ID: IJARS/2015/13766:2060

Case Report

Surgery Section

Ipsilateral Medial Fibular Transposition in A Case of Chronic Osteomyelitis of Tibia: A Case Report

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ABSTRACT

Chronic osteomyelitis in adults is a rare disease. It is usually seen in patients with transient or chronic immune deficiency. Chronic osteomyelitis develops as a result of inadequate or improper treatment of acute osteomyelitis. Sometimes large sequestrum develops with massive destruction of bone. Such a big sequestrum removal puts bone in real danger of pathological fracture. In such cases ipsilateral fibular transposition can be done by Huntington's procedure. Here we are presenting a case of chronic osteomyelitis with massive sequestrum formation, that was removed and saucerization done and after controlling infection ipsilateral fibular transposition by Huntington's procedure was done. Patient was kept in above knee POP cast and following that a Patellar Tendon Bearing (PTB) cast was put. When fibula was united above knee walking caliper was given, which was continued for two years for proper consolidation and incorporation of graft. Screws removed after two years. After two years, consolidation and integration of fibula was complete without any complication. Range of motion was full. Finally in our patient ipsilateral fibular transfer to fill tibial gap gave good result but required long follow-up.

Keywords: Consolidation, Integration, Huntington's procedure, PTB, Saucerization, Sequestrum

CASE REPORT

Here we present a case of a 25 years old female who came to RIMS Orthopaedics OPD with chief complaints of pain with discharging sinus in right leg for one year. Pain was constant nagging in nature, not felt in any other areas, increases while walking and relieved after taking rest. It was constant at night, which was disturbing her sleep. She complained of white smelly discharge from inner side of her mid leg for same duration. She was apparently alright one and half year back when she suffered a brief period of flu, following which she started having pain in her left leg which was severe in nature and associated with high fever. She consulted a local doctor and was prescribed a course of oral antibiotic and pain killers, which gave her initial relief. But she was having off and on pain while walking and also at rest. She took analgesics for a period of six to eight weeks. After that pain became constant. After that she felt irregular thickening in her leg bone. After few months, she noticed a small opening over inner side of middle leg which was small (5 mm × 5 mm in diameter), present on the middle leg and was discharging white colored smelly pus. For the last four months she was often suffering from fever and then she came to RIMS OPD. She was non-vegetarian, non-alcoholic and occasional betel leaf chewer. Components used with betel leaf usually contain nicotine that might have further reduced the blood supply in the affected leg. She was off average local built and average nutrition. All other family members were apparently healthy. On examination she was well oriented to time, place and person. She had pallor but there was no icterus or cyanosis or edema. On local examination tibia was of irregular contour, tender on deep palpation and one discharging sinus was seen over medial aspect of left middle leg with purulent smelly discharge. Radiographic examination showed big sequestrum in mid tibia with patchy bone resorption over proximal and middle third. Based on radiographic examination it was diagnosed a case of type IV Cierny and Mader chronic osteomyelitis as it had diffuse involvement [1]. CT scan was done for proper definition of sequestrum and MRI to know soft tissue status and sinus tract. Sinogram was done to see the extent of the sinus tract. Routine investigations revealed raised ESR and WBC count. CRP was positive. Other parameters were within normal limit. She was given intravenous 3rd generation cephalosporin. Pus was sent for culture and sensitivity and TB PCR, which showed staphylococcal growth. TB PCR was negative. After getting anaesthetic clearance sequestrectomy and saucerization done to remove all the infected necrotic bone and soft tissue with sinus tract. A drain was kept which was removed after five days when there was no discharge. Above knee slab was applied.

Post-operatively she was given intravenous cephalosporin for five days and then oral cephalosporin was given (according to sensitivity report). She was discharged with proper advice and oral antibiotics. After two weeks slab was changed to cast and continued for three more weeks and then PTB cast applied. Oral antibiotic was continued. Serial radiographic monitoring was done. Her ESR came within normal limit and CRP came negative. She was followed up in OPD for next four months with advice of non weight bearing because of weakening of tibia following massive sequestrum removal. In serial radiography gap following removal of sequestrum was still persisting and not showing any sign of resolution. By the end of six months all her routine blood investigation reports came within normal limit. CRP was negative and she was not having any pain or fever, indicating controlled infection. We planned for Huntington's procedure. Postero-lateral approach was used. Fibula was osteotomized in two levels corresponding to tibial defect and the osteotomized segment of fibula with attached muscles was transferred to the tibial shaft where bone was lacking (middle third) and was fixed to remaining cortex of tibia with two cortical screws. Cancellous bone graft from iliac crest put in the gaps. The tibial segment proximal to osteotomy was loose and encirclage was done with stainless steel wire encircling proximal tibia and fibula. Distal fibula was kept intact to maintain ankle syndesmosis [Table/Fig-1, 2]. Post-operatively POP slab given and changed to POP and was kept for 12 weeks. Then we changed the POP cast to PTB cast, which was kept for another six weeks. By this time bone was united and we gave a walking above knee caliper which was continued for two years. By 2.5 years fibula was completely incorporated and integrated. After proper radiological evaluation when consolidation was certain, we removed the screws but encircling wire kept in situ [Table/Fig-3]. After removal of screws PTB was kept for four weeks. Patient was allowed full weight bearing. Final external look of the affected leg was distorted but it did not hamper her functional capabilities [Table/Fig-4, 5].

[Table/Fig-1]: Postoperative screws in-situ. (Left)
[Table/Fig-2]: Post-operative; screws. (Right)

[Table/Fig-3]: After screw removal

[Table/Fig-4]: Final appearance of leg after consolidation. (Left)
[Table/Fig-5]: Final appearance of the leg after consolidation and healing. (Right)

DISCUSSION

As relatively avascular dead bone (sequestrum) with surrounded thick periosteum with scarred soft tissue covers infection focus, systemic antibiotics cannot act effectively. Usually surgery is only answer. But it might weaken the involved bone, especially following large sequestrum removal. Many a times over all general condition of the patient is not good, as in adults chronic osteomyelitis develops when patient's immune system is jeopardized. Diabetes, chronic alcoholism, immunosuppressive disease and much other chronic disease puts patient in a risk zone of developing chronic osteomyelitis. Over all treatment of chronic osteomyelitis is a matter of concern. It needs multidisciplinary approach [1]. Treatment consists of spells of bed rest, antibiotics and a waiting policy to monitor whether can be treated conservatively or not

[2]. Treatment not only cost the patient economically but functionally and psychologically too. It requires a long period of observation. Usually gap is formed following big sequestrum removal. Limb salvage surgery when employed correctly, has shown better functional outcome than amputation [3]. Available techniques to fill the gap are Papineau's technique of allograft, bone transport by The Ilizarov technique, free vascularized fibular graft, tibiofibular synostosis and medial transportation of the fibula by Tuli's method. Tibiofibular synostosis carries the risk of fibular fracture because of eccentric loading and in the lesions of the distal tibia the synostosis reduces the range of motion of the ankle [4]. The Ilizarov technique does bone transfer and by compression-distraction it stimulates bony union. In this procedure early weight-bearing is possible [5]. Also this method can be used to achieve realignment of the limb. The frame is not easily tolerated by patient and pin tract infection is also a challenging problem. Free fibular transfer with micro-anastomosis requires microsurgical technique, a technically demanding procedure. Fibula has very rich vascular soft tissue coverage and for that it can be used a graft to cover tibial gap [6]. Huntington in 1944 popularized Huntington's procedure for treatment of tibial defects in children, which he described it as a two-stage procedure [7]. As infection is principle contraindication of fibular transport, it should be eliminated before proceeding to Huntington's method. Fibula can be cut at desired site and can be fixed with weak tibia. But it requires a long period of immobilisation for proper union and consolidation and integration of fibula. Failure is very rare, because fibula is transported with intact muscle attachment. Distal end is not cut it to preserve ankle mortise. This is a simple procedure and can be easily done in hospital with minimal infrastructure. Disease site is not opened and as same sided fibula we are mobilising volume of leg is reduced aiding in proper closure, especially in presence of scarred tissues. In our case we did this operation in two stages. But 2 stage operations keep patient in long non-weight bracing condition, so active and passive joint mobilising exercises should be introduced early. Single stage operation is better in this aspect and takes a bit shorter time, but risk of infection is always there. After transfer of fibula it gets hypertrophied with time due to normal weighting stress, but during this time it should be protected by PTB or suitable braces. Complete integration and consolidation takes almost two years. Finally, advantages of this method are technically less demanding, wound closure is better, union rate is good and requires minimal instrumentation. Some drawbacks of this procedure are like limb shortening, deformity, long duration of treatment and patient can't get involved in heavy sporting activities. In our case final outcome was good in terms of union, strength and range of motion.

CONCLUSION

Treatment of chronic osteomyelitis with large sequestrum is a real problem for both the patient and the orthopedic surgeon concerned. If sequestrum is large enough it will weaken already weaken bone and put bone in real danger of pathological fracture. Much method is already described in many literature and study. Among them Huntington's procedure is easy to perform, requires less surgical expertise and relatively cheaper. Integration of fibular graft is almost certain as its vascular attachments are kept intact. As we a using same sided fibula wound closure also good in spite of scarred tissue, as it reduced the volume. But only Huntington's method is not answer to all the cases, many other methods may be necessary depending on the case. In our case we did operation in two stages, though single operation reduces time and cost of treatment. Our result is good in terms of union, consolidation and functional outcome, but it required a long period of non weight bearing. Finally we can say that this operation is very easy to perform, gives good union rate and solid consolidation with full range of motion usually achieved.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Publishing: **Jul 01, 2015**