National Journal of Clinical Orthopaedics

ISSN (P): 2521-3466
ISSN (E): 2521-3474

www.orthoresearchjournal.com
2018; 2(3): 87-89
Received: 14-05-2018
Accepted: 15-06-2018

Dr. Tashi Galen Khonglah
Assistant Professor, Dept. of Orthopaedics & Trauma, North Eastern Indira Gandhi Regional Institute of Health & Medical Sciences, Mawdiangdiang, Shillong, Meghalaya, India

Dr. Bhaskar Borgohain
Associate Professor, Dept. of Orthopaedics & Trauma, North Eastern Indira Gandhi Regional Institute of Health & Medical Sciences, Mawdiangdiang, Shillong, Meghalaya, India

Dr. Wanlamkupar Khongwir
Senior Resident Doctor, Dept. of Orthopaedics & Trauma, North Eastern Indira Gandhi Regional Institute of Health & Medical Sciences, Mawdiangdiang, Shillong, Meghalaya, India

Dr. Kashif A Ahmed
Senior Resident Doctor, Dept. of Orthopaedics & Trauma, North Eastern Indira Gandhi Regional Institute of Health & Medical Sciences, Mawdiangdiang, Shillong, Meghalaya, India

Correspondence
Dr. Tashi Galen Khonglah
Assistant Professor, Dept. of Orthopaedics & Trauma, North Eastern Indira Gandhi Regional Institute of Health & Medical Sciences, Mawdiangdiang, Shillong, Meghalaya, India

Salvaging a segmental defect of the tibia using the Huntington's procedure: A case report

Dr. Tashi Galen Khonglah, Dr. Bhaskar Borgohain, Dr. Wanlamkupar Khongwir and Dr. Kashif A Ahmed

Abstract
Background: Historically, gap non-unions of the tibia arising due to infections or trauma resulted in an amputation. However, with the advent of modern surgical techniques, such injuries can now be salvaged. Various techniques have been described in literature for the treatment of gap non-unions, each having its own limitation. Attempting limb reconstruction in the presence of significant bone loss presents a monumental challenge for the orthopaedic surgeon with no assurance of a satisfactory outcome.
Case presentation: An 8-year-old girl attended our OPD presenting an exposed right tibia following a chronic infection to the bone. After debridement of the infected bone, there was an extensive gap between the ends of the tibia. Subsequent to control of all infection, using the Huntington's procedure; the ipsilateral fibula was medialized to the remaining tibia. This was done in two stages, initially the proximal end of the fibula was fixed to the proximal tibia. After a period of 8 weeks following signs of union, the distal fibula was then transposed to remaining tibia. After a brief period of guarded weight bearing, it was noted that the fibula hypertrophied and was completely incorporated into the tibia.
Conclusion: Various methods have been described to manage segmental bone loss of the tibia. The Huntington's procedure has the advantage that it can be performed by a trained orthopaedic surgeon even in hospitals with modest infrastructure. The Huntington's procedure is a safe and simple salvage procedure and remains a superb option for treating gap non-unions of the tibia.

Keywords: Gap non-union, bone-loss tibia, segmental defect, Tibialization, huntington's procedure

Introduction
Gap nonunions of the tibia are not uncommon and present an enormous challenge to both the orthopaedic surgeon and the patient. In the past, cases with wide bone loss following severe injuries or infections often required amputation. Today, with the advent of modern surgical techniques such non-unions can now be salvaged [1]. However, attempting limb reconstruction in the presence of significant bone loss usually involves surgery which is technically difficult, time consuming, physically and psychologically demanding for the patient with no guarantee of a satisfactory outcome. The problems also involve bridging or regenerating areas of bone loss while maintaining limb length and alignment [2]. Nonunion of the tibia with infection, bone loss, or both represent a complicated scenario and is better managed with a vascularized fibular graft, free fibular graft or bone transport [3, 4]. Transposition of the ipsilateral fibula to the tibia was suggested by Hahn in 1884 [5] and was first used successfully by Huntington in 1903 to fill a 12.7cm tibial defect in a 7 year old boy [6]. The technique which we describe here involves the relocation of the fibula to the tibia as a pedicle graft in a two-staged procedure. Due to the preservation of blood supply to one end of the fibula, the graft readily takes up and hypertrophies upon weight bearing over a period of time [7].
We report a case of an 8-year-old girl who presented with a segmental defect resulting from chronic osteomyelitis involving the right tibia.

Case Report
An 8-year-old girl was referred from a local private hospital to our OPD. She presented with an exposed tibia which was initially bandaged in a concoction of herbs. Following a detailed history, it was revealed that the child belonged to a low socio-economic upbringing and hailed from a remote hamlet with no access to modern medicine. She had been treated for a month by a traditional healer for a mild discharge from a wound on her leg.

By the time she sought help from us, 70% of her right shin bone was exposed. We set about performing a debridement with excision of the extensive diaphyseal sequestrum. The initial infection was controlled by consecutive debridements followed by appropriate intravenous antibiotics and the limb was immobilized in a long leg plaster. Concomitantly, the child's overall nutrition was improved with the help of the hospital dietitian. After control of the infection, the first stage of bone transport included fixation of the proximal tibial fragment and the proximal fibula. Two incisions were used, a lateral incision to expose the proximal fibula and an anterior incision to expose the distal medial part of the proximal tibia. Unlike the usual method of synostosis, the fibula was fixed to the tibia using a 5-hole recon plate. Following surgery, the limb was immobilized for 8 weeks and by then radiographic union was evident at the site of plating. The second stage of the procedure was then carried out by fixing the distal end of the fibula to a prepared slot in the tibia and this was reinforced using a single screw. Immobilization in a long plaster cast was continued for another 8 weeks. Weight bearing during this period was restricted only to toe touch. This was followed by guarded weight bearing on a patellar tendon bearing fibre glass cast until sufficient hypertrophy of the fibula was apparent. The patient was discharged with the advice for regular monthly follow-ups at the OPD. During this period, serial radiographs of the involved limb were taken and at 18 months, it was noted that there was complete incorporation of the fibula into the tibia following which it was decided to remove the implants. At final follow-up, the patient did not complain of any pain and had an excellent range of motion at the knee and ankle. She was able to perform daily activities like squatting and climbing stairs. A deformity with shortening (2.5cms) of the right leg however persisted. Both the parents and the child were extremely satisfied with the end results.

Fig 1: Radiographs of the involved limb during admission, Anteroposterior and Lateral views.

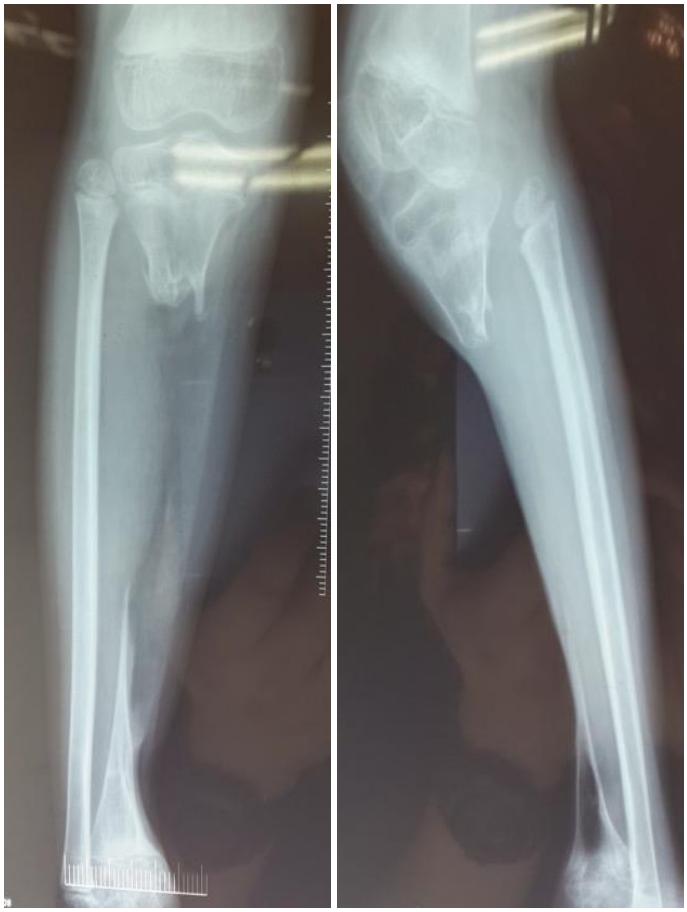

Fig 2: Radiographs of the involved limb following debridement and sequestrectomy. Note the segmental bone loss of the tibia.

Fig 3: Radiograph of the limb following Huntington's procedure.

Fig 4: Radiographs of the limb following tibialization of the fibula at final follow-up.

Fig 5: Follow-up of the patient at 2 years.

Discussion

The treatment of large bone gaps in the tibia present a monumental challenge to the orthopaedic surgeon and the patient. Such bone loss is commonly seen in neglected, chronic osteomyelitis in developing countries. Various methods of treatment have been used to manage such cases, including the Papineau procedure, allograft reconstruction, distraction osteogenesis, vascularized or nonvascularized contralateral fibular transfer, Huntington's procedure, among others [8]. There are many advantages of using this procedure of medialization of the ipsilateral fibula (Huntington's procedure). It may be performed by a trained orthopaedic surgeon even in hospitals with modest infrastructure. Following synostosis and when the fibula is subjected to more than normal weight bearing stresses, it undergoes hypertrophy and becomes an integral part of the static supporting architecture of the leg [7]. Huntington in 1944 popularized a procedure for treatment of tibial defects in children, which he described as a two-stage procedure [6]. We opted for this procedure as a last resort and had good success in rescuing the limb. The results achieved were comparable to various other studies [8, 9].

Conclusion

The Huntington's procedure still holds a distinctive place for salvaging gap nonunions of the tibia, especially in paediatric patients. Tibialization of the fibula is a simple, cost effective and easy procedure which can be performed in any moderately equipped hospital.

References

1. Canale ST, Beaty JH. Campbell's Operative Orthopaedics. In: 12th ed. Philadelphia, PA: Elsevier, 2013, 2981-3013.
2. Keating JF, Simpson AHRW, Robinson CM. The management of fractures with bone loss. J Bone Joint Surg Br. 2005; 87(2):142-50.
3. Ryzewicz M, Morgan SJ, Linford E, Thwing JI, de Resende GVP, Smith WR. Central bone grafting for nonunion of fractures of the tibia: a retrospective series. J Bone Joint Surg Br. 2009; 91(4):522-9.
4. Wiss null, Stetson null. Tibial Nonunion: Treatment Alternatives. J Am Acad Orthop Surg. 1996; 4(5):249-57.
5. Hahn E. Eine Method, Pseudaarthrosen der tibia mit grossen knockendefekt zur heilung zu bringen. Zentralbl f Chir. 1884; 11:337-41.
6. Huntington TW. The Classic: Case of Bone Transference. Use of a Segment of Fibula to Supply a Defect in the Tibia. Clin Orthop. 2012; 470(10):2651-3.
7. Agiza A. Treatment of tibial osteomyelitic defects and infected pseudoarthroses by the Huntington fibular transference operation. J Bone Joint Surg Am. 1981; 63:814-9.
8. Gupta SP, Garg G. The Huntington procedure: still a reasonable option for large tibial defects in paediatric patients. J Child Orthop. 2014; 8(5):413-21.
9. Kundu ZS, Gupta V, Sangwan SS, Kamboj P. Gap nonunion of tibia treated by Huntington's procedure. Indian J Orthop. 2012; 46(6):653-8.