Reviews of clinical and radiological anatomy

The popliteal entrapment syndrome

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Summary. Five examples of the popliteal entrapment syndrome have been reported in 4 patients aged between 17 and 41. The diagnosis in each case was made pre-operatively. The anatomical anomalies consisted in three instances of an abnormally high insertion of the inner gemellus (medial head of gastrocnemius) muscle tendon with the artery located twice in front and once in the middle of the tendon, in another instance compression was due to a hypertrophic musculus plantaris and finally, in the last instance, the anomalies were caused by abnormal fibrous bands. In two instances the artery was thrombosed, in three it was compressed in an intermittent fashion. The patients responded well to treatment, by a graft in the case of thrombosis, and by sectioning the abnormal insertions of the gemellus muscle or the fibrous bands in the others. The frequency of these different anatomical types, the relative evolutivity and the embryological hypotheses are studied in the 111 cases recorded in the literature between 1970 and 1983.

Key words: Popliteal entrapment syndrome

Anatomical variations in vessels of the limbs are rare and usually have few pathological consequences. In some cases they result in entrapments in which the neuro-vascular bundles are compressed by the muscular osteo-fibrous elements surrounding them. The most frequent compressions are those of the axillary-subclavian axis in the thoracic-brachial course and of the left common iliac vein in the osteo-arterial constriction produced by the 5th lumbar vertebra and the right common iliac artery. The popliteal fossa can also be the site of such an entrapment. The earliest observations were recorded in 1879 by Stuart [24] and then in 1925 by Chambardel-Dubreuil [3]. Over 150 cases have been reported throughout the world, usually quite incidentally, so that it is difficult to evaluate the real frequency of these anomalies. Gibson [9] has found three in 86 dissections. Between 1976 and 1983 we have observed five examples in four patients. The purpose of this paper is to report on these observations and to analyse the cases recorded in international literature since 1970, in an attempt to determine the most frequent anatomical types, their respective development and to discuss embryological hypotheses.

Observations

Observation n° 1

After a football match a man of 42 suddenly developed claudication in the lower right limb. Clinical examination revealed a good right femoral pulse but no distal ones. In the contralateral limb all pulses were detectable. There was no atheromatous risk factor. Arteriography...
showed (Fig. 2a) a popliteal thrombosis high up with extensive collaterals in the lower popliteal region and the three small arteries of the leg. On the left the arteries were permeable, but the popliteal artery had been displaced inwards. The popliteal was approached from the back. The artery, held against the bony plane by the tendon of the inner gemellus was reduced to a fibrous cord (Fig. 1a). The vein and the nerve were in their usual position. A reversed saphenous vein by-pass was placed in an anatomical position between two segments of the sound artery. The results of the operation were simple with a recovery of all the ankle pulses and complete ability to walk. Owing to the arteriographic appearances the patient was operated on the left side six months later. Here again the same anatomical entrapment was found. As the artery was permeable it was sufficient to divide the insertion of the inner gemellus muscle. No complications resulted from this operation and one year later the patient was completely unrestricted in his walking.

Observation n° 2
A man of 41 suddenly presented with ischemia in the left big toe with significant claudication. A clinical examination found a good left femoral pulse but nothing below. The arteriography showed a popliteal thrombosis, a revascularization of the leg arteries by a collateral circulation. The patient was a moderate smoker. The popliteal region was approached by a posterior incision. The artery passed through the middle of the inner gemellus muscle tendon (Fig. 1b). A by-pass by the reversed long saphenous vein between the superficial femoral and the lower popliteal region led to recovery of the distal pulses. A year later the patient was able to walk without restriction.

Observation n° 3
A man of 32 presented an ischemic syndrome in the left foot when in a crouching position. He had a slight claudication when bicycling but