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(CASE REPORT)

Congenital bilateral hypoplasia of the radius and ulna associated with Camptodactyly: A Case Report

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Abstract

Introduction: Congenital hypoplasia of the forearm bones is a rare longitudinal anomaly that can affect the radius, ulna, or both bones simultaneously. Combined bilateral involvement is exceptional and may be associated with digital malformations.

Case presentation: We report the case of a 6-year-old boy with bilateral hypoplasia of the radius and ulna associated with bilateral camptodactyly of the 4th and 5th fingers. Clinical examination revealed limited extension of the affected wrists and proximal interphalangeal joints, with preserved muscle strength and grip. Standard radiographs confirmed bilateral hypoplasia of both forearm bones without major carpal instability.

Discussion: Longitudinal malformations of the forearm are classified according to international classifications and their anatomical and radiological characteristics. Management depends on the functional impact and is initially based on conservative treatment, with surgery reserved for progressive or functionally disabling forms.

Conclusion: Rigorous clinical and radiological evaluation, combined with international classifications, allows the therapeutic strategy to be adapted and the functional prognosis to be optimized.

Keywords: Congenital Hypoplasia; Radius; Ulna; Longitudinal Malformation; Camptodactyly

1. Introduction

Congenital malformations of the forearm belong to the group of longitudinal anomalies of the upper limbs [1]. They result from a disturbance in the embryonic development of the limb bud between the 4th and 7th week of gestation [2]. Hypoplasia can affect the radius, the ulna, or both bones simultaneously, with an anatomical spectrum ranging from simple shortening to partial or complete absence [1,3].

Combined bilateral involvement of the radius and ulna is rare and may be associated with hand abnormalities, particularly digital deformities such as camptodactyly [4]. A precise anatomical and functional understanding of these abnormalities is essential in order to guide management and anticipate progression during growth [5].

2. Case presentation

A 6-year-old boy was referred for evaluation of a congenital malformation of the upper limbs. Born at term, his perinatal history was unremarkable. The vaginal delivery proceeded without incident after a normal pregnancy. He was the

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second child of non-consanguineous parents with no family history of congenital abnormalities. Clinical examination revealed deformity of both upper limbs, including bilateral limitation of wrist extension and bilateral camptodactyly of the 4th and 5th fingers, as well as limitation of proximal interphalangeal joint extension. Muscle strength was normal, as were gross and fine motor skills. There was no pain, instability, or sensory disturbance. No abnormalities of the thumb or major carpal instability were noted.

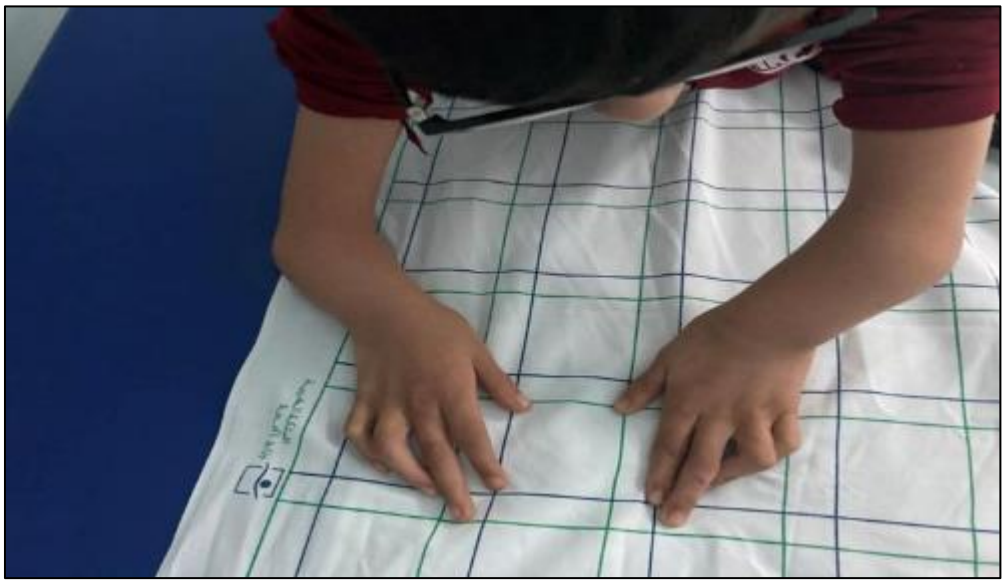

Figure 1 Dorsal view of the child's hands and forearms, showing the reduced length of the forearms and bilateral camptodactyly of the 4th and 5th fingers

Figure 2 Standing view of the child, showing the bilateral shortening of the forearms and the general posture of the hands

Radiographic assessment

Standard radiographs of both forearms showed:

- Bilateral hypoplasia of the radius.
- Associated bilateral hypoplasia of the ulna.
- Normal carpal architecture, with no obvious dislocation or subluxation.
- Absence of radioulnar synostosis.

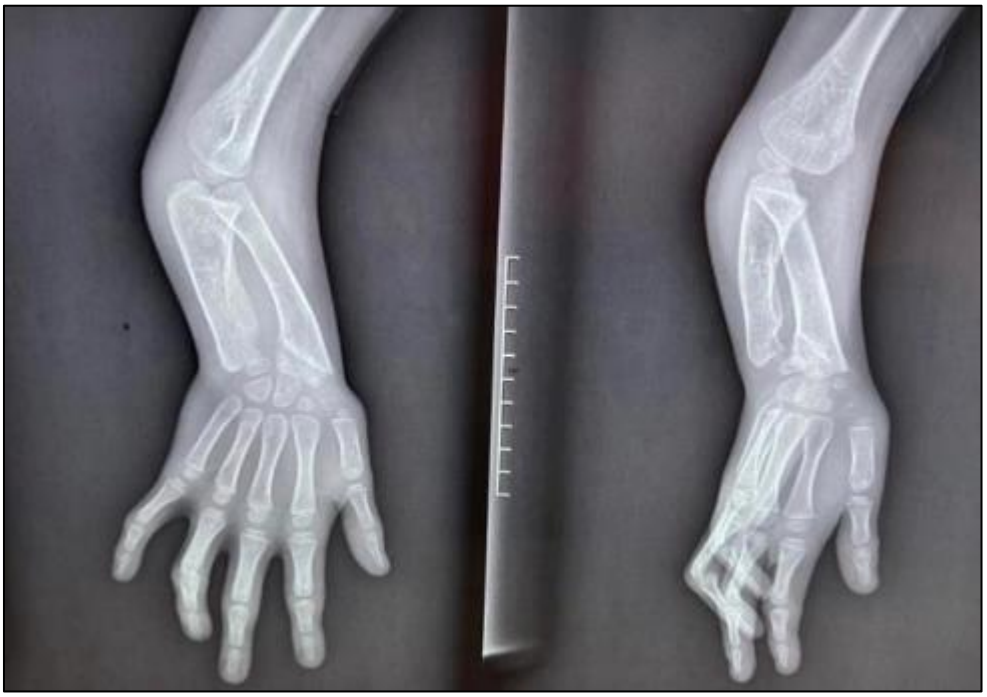

Figure 3 Standard X-rays of the hand and forearm in frontal and profile views, showing hypoplasia of the radius and ulna

3. Discussion

Combined bilateral hypoplasia of the radius and ulna is a rare form of longitudinal forearm deficiency resulting from early disruption of mesenchymal differentiation of the upper limb bud during embryogenesis [2]. According to the international classification of the IFSSH (International Federation of Societies for Surgery of the Hand), these anomalies belong to the group of longitudinal deficiencies [6]. Radial deficiencies are classified according to Bayne and Klug into four types based on the degree of development of the radius, ranging from simple shortening to complete absence [7].

However, there is no universally accepted classification for ulnar hypoplasia; it is generally described anatomically and radiologically according to the degree of shortening, partial or total absence of the ulna, and the possible presence of associated anomalies [8]. When both bones are affected, as in our case, radiographic evaluation must analyze the relative length of the bone segments, wrist alignment, carpal congruence and stability, as well as proximal and distal radioulnar mobility [3].

The functional impact depends mainly on the range of flexion-extension of the wrist, pronation-supination, and the quality of the grip [5]. In our observation, despite limited wrist extension, muscle strength and grip function were preserved, pointing to initial conservative management. This is based on early physical therapy to maintain joint range of motion, prevent capsuloligamentous retraction, and optimize muscle balance, possibly combined with corrective orthoses to limit progressive deviation [9].

Surgical management is reserved for progressive, unstable, or functionally disabling forms; it may include carpal centralization or stabilization procedures, corrective osteotomies, progressive bone lengthening using an external fixator, or tendon transfers aimed at improving the dynamic balance of the wrist [10,11]. The prognosis depends mainly

on the initial anatomical severity, joint stability, and early multidisciplinary follow-up combining surgery and specialized rehabilitation [12].

4. Conclusion

Congenital bilateral hypoplasia of the radius and ulna is a rare condition belonging to the category of longitudinal upper limb deficiencies. The use of international classifications allows for a standardized anatomical description and guides the therapeutic strategy. In the absence of major functional repercussions, conservative management with regular monitoring is indicated. Prolonged follow-up during growth is essential in order to adapt treatment according to clinical and radiological developments.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

Statement of ethical approval

This study was conducted in accordance with the principles of the Declaration of Helsinki.

Statement of informed consent

Informed consent was obtained from the child's parents for participation and publication of this case report.

References

[1] Manske PR, Goldfarb CA. Congenital failure of formation of the upper limb. Hand Clin. 2009;25(2):157-70.

[2] Sadler TW. Langman's Medical Embryology. 13th ed. Philadelphia: Wolters Kluwer; 2015.

[3] Bednar MS, James MA, Light TR. Congenital longitudinal deficiency. J Hand Surg Am. 2009;34(9):1739-47.

[4] Ogino T, Kato H. Clinical and radiographic features of congenital ulnar deficiency. J Hand Surg Am. 1988;13(6):834-41.

[5] Gerber Ekblom A, Dahlin LB, Rosberg HE, Wiig M, Werner M, Arner M. Hand function in children with radial longitudinal deficiency. BMC Musculoskelet Disord. 2013;14:116.

[6] Tonkin MA. Classification of congenital anomalies of the hand and upper limb: development and assessment of a new system. J Hand Surg Eur Vol. 2013;38(6):621-8.

[7] Bayne LG, Klug MS. Long-term review of the surgical treatment of radial deficiencies. J Hand Surg Am. 1987;12(2):169-79.

[8] Swanson AB. A classification for congenital limb malformations. J Hand Surg Am. 1976;1(1):8-22.

[9] James MA, Bednar MS. Treatment of radial longitudinal deficiency. J Am Acad Orthop Surg. 2010;18(10):599-610.

[10] Goldfarb CA, Wall LB, Bohn DC. Centralization and radialization in radial longitudinal deficiency. J Hand Surg Am. 2012;37(11):2468-76.

[11] Paley D. Current techniques of limb lengthening. J Pediatr Orthop. 1988;8(1):73-92.

[12] Bauer AS, Bednar MS, James MA. Congenital longitudinal deficiencies of the forearm. J Hand Surg Am. 2013;38(11):2293-302.