showed Type IIIB compound fracture of both bones with comminution of the tibia and transverse fracture of the fibula. The entire lateral compartment was exposed in the compound wound. The bone fragments of both the bones are seen through the wound some of them with no soft tissue attachments. Patient has been taken up for debridement and external fixation and prepared accordingly after he has been recovered sufficiently from shock.

Fig.1 Compound wound

Fig.2 Pre operative Radiograph

The compound wound has been thoroughly debrided and uni planar external fixation is done from the antero medial side. There were multiple loose fragments of the tibia , that have lost soft tissue attachments , washed out of the wound. The fracture on the right femur is immobilized on a Thomas splint and left with Braun Bohler splint.

They were subsequently taken up for skin grafting for left leg, and fracture femur fixation on both sides with interlocking nail. All wounds eventually healed.

Fig 3. Post operative clinical photo.

After the soft tissues wounds of compound fracture and surgi-

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cal wounds of both femur fractures have healed a reassessment is done decision is taken to internally fix the tibia. The reassessment revealed a fracture tibia with unicortical bone loss and transverse fracture of the fibula with lot of scarring on the lateral compartment of the leg.

Fig 4 Radiograph with Ext. fixator

The external fixator has been removed and the leg is immobilized with a POP slab till the pin tracts have healed beyond doubt. Another evaluation is done with Radiographs.

Fig.5 Pre operative Radiograph for Fibular strut graft

The lateral approach has been slightly modified to cause minimal damage to the scared tissues and fibula is harvested with sub periosteal dissection. The medullary canal of the tibia is opened , the edges of the tibial fracture are trimmed. The harvested fibula has been inserted as a strut into medullary canal of tibia , over the remaining cortex. The graft is secured as well the fracture of tibia with a locking compression plane avoiding the previous external fixator pin tracts. The surgical wounds have healed well.

Fig. 6 Post operative Clinical photograph after Fibular strut graft

The fibular strut graft has filled the gap in the tibia due to bone loss without causing further shortening by not trimming the single viable cortex of the tibia.

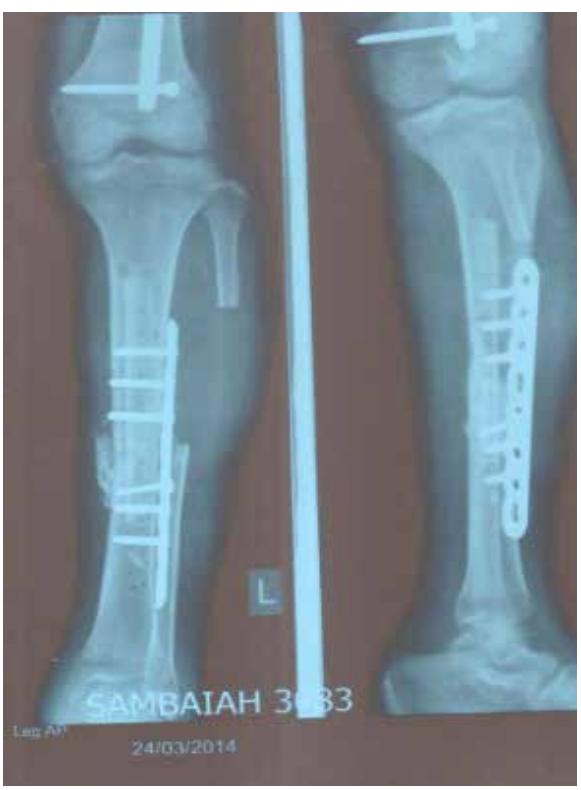

Fig.7 Post operative Radiograph with Fibular strut graft and LCP for Tibia.

Patient is allowed non weight bearing movements following sixth week and full weight bearing from tenth week. However the compound fracture and fracture femur on the same side has caused a one and half inch shortening which is managed by shoe rise.

DISCUSSION:

The fibula has been used as a vascularized or a non vascularized graft for bone defects caused by tumor resections or communuted fractures to fill the bone defects. The dimensions of the fibula make it a better biological choice when filling a defect in

the diaphyseal part of the bone [1]. Traumatic conditions which require bigger defects in a variety of soft tissue injuries can be treated with Fibular grafts[2]. In a weight bearing bone like tibia a strut graft of fibula is filling the defect with double cortex support at the defect site [3]. Fibula has been a choice as a graft for treating defects created in Type IIIB compound fractures of tibia[4].Apart from tumors other conditions requiring bone graft like osteonecrosis are also treated by using fibular grafts[5]. Fibular strut grafts can be used to fill big defects involving the entire cortex at the fracture site or with some cortical contact to minimize shortening. The strut graft can be secured in place by using hardware suited for the defect[6].

CONCLUSIONS:

The case we reported is a case of poly trauma involving both femurs with comminuted fractures and Type IIIB compound fracture of both bones of leg with unicorticl bone loss of tibia. The fibula of the same leg has been used to fill the unicortical loss of tibia by using it as strut and securing it at the defect site by Locking Compression Plate. This has resulted in not causing further shortening and biological as well as hardware support to the graft. Strut grafts give necessary support for the healing process and better conduits for the creeping vasculature to bridge the defects and further healing.

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