



POSNA

The Core Curriculum

Tibia vara

Objectives

1. Define infantile tibia vara and late onset tibia vara
2. Describe clinical and radiographic criteria used for the diagnosis and staging of tibia vara
3. Discuss reliability of radiographic criteria used for the diagnosis and staging of tibia vara
4. Discuss treatment of infantile and late onset tibia vara
5. Discuss natural history of untreated infantile and late onset tibia vara
6. Discuss the differential diagnosis of infantile and late onset tibia vara

Discussion point

1. If it is hard to radiographically establish the diagnosis of early stages of infantile tibia vara, how do we evaluate the effectiveness of brace treatment?

Discussion

Tibia vara is the most frequent nonphysiologic cause of genu varum in children. It is generally subdivided into infantile and late onset forms. The infantile form is noted shortly after walking commences; early differentiation from physiologic bowing is very difficult until after age 2 when the radiographic changes suggestive of infantile tibia vara are more evident. Staging of tibia vara has been described by Langenskiold; his concepts have been a standard of assessment to the present time, even though a study of the reliability of orthopaedists in using the classification revealed problems in staging intermediate groups. Others have developed radiographic criteria, such as the metaphyseal diaphyseal angle for the early diagnosis of structural tibia vara. Some children with metaphyseal diaphyseal angles described as compatible with infantile tibia vara (an angle of 16 degrees is currently accepted) spontaneously improve without treatment; at the present time, this differentiation continues to be very difficult in the early Langenskiold stages. Biopsy of the lesions in tibia vara reveal abnormally large groups of capillaries, densely packed hypertrophic chondrocytes, and islands of almost acellular fibrous tissue. Results of bracing are generally described as good, with obesity, instability or delayed bracing as risk factors for failure. The definitive treatment of infantile tibia vara is proximal tibial valgus osteotomy. The rationale of surgery is to unload the medial joint. Results are generally reliable; but recurrence, which is generally due to deficient medial growth, occurs more often with stage IV or higher, age 4 1/2 or greater, and obesity. The natural history of untreated tibia vara is to progress to complete medial physeal arrest, which can occur by age 6. In such an event, subsequent treatment is difficult, as both angular deformity and tibial shortening must be addressed.

Late onset tibia vara has its onset between ages 6-13. It is particularly prevalent in obese, black males, but is emphatically not confined to this population. Pathologic analysis reveals changes

similar to those seen with slipped capital femoral epiphysis. Deformity can relentlessly progress, making walking difficult or impossible. Bracing is not effective for treatment of late onset tibia vara, either lateral tibial (and proximal fibular) epiphyseodesis for milder cases or proximal tibial osteotomy for more severe cases. Various techniques, including plate fixation; and monoplane or circular external fixation have been described to maintain position after osteotomy. The rate of correction following lateral epiphyseodesis has been reported as 4 degrees per year. Maintenance of fixation in the very obese is technically demanding.

Differential diagnosis of tibia vary includes the common physiologic bowing of toddlers, focal fibrocartilaginous dysplasia, renal osteodystrophy, rickets, metaphyseal chondrodysplasias, and post-traumatic or infectious asymmetric proximal tibial physal arrest. The systemic conditions associated with genu varum are accompanied by short stature.

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