A Case Report of Congenital Hallux Valgus from an Incomplete Preaxial Polydactyly without a Supernumerary Digit

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Learning Point of the Article:

The reader will learn that incomplete pre-axial polydactyly is a potential cause of congenital bunion deformity and that spontaneous resolution, without treatment is possible.

Abstract

Introduction: While hallux valgus is a common deformity occurring in adults and adolescents, congenital hallux valgus is rare. There is a paucity of information available about the deformity and even less information about its cause. In fact, discrepancies exist within literature as to its etiology. This is a case report of bilateral congenital hallux valgus that appears to have been caused by preaxial polydactyly of the great toe, without a supernumerary digit, which to date has not been reported in literature. Markedly increased intermetatarsal and hallux valgus angles were present in both feet. Furthermore, bilateral interval improvement of the angulation occurred spontaneously without operative or non-operative intervention. This case reveals another potential cause of congenital hallux valgus not previously described. Our patient demonstrates that preaxial polydactyly could be another possible etiology of congenital hallux valgus. This case also demonstrates that magnetic resonance imaging (MRI) may be required for accurate diagnosis.

Case Report: The subject of this case report is a 6-month-old boy who presented with what appeared to be severe bilateral congenital hallux valgus. However, an MRI was suggestive of preaxial polydactyly without a supernumerary digit. At 26 months of age, clinical follow-up demonstrated that the deformity had improved and the patient was doing well clinically without intervention.

Conclusion: Congenital hallux valgus is an uncommon deformity. Our patient demonstrates that the etiology may be incomplete preaxial polydactyly without a supernumerary digit. Overtime, even without treatment, the deformity appeared to improve, and the patient had no clinical complaints. The lack of an accessory ossicle or supernumerary digit makes our patient's case unique.

Keywords: congenital hallux valgus, incomplete preaxial polydactyly, supernumerary digit.

Introduction

Hallux valgus is a common deformity occurring in adults and adolescents. It is thought to be caused by a combination of both extrinsic and intrinsic mechanisms. As the proximal phalanx of the great toe begins to migrate, muscles that once acted as stabilizers become forces that worsen the deformity [1]. Congenital hallux valgus is rare and there is a paucity of information available on the subject. Lieberson and Medes [2]evaluated 5700 newborns between 1984 and 1987 and identified eight cases of congenital hallux valgus; all within the 1styear of life. The deformity was treated with corrective plastic splints that applied a varus force on the great toe. It was speculated that the presence of congenital hallux valgus was caused by muscular deformity and an early manifestation of the juvenile deformity. Heller [3]also speculated that the congenital form of hallux valgus may be related to a muscular imbalance or possibly an interposed bone in a reported case of bilateral congenital hallux valgus. In contrast, polydactyly is fairly common, occurring in 1.7/1000 live births [4]. Depending on location, polydactyly is classified as preaxial, central, or postaxial, with postaxial being most prevalent. Belthur et al. evaluated 21 children with preaxial polydactyly

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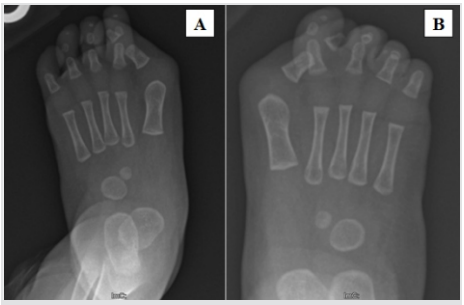

Figure 1: Anteroposterior radiograph of the feet at 6 months of age showed hallux valgus with overlap of the first and second digits. Image A demonstrates the left foot with an intermetatarsal angle(IMA) of 13° and the hallux valgus angle(HVA) of 50°. Image B demonstrates an IMA of 18° and HVA of 62° on the right foot.

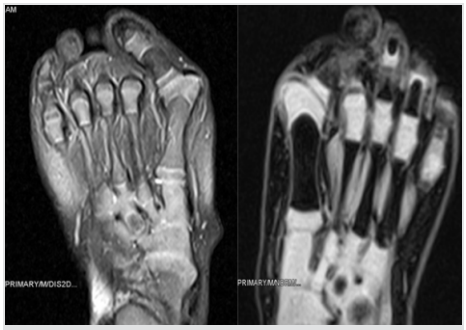

Figure 2: Coronal magnetic resonance imaging of the feet at 6 months of age revealed a broad, cartilaginous component of the distal first metatarsal, suggestive of incomplete preaxial polydactyly without a supernumerary digit.

and reported hallux varus as the most common deformity; however, hallux valgus was also noted [5]. All of the children with hallux valgus in Belthur et al. study had a duplication that extended into the tarsal bones with a supernumerary digit [5].

Case Report

The subject of this case report is a 6-month-old boy referred for evaluation of bilateral hallux valgus. He was the result of a full term, uncomplicated pregnancy and weighed nine pounds at birth. No family history of bone or joint problems was reported. No other medical issues were noted other than penile torsion. The parents reported that the deformities have been present since birth and believe that they have progressively worsened. On physical examination, no dysmorphic features were observed. Each great toe deviated laterally and crossed under the lesser toes at the level of the metatarsophalangeal joints. The first metatarsal head was prominent bilaterally with subsequent blistering and callus. The great toes were flexible in the sagittal plane, but not in the coronal plane. He appeared to have mild discomfort associated with passive range of motion of his great toes. Weight-bearing films of the feet demonstrated hallux valgus deformity bilaterally. The right foot had an intermetatarsal angle(IMA) of 18°with a hallux valgus angle(HVA) of 62°. The left foot had an IMA of 13°and an HVA of 50° (Fig. 1). Amagnetic resonance imaging (MRI)was subsequently performed to evaluate for additional abnormalities that may be contributing to the foot deformities. A bicondylar metatarsal head reminiscent of a forme fruste of preaxial polydactyly without supernumerary digit was evident on MRI (Fig. 2). The apparent duplication of the cartilaginous metatarsal head favored a diagnosis of polydactyly. Treatment was offered consisting of splinting of the feet and lower extremities with close follow-up and, if there was no improvement overtime, excision of the redundant metatarsal head with closing wedge osteotomy of the distal metatarsal. The family declined any treatment including bracing. At 14 months of age, the subject was pulling to stand and cruising. The overall appearance of his foot had improved with a drastic decrease in overlap of the second and first toe. He had no difficulty with shoeing or other clinical problems. Imaging demonstrated an overall improvement in alignment. The right IMA had improved to 16°with an HVA of 40°. The left IMA hadactually worsened radiographically to 17°, but the HVA had improved to 38°(Fig. 3). At 26 months of age, the subject remained asymptomatic. Imaging demonstrated improved alignment from the previous visit with a normal IMA bilaterally of 8°. His HVA on the right was 32°and 41° on the left, which was consistent with prior measurements (Fig. 4). He was able to keep up with other children without difficulty and had no problems with shoe wear. He continued to have overlap of the first and second toe (Fig. 5), but he had full, painless range of motion.

Discussion

Congenital hallux valgus is a rare deformity [2].There is a paucity of information available about the deformity and even less information about its cause. In fact, discrepancies exist within literature as to its etiology. The primary cause of hallux valgus has been reported to be the preexistence of metatarsus primus varus, which results in a compensatory distal angulation of the great toe [3].

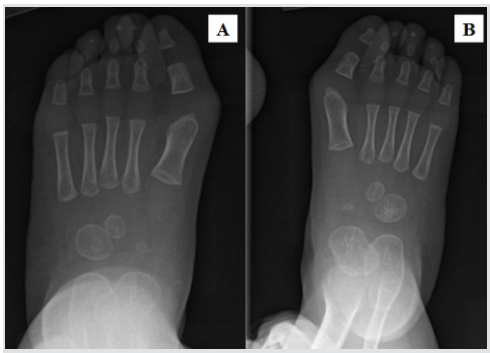

Figure 3: Anteroposterior radiograph of the feet at 14 months of age shows markedly improved hallux valgus deformities. Image A of the left foot demonstrated an intermetatarsal angle (IMA) of 17° and hallux valgus angle (HVA) of 38°. Image B of the right foot demonstrates that the new IMA and HVA were 16° and 40°, respectively.

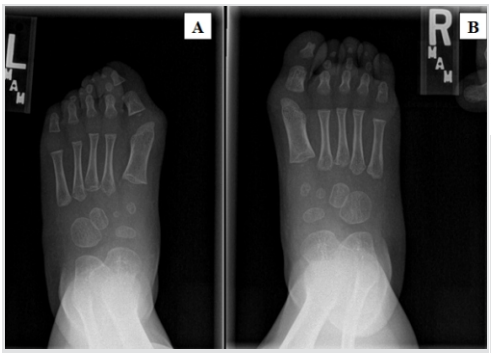

Figure 4: Anteroposterior radiograph of the feet at24 months of age demonstrating continued improvement of hallux valgus deformities. Image A of the left foot demonstrates an intermetatarsal angle (IMA) of 8° and hallux valgus angle (HVA) of 41°. Image B of the right foot demonstrates an IMA of 8° and HVA of 32°.

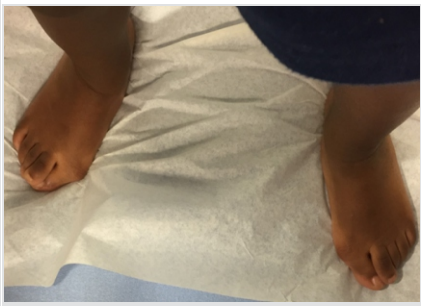

Figure 5: Clinical photograph of the feet at 24 months of age.

Others have attributed hallux valgus to footwear or other impediments, deforming forces applied in utero, the presence of an accessory bone or intermetatarseum between the first and second metatarsals, or the presence of a supernumerary digit [2, 3].Typically, a corrective orthosis or shoe modification is employed to treat the deformity in children[2]. Thisis a case report of bilateral hallux valgus that appears to have been caused by a preaxial polydactyly without a supernumerary digit on the great toe which to date has not been reported in literature. Markedly increased intermetatarsal and HVAs were present in both feet. Furthermore, bilateral interval improvement of the angulation occurred spontaneously without operative or non-operative intervention. This case reveals another potential cause of congenital hallux valgus not previously described. Our patient demonstrates that a preaxial polydactyly can be another possible etiology of congenital hallux valgus. The os intermetatarseum has been described as an accessory bone or prominence that can contribute to hallux valgus. These abnormalities typically appear between the first and second metatarsals and have been shown through anthropological studies to have strong associations with genetic inheritance[6, 7]. However, this condition is not considered a true form of polydactyly. The lack of an accessory ossicle or supernumerary digit makes our patient's case unique. Although congenital hallux valgus is a rare condition, polydactyly in the pediatric population is not uncommon [8]. Polydactyly can result from an isolated malformation, one part of a larger pathologic syndrome, an inherited or congenital abnormality, or a combination of the above. Similar to the os intermetatarseum, patterns of inheritance have been established with some forms of polydactyly. In the upper extremity, a non-syndromic preaxial polydactyly was pinpointed to a discrete genetic locus, shedding light on the predictability of its inheritance [9]. Although our patient's condition, per history, appears to be an isolated malformation, it should make physicians cognizant of the fact that polydactyly can present as a congenital hallux valgus and vice versa. Some pediatric patients have a predisposition to accessory digits, and physicians should be aware of this potential presentation in their own populations. Perhaps, most importantly, our patient showed interval improvement without intervention. In the skeletally immature patient, this case supports consideration of a trial of watchful waiting in patients with this abnormality.

Conclusion

Congenital hallux valgus is an uncommon deformity. This case reveals another potential cause of congenital hallux valgus not previously described. Our patient demonstrates that a preaxial polydactyly without a supernumerary digit can be another possible etiology of congenital hallux valgus and that an MRI may be required to make an accurate diagnosis. Overtime, even without treatment, the deformity appeared to improve, and the patient had no clinical complaints.

Clinical Message

Pediatric orthopedists may occasionally see patients with congenital hallux valgus. Literature does not contain clear guidance as to the etiology, pathoanatomy, natural history, or treatment guidelines of the condition. While this case appears to be classic hallux valgus clinically, the MRI indicates that it is due in part to a forme fruste of preaxial polydactyly. This information adds knowledge to literature as to the etiology and pathoanatomy and suggests that an MRI may be required to make an accurate diagnosis. Our follow-up, without treatment, provides support for a favorable natural history. Clinicians can use this information to council patients.

References

1. Michael JC, Saltzman CL, Anderson RB, Mann RA. Hallux valgus. In: Mann's Surgery of the Foot and Ankle. Philadelphia, PA: Saunders/Elsevier; 2014.
2. Lieberson S, Medes DG. Congenital hallux valgus. Orthopedics 1991;14:588-94.
3. Heller EP. Congenital bilateral hallux valgus. Ann Surg 1928;88:798-800.
4. Phelps DA, Grogan DP. Polydactyly of the foot. J Pediatr Orthop 1985;5:125-84.
5. Belthur MV, Linton JL, Barnes DA. The spectrum of preaxial polydactyly of the foot. J Pediatr Orthop 2011;31:435-47.
6. Henderson R. Os intermetatarseum and a possible relationship to hallux valgus. Bone Joint J 1963;45:117-21.
7. Case D, Ossenberg N, Burnett S. Os intermetatarseum: A heritable accessory bone of the human foot. Am J Phys Anthropol 1998;107:199-209.
8. Watanabe H, Fujita S, Oka I. Polydactyly of the foot: An analysis of 265 cases and a morphological classification. Plast Reconstr Surg 1992;89:856-77.
9. Zguricas J, Heus H, Morales-Peralta E, Breedveld G, Kuyt B, Mumcu EF, et al. Clinical and genetic studies on 12 preaxial polydactyly families and refinement of the localisation of

the gene responsible to a 1.9 cM region on chromosome 7q36. J Med Genet 1999;36:33-40.

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Consent: The authors confirm that Informed consent of the patient is taken for publication of this case report

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