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OUTCOMES OF EARLY INTERVENTION IN BILATERAL TIBIAL HEMIMELIA: A CASE SERIES ANALYSIS

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ABSTRACT

Bilateral tibial hemimelia is a rare congenital condition characterized by the partial or complete absence of the tibia, one of the main bones in the lower leg[1]. This condition can lead to significant challenges in lower limb function and mobility. In the case of Jones Group-I bilateral tibial hemimelia, the absence of the tibia is associated with additional complications, including unstable knee and ankle joints[2]. The instability in these joints can further impair the ability to bear weight, walk and perform normal daily activities, requiring careful management and surgical intervention. The management of this condition often involves multidisciplinary care, including orthopedic surgeons, prosthetists and rehabilitation specialists, to address both the structural and functional aspects of the lower limb. Treatment strategies may vary depending on the severity of the deformity, the age of the patient and the presence of associated complications, with the goal of achieving optimal limb function, stability and quality of life.

KEYWORDS

Bilateral tibial hemimilia, Orthopedic, Prosthetists, Absent patella and Craniofacial.

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INTRODUCTION

Case History

A three year old boy admitted at Ganga Hospital Private Limited, Coimbatore, one of the twins first born child to his parents, of non consanguineous marriage was brought to us with hypoplastic lower limbs, He cannot walk. He underwent two surgeries for the limbs-osteotomy of the hind foot in an attempt reconstruct the limbs.

Antenatal History

Non consanguineous marraige, P1L2A1- early pregnancy loss once. It was a twin pregnancy.

Antenatal scan revealed absent fibula and the parents were adviced that the condition could be corrected with surgeries. At conception, maternal age was 24 years and postnatal age was 34 years. The baby did not require any NICU admission. Developmental milestones attained at normal age.

Physical Assessment

By doing physical assessment found that the child had low weight for age (13.2kg).The lower limbs were hypoplastic with severly hypoplastic leg and feet. The knee and ankle joints were unstable. The knee joint looked dislocated with flexion contracture. The ankle joints had equinovarus with full supinated feet. Spine normal. Upper limbs were normal. No craniofacial anomalies.

RADIOLOGY REPORT

X-ray both lower limbs Tibia absent Dislocated knee joints. Absent patella. The feet were deformed and supinated.

TREATMENT CONSIDERATION

The child has bilateral tibia hemimelia with unstable knee and ankle joints and hypoplastic limbs. Hence bilateral knee articulation and prosthesis fitting done under general anesthesia and bilateral femoral block, under tourniquet control, a curved incision was made on the posterior aspect of the left leg, just distal to the knee. The neurovascular bundles were ligated. The nerves were pulled and cauterised and allowed to retract after division. The gastrocnemius muscle was divided. The tourniquet was released, 22 minutes. The skin was closed in 2 layers using 4-0 vicryl rapid. The steps were repeated on the right side. The tourniquet time was 15 minutes. Dressings and crepe were done.

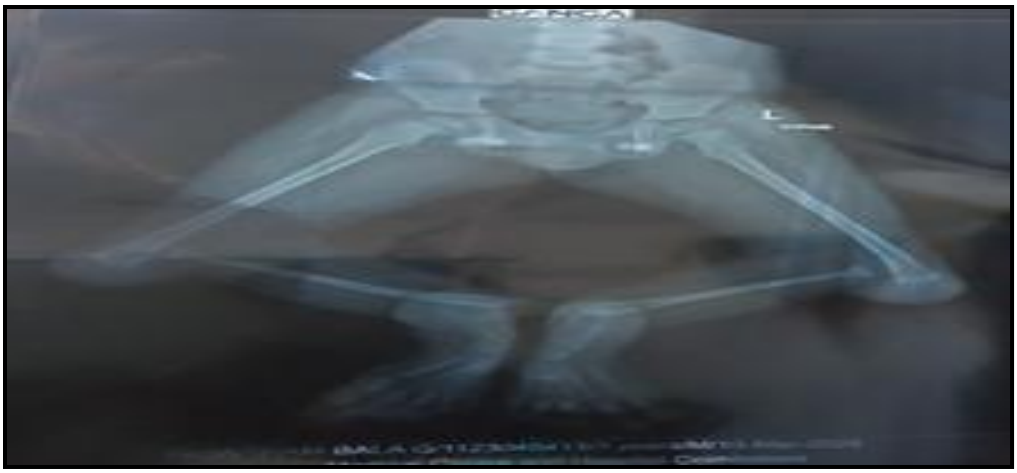
DISCUSSION

Bilateral hemimelia is a rare and complex congenital disorder characterized by the absence or malformation of one or both of the limbs, typically affecting the lower or upper limbs symmetrically[3]. This condition involves complete or partial absence of the limb structures, and it can manifest with a wide spectrum of severity, from the complete absence of limbs to partial malformations such as shortened or malformed limbs[4].

Bilateral hemimelia affects both sides of the body, which can pose unique challenges for diagnosis and treatment[5]. In some cases, it can be detected prenatally through ultrasound, which provides valuable time for parents to plan for the care and treatment of the child[6]. After birth, clinical examination confirms the absence or malformation of the limbs, which may vary widely in terms of severity[7]. Some children with bilateral hemimelia may have no arms or legs, while others may present with underdeveloped or partially formed limbs, with additional skeletal abnormalities often present, such as joint deformities or scoliosis.

The management of bilateral hemimelia often involves a multidisciplinary approach, including orthopedic surgery, prosthetics, physical therapy, and, in some cases, psychological care[8]. Surgical interventions may aim to correct skeletal deformities, lengthen remaining bones, or create more functional limb structures. In many cases, however, prosthetics play a significant role in enhancing the quality of life. Advances in prosthetic design and technology have significantly improved the functionality and comfort of artificial limbs, and children with bilateral hemimelia can often lead highly active lives with appropriate prosthetic devices. There are, however, challenges associated with fitting prostheses, especially for young children and the need for ongoing adjustments as the child grows.

Bilateral hemimelia is a complex and multifactorial condition that requires a comprehensive approach to management. While challenges exist in terms of physical, psychological, and social well-being, advances in medical care, prosthetic technology, and psychosocial support have dramatically improved the quality of life for affected individuals. Continued research into the genetic and environmental causes of this condition, as well as the development of more sophisticated prosthetic solutions, holds promise for improving outcomes and further enhancing the lives of those living with bilateral hemimelia[9].



Supportive Image

CONCLUSION

Bilateral tibial hemimelia represents one of the rarest and most functionally challenging congenital limb deficiencies. Early diagnosis, particularly through prenatal imaging, provides a valuable opportunity for timely intervention and family counseling. In this case series, early surgical management involving knee disarticulation and prosthesis fitting yielded favorable outcomes in terms of limb function, mobility and potential for future rehabilitation[10,11].

The success of the treatment underscores the importance of a multidisciplinary approach that includes orthopedic surgeons, prosthetists, physical therapists, pediatricians and nursing professionals. Surgical intervention, while complex, can significantly improve the quality of life in affected children by facilitating early ambulation through prosthetic use. The adaptation of prosthetic limbs in growing children is not only a technical endeavor but also requires ongoing psychological and social support to aid in adjustment and integration into normal life activities[12].

The case also highlights the need for individualized care plans based on the severity of the deformity, patient age, limb functionality, and family expectations. Although bilateral limb deformities pose unique challenges, advances in surgical techniques and prosthetic engineering have made it possible for many children with severe congenital anomalies to achieve mobility and independence comparable to their peers[12].

Furthermore, long-term follow-up is critical to monitor growth-related changes, prosthetic needs, and emotional development. Continued research into the genetic, environmental, and embryological mechanisms underlying tibial hemimelia is necessary to enhance prevention strategies, prenatal counseling and treatment outcomes[3].

In conclusion, early surgical intervention, supported by comprehensive rehabilitation and prosthetic care, offers a viable pathway toward improved functional outcomes and enhanced quality of life for children with bilateral tibial hemimelia. This case reinforces the value of early multidisciplinary intervention and the transformative role of prosthetics in pediatric limb reconstruction[12,13].

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

BIBLIOGRAPHY

1. Ghaznavi A, Nosratpour M. Reconstructive surgery to preserve ankle function in a 5-year-old girl with bilobed distal tibia in an unclassified case of tibial hemimelia: A case report, *Jour of Med Cas Rep,* 19(1), 2025, 46.

2. Ghaznavi A, Nosratpour M, Moteshakereh S M, *et al*. Reconstructive surgery to preserve ankle function in a 5-year-old girl with bilobed distal tibia in an unclassified case of tibial hemimelia: A case report, *J Med Case Rep,* 19(1), 2025, 46.
3. Yang X, Pu S, Xiang B, *et al*. A novel smoothed (SMO) point mutation in congenital tibial hemimelia: A case report, *BMC Pediatrics,* 23(1), Article 424, 2023.
4. Paley D. Tibial hemimelia: New classification and reconstructive options, *European Spine Journal,* 25(8), 2016, 1785-1794.
5. Pattanaik R, Dash M P, Lenka S. Prosthetic rehabilitation of bilateral tibial hemimelia: A case report, *RGUHS Journal of Physiotherapy,* 2(2), 2022, 22-24.
6. Ilerisoy Yakut Z, Ipek A, Akkaya H, Arslan H. Prenatal diagnosis of type 1 fibular hemimelia. *Journal of Medical Ultrasonics,* 41(4), 2014, 539-544.
7. Benli S, Bulut L, Aydogan C, Karataş B, Atasci T, Taskin E, Aydin M**.** A newborn with lower limb deformity in tibia and fibula and oligodactyly, *Pediatric Oncall Journal,* 19(1), 2022, 35-40.
8. Fujiwara S, Noguchi S, Shibata T, Echizenya T, Ohnishi K, Nishizaka C, Mano H, Haga N**.** A multidisciplinary rehabilitation approach in managing children with congenital limb deficiency or acquired amputation, *Bulletin of the Japanese Society of Prosthetics and Orthotics,* 37(3), 2021, 10-18.
9. Bradley Reeves, Brennan Roper. Outcomes of simultaneous lengthening and ACL reconstruction in fibular hemimelia: A retrospective case series**,** *Iowa Orthop J,* 44(1), 2024, 93-98.
10. Paley D. Tibial hemimelia: New classification and reconstructive options, *J Child Orthop,* 10(6), 2016, 529-555.
11. Jones D. Congenital absence of the Tibia, *J Bone Joint Surg Br,* 60-B(1), 1978, 31-39.
12. Fraga C E C, Vilela M E F B, Bueno V F P, Leao G T, Sola Y N, Resende M H A. Tibial hemimelia: A surgical approach for bone reconstruction and lengthening, *J Foot Ankle*, 18(2), 2024, 250-254.
13. Yadav. Discussed the reconstruction of complex fibular hemimelia cases through tibial lengthening and ankle arthrodesis, *Int Orthop,* 48(8), 2024, 2073-2081.
14. https://rarediseases.org.
15. https://www.orpha.net.
16. https://www.aaos.org.
17. https://www.mayoclinic.org.

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