

Avascular Necrosis of the 1st Metatarsal Head

Idiopatická avaskulární nekróza hlavičky I. MTT kloubu

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SUMMARY

Idiopathic avascular necrosis of first metatarsophalangeal head in child is unique condition not described in literature in past exclude one case. It seems to be part of avascular bone necrosis syndromes, like Freiberg disease, Sever disease etc. and the same principles of treatment are appropriate in AVN of 1st MTT head.

We describe the case of bilateral AVN of 1st MTT head treated conservatively with complete cure.

INTRODUCTION

Avascular necrosis (AVN) of the bone (including osteochondrosis dissecans) is not a rare diagnosis and can involve several locations in the skeletal system (2, 3, 4, 6, 7, 9, 13, 15, 21, 23, 25, 26). In the foot, the best known sites are the 2nd metatarsal head (Freiberg), the calcaneus (Sever), and the talus (2, 5). Etiology includes trauma, steroid use, blood dyscrasias, alcoholism, scuba diving, caisson disease and, mainly, idiopathy (4, 7, 21). In adults, the most common cause of AVN of the 1st metatarsal (MTT) head is iatrogenic insult to vascularity by a distal 1st MTT osteotomy for correction of hallux valgus deformity (19, 22).

We were able to find only one report of bilateral 1st MTT head idiopathic AVN in a child (7) and this is a report of another boy with similar, bilateral idiopathic AVN of the 1st MTT.

CASE REPORT

A 6-year old, previously healthy, Arabic boy complained of two weeks of pain in his right foot. There was a history of minor trauma several weeks previously, without complications. The patient and his family denied any history of direct trauma or overuse, medications, metabolic abnormalities, or blood dyscrasias. On physical examination, swelling of the right 1st metatarsal phalangeal joint (MTPJ) with mild local redness and heat was noted. The joint was painful on movement and palpation. The clinical appearance of the feet, sensation and local perfusion in the toe were normal. On x-ray, enlargement of the right 1st MTT head was found. On

the opposite foot, the 1st MTT was normal. The otherwise normal bone scan showed local isotope absorption in the right 1st MTT head.

Conservative treatment was initiated with non-weight-bearing and analgesics.

On follow-up two weeks later, signs of right 1st MTT head (medial side) necrosis were found on the radiographic examination (Fig. 1). Conservative treatment was continued until three months later when the boy began to complain of pain in his left big toe.

At four months after the first examination, the right side was clinically silent with signs of 1st MTT head remodeling on x-ray. However, there was local swelling, redness, heat and sensitivity above the left 1st MTPJ. On x-ray, lytic changes and destruction of the left 1st MTT head (Fig. 2) with cystic changes and sclerosis of the proximal epiphysis of the proximal phalanx of the big toe were found. The otherwise normal bone scan at this time showed local isotope absorption in the left 1st MTT head. Routine blood tests (CBC, ESR, CRP, ANF, ASLT, RF) were normal. The patient continued with non-weight-bearing, this time on the left side.

On follow up three months later, the boy had no complaints on either side. There was no pain, but tenderness was observed on big toe movement. Full ROM was achieved without swelling, redness or local heat. A subchondral lytic lesion and mild deformity of the right and left 1st MTT heads with almost full remodeling were seen on radiography (Fig. 3).

Three months further on, the boy walked and even ran without any limitation. There were no local signs of inflammation and x-ray showed full remodeling on the right side and signs of progressive remodeling on the left side.



Fig. 1

DISCUSSION

Avascular necrosis of the bone is not a rare disease and can occur theoretically in any bone but with a known preference for various sites (7, 9, 15, 23, 25, 26). Various pathological mechanisms are considered to be responsible for this situation. The most known are trauma, steroid use, blood dyscrasias and alcohol overuse. The common pathway is believed to be increasing intraosseous pressure and impairment in the vascular supply to the involved bone (27, 28). In most cases, no obvious pathological mechanism is found.

There are several classification schemes based on the radiographic features in an attempt to categorize the natural progression of the syndrome (14, 20). The closest to our patient is that of Smillie who introduced the unique classification addressed to Freiberg disease (10, 20). Smillie's classification involves five stages of MTT degeneration (20). Stage I represents an epiphyseal fracture that is typically not visualized on radiographs. Joint space widening may occur, but is a non-specific finding. Stage II represent MTT head flattening as the dorsal aspect of the joint continues to deteriorate, easily identifiable on radiographs. Structural compromise of the MTT head is the hallmark of Stage III and results in central joint depression from subchondral bone collapse. The medial and lateral aspects of the MTT head remain intact and are visualized as medial and lateral osseous projections. Significantly, only the dorsal aspect of the joint is involved while the plantar aspect remains intact. In Stage IV, loose bodies are seen about the periphery of the joint; these represent fracturing of the medial and lateral projections. Stage V presents complete degeneration (arthrosis) of the MTPJ, the end point of the condition. Of similar value is Waldenström classification for LCPD (10).

Applying the principles of Ficat and the theory of increased intraosseous pressure, the decompressive procedure may be useful in the case of femoral head AVN (7).



Fig. 2



Fig. 3

On the other hand, no treatment is recommended for Sever's and Köler's diseases and many other osteochondroses. Unloading of the foot by simple rest or non-

weight-bearing, casting or an orthotic device such as an arch support can be useful (18, 21). This also seems to be valid for symptomatic Freiberg disease. Nevertheless, sometimes the surgical solution is necessary (20).

The boy described by us is a very rare situation where AVN involved the 1st MTT head bilaterally, healing practically spontaneously. We were able to find only one similar report about the bilateral condition (7). A report of AVN of the epiphysis of the 1st MTT has been published (21). This undoubtedly is not a variant of classic Freiberg's infarction (2nd MTT). As in Freiberg, no obvious pathological mechanism was found. The bilaterality (left side three months after the right side) of our patient denies trauma as a cause of the disease, as the left side was never injured and the complete spontaneous cure is not appropriate for Freiberg infarction as classified by Smillie.

Conservative treatment proved to be successful and full remodeling of the 1st MTT heads bilaterally was achieved.

ZÁVĚR

Idiopatická avaskulární nekróza hlavičky I. MTT kloubu u dětí je velmi vzácné onemocnění, které kromě jednoho případu nebylo v literatuře popsáno. Je zřejmé součástí syndromů avaskulární kostní nekrózy, jako například Freibergova choroba, Severova choroba atd. Pro léčbu avaskulární nekrózy hlavičky I. MTT jsou vhodné stejné zásady. Autoři popisují případ oboustranné avaskulární nekrózy hlavičky I. MTT léčené konzervativně s úplným zhojením.

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