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Advantages of Intramedullar Fixation in Treatment of Congenital Tibial Pseudoarthrosis – A Case Report

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ABSTRACT

This report describes a case of a 29-year old patient with congenital pseudoarthrosis of the distal tibia previously treated unsuccessfully by a conventional surgical method. Tibial congenital pseudoarthrosis is a rare disease characterized by segmental osseous weakness resulting in deformation of the bone and spontaneous fractures which progresses to a tibial nonunion. In our case we used intramedullary stabilization with bone grafting and six month after operation congenital pseudoarthrosis of the tibia healed.

Key words: congenital, pseudoarthrosis, tibia, intramedullary

Introduction

Congenital pseudoarthrosis of the tibia is a rare disease characterized by segmental osseous weakness resulting in anterolateral angulation of the bone and spontaneous fractures which progresses to a tibial non-union^{1,2}. Is an uncommon entity with a reported incidence of 1:140,000–1:250,000 neonates³. The congenital osseous dysplasia in the distal third of the tibia with fibroblastic tissue which disrupts callus formation leads to a tibial non-union². The etiology is unknown. In 50% of the cases is associated with a neurofibromatosis³. In others, hereditary and mechanical factors are debated. Various classification systems have been proposed (Andersen, Boyd, Crawford)³. Usually the disease becomes evident within a child's first two years of life but may be undetected up to the age of 12 years^{1,2}. Intramedullary stabilization, free vascularized fibula, and Ilizarov external fixation are among the most frequently used methods of treat-

ment, in addition bone morphogenetic protein has shown promising results. Is often resistant to standard treatment, and refractures are common. Patient with congenital pseudoarthrosis of the tibia in this report had 6 unsuccessful surgeries before he presented to our hospital. We made corrective osteotomy and intramedullary fixation with bone grafting and six months after the operation congenital pseudoarthrosis of the tibia healed.

Case Report

A 29 year old male patient presented to our hospital with a congenital pseudoarthrosis in the distal third of the left tibia. Patient was previously treated in other hospitals and he had six unsuccessful surgeries during the period between 1980 and 1990. Patient presented to the

hospital for the first time at the 5 year of age with varus deformity of distal tibia (Crawford type II) and corrective osteotomy with Kirschners wires was made. Three months later he underwent second operation and corrective reosteotomy was performed. Two years later at the 7 year of age he was operated for the third time and the reosteotomy with Müller plate was made. The fourth operation was done at the 9 year of age, he underwent to the osteosynthesis with DC plate. Two years later at the age of 11 he was readmitted to the hospital because of a spontaneous refracture and reosteosynthesis with DC plate and bone grafting was made. Sixth operation was done at the age of 13, pseudarthrosis was exposed, radical resection of sclerotic tibial segments and external fixation using Ilizarov's device was performed. Pseudoarthrosis healed but bone deformity remained. During the year 2007 at the age of 28 patient had fracture of the distal tibia during sport activity. He underwent conservative treatment with closed reduction and immobilisation. After 4 month fracture healed, but few month later spontaneous refracture happened 3 cm below the first fracture and the long leg plaster was applied for 5 months. Because of delayed healing of the fracture he presented to our hospital in year 2008. After clinical and radiological examination (Figure 1 and 2). We decided for intramedullary fixation. We performed corrective osteotomy with autologous bone grafting and intramedullary fixation. After the operation, radiographs were taken and the clinical situation was controlled monthly until six months, and after that at intervals of a couple of months (Figure 3 and 4). Six month after the operation tibia was healed, after one year patient was fully weight bearing.



Fig. 1. Preoperative AP radiograph of the patient's left tibia with congenital pseudoarthrosis and varus deformity.



Fig. 2. Preoperative LL radiograph showing anterolateral deformity.

Discussion

Congenital pseudoarthrosis of the tibia continues to be a challenge for surgeons. The reported union rates for different techniques are 90% for bone grafting with medullary fixation, 81% for vascularised bone grafting, and 71% for Ilizarov's technique. The number of failures is high for all methods and refractures occur repeatedly,



Fig. 3. Postoperative AP radiograph of patient's tibia with intramedullary fixation one year after the operation.



Fig. 4. Postoperative LL radiograph one year after the operation.

like it was in our case. Literature reports say that surgical treatment for children less than 3 years of age are unsuccessful. Internal fixation with plates has not proved effective because it worsen local bone circulation and treatment with telescopic medullary nail is not capable of producing adequate compression. Our patient was un-

successfully treated with conventional surgical method, he had six surgeries and only Ilizarov method was effective. We think that the reasons of previous failures are not only inadequate fusion and compromised local circulation but also the incomplete removal of the pseudoarthrosis and surrounding altered fibrous soft tissues. Ilizarov method was successful because radical resection of sclerotic tibial segments was made. The risk of further fractures diminishes in older child, particularly after completion of growth. Our patient was without spontaneous fractures during period from age 13 to age 29 year. Our opinion is that in the adult age the choice of conservative treatment was wrong knowing the previous medical history. Conservative treatment is not capable of producing any fusion. We own our success to complete removal of the pseudoarthrosis and autologous bone grafting in combination with tibial intramedullary nail. Intramedullary fixation made possible to preserve local circulation with adequate compression and early rehabilitation.

Conclusion

We think that after completion of growth intramedullary fixation with autologous bone grafting is a good choice for treatment of tibial congenital pseudoarthrosis as our result showed, and in the early age Ilizarov technique should be performed. With the intramedullary fixation we can preserve local circulation, produce adequate compression and in the same time prevent refracture.

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KONGENITALNA TIBIJALNA PSEUDOARTROZA – PRIKAZ SLUČAJA

SAŽETAK

U ovom radu prikazujemo slučaj 29 godina starog pacijenta sa kongenitalnom tibijalnom pseudoartrozom distalne tibije koji je prethodno u više navrata neuspješno liječen. Tibijalna kongenitalna pseudoartroza je rijetka bolest karakterizirana segmentalnom koštanom slabošću koja rezultira deformitetom i spontanim frakturama koje ne zaraštavaju. U našem slučaju koristili smo intramedularnu osteosintezu sa spongioplastikom te je šest mjeseci po zahvatu došlo do cijeljenja tibijalne kongenitalne pseudoartroze.