COMPARTMENT SYNDROME ASSOCIATED WITH AN OSTEOCARTILAGINOUS EXOSTOSIS

J. VAN OOST[1], J. FEYEN[1], J. OPHEIDE[2]

The authors describe a compartment syndrome of the deep posterior flexor compartment due to perforation of the popliteal artery by an osteocartilaginous exostosis, in a healthy 13-year-old boy. The difficulties in making the diagnosis are discussed. In a review of the literature regarding this condition, the combination of compartment syndrome and exostoses could not be found.

Keywords : compartment syndrome ; exostosis.
Mots-clés : syndrome des loges ; ostéochondrome.

INTRODUCTION

A compartment syndrome caused by sudden trauma is a well-known entity. Vascular lesions due to slowly progressive erosion by an osteocartilaginous exostosis have been described, but to our knowledge, a compartment syndrome has never been described.

We present the case of a child in whom this syndrome developed owing to erosion of the popliteal artery by an osteocartilaginous exostosis of the proximal tibia.

CASE REPORT

A 13-year-old boy presented at midnight in the emergency department with complaints of increasing pain and swelling in his left calf. He also noted numbness in the sole of the left foot. The pain had started three hours before admission, and he did not recall any injury. He had been swimming in the afternoon, without any problems. On further questioning he recalled he sometimes felt slight pain in the left calf after strenuous efforts.

On examination, there was obvious swelling of the upper part of the calf, which measured 31 cm in circumference, compared to 28 cm on the right. The distal pulses were palpable, sensitivity was diminished in the sole of the foot, and paresis of the flexor hallucis longus was noted. Passive extension of the toes was not particulary painful, but there was localized tenderness in the proximal calf.

The boy was afebrile and peripheral blood tests were normal. A radiograph (fig. 1) of the knee showed an osteocartilaginous exostosis of the posterior proximal tibia. Ultrasound examination showed only a small amount of fluid in the deep proximal calf and slight swelling of the muscles but no massive hematoma or aneurysm.

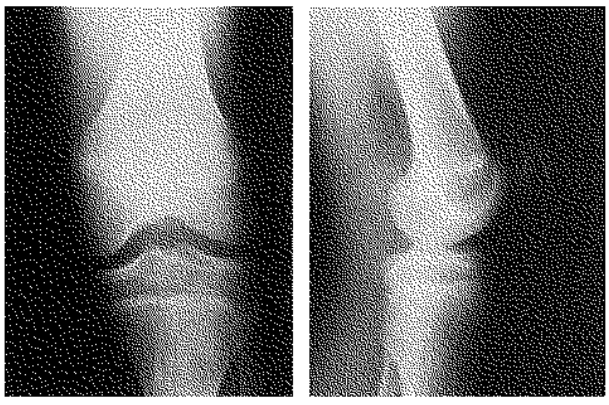

Fig. 1. — Exostosis of the posterior proximal tibia.

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The presumptive diagnosis of impending deep posterior compartment syndrome was made, although the reason why this developed spontaneously in an otherwise healthy young boy was not fully understood.

It was postulated that the combination of swimming and the exostosis might have triggered the symptoms.

Compartment pressures were measured with the Stryker miniaturized digital fluid pressure monitor in the midcalf, so as not to injure the neurovascular structures. A pressure of 23 mm Hg was recorded. Because the pressure was not abnormally high, the boy was admitted for bedrest, ice therapy, anti-inflammatory medication and observation.

A CT-scan (fig. 2) without contrast was performed the next morning as the complaints remained unchanged. This confirmed the ultrasound findings of a small amount of fluid in the deep proximal calf but no massive hematoma or aneurysm.

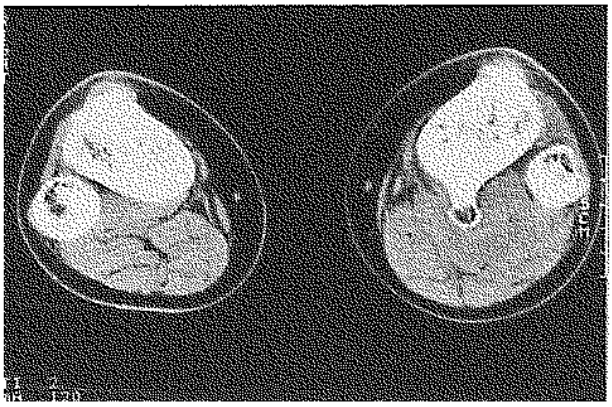

Fig. 2. — CT Scan: small amount of fluid in the deep proximal calf.

Twelve hours following admission, surgical exploration was performed through a posterior approach, with a tourniquet in place, but not inflated. With the patient already under anesthesia a new pressure measurement was done, this time very proximal in the calf, and the pressure recorded in the deep flexor compartment was 58 mm.

The medial gastrocnemius had to be turned down to reach the lesion. The anterior wall of the popliteal artery was perforated just underneath the soleus hiatus, with some small blood clots around it. Following removal of the exostosis, the artery was sutured primarily by the vascular surgeon. A fasciotomy was performed, and a posterior plaster slab was applied to protect the gastrocnemius tendon reinsertion.

The postoperative course was uneventful, and the patient was discharged after five days with crutches. At that time he had no pain, and, he had partial recovery of sensation, but he still showed motor weakness of the flexor hallucis longus. Recovery of sensation and full strength of the flexor hallucis longus was observed after two weeks.

DISCUSSION

Fibrocartilaginous exostoses around the knee are very well known. About 38% of all the exostoses are located around the knee, predominantly in the metaphysis of the femur. Most are discovered incidentally on radiographs. Complications due to exostoses are rather rare.

Apart from sarcomatous degeneration or occasional fracture, thrombosis of the popliteal vein caused by an exostosis has been described (5).

Nevertheless, the most common complications are arterial lesions due to an exostosis.

Lemaire and Beaujean (7) collected 43 such cases in 1975 (one personal case and the others from the literature), around the knee joint. All authors mention the development of a false aneurysm (3, 4, 7) or exceptionally a real aneurysm (2, 6) or an arterial thrombosis (1). Nevertheless, they never mention a compartment syndrome due to perforation of the artery by an exostosis.

The development of a compartment syndrome can be explained as follows. The popliteal artery is relatively immobilized by the arch of the soleus and the anterior tibial artery. The anterior wall of the popliteal artery is eroded against the exostosis by repetitive movements which cause a chronic irritation of the artery. Forceful repetitive movements (e.g. swimming) can then cause an acute perforation of the artery. Blood extravasates into the deep flexor compartment causing an increase in the intracompartmental pressure and consequently a compartment syndrome.

There have certainly been some mistakes in the assesment of our patient.

It is obvious that arteriography would have led us to a definitive diagnosis. Even a CT-scan with contrast would have given us more information.

Second, the first pressure measurement of the deep posterior compartment was inappropriate as it was measured too distally in the calf. Heckman *et al.* (8) studied the relationship between compartment pressure and the distance at which the pressure was measured from the site of a fracture. They found that measuring the pressure within a few centimeters of the zone of peak pressure may result in a serious underestimation of the maximum compartment pressure. This can explain the difference between the first pressure measurement, which was taken too distally and the second, which was more proximal in the calf.

Finally, must all accidentally found exostoses, in the neighbourhood of vital structures be removed ?

Most authors advise preventive excision because of the relative high risk of complications.

Another approach is close follow-up after the patient is alerted to the possible complications or symptoms.

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SAMENVATTING

J. VAN OOST, J. FEYEN, J. OPHEIDE. Compartimentsyndroom i.v.m. een osteocartilagineuse exostose.

De auteurs beschrijven een compartimentsyndroom van het diep flexorcompartiment bij een dertienjarige jongen als gevolg van een perforatie van de arteria poplitea door een osteocartilagineuse exostose.
De moeilijkheden bij het maken van de juiste diagnose worden besproken. In een overzicht van de literatuur betreffende dit voorval, bleek de combinatie van compartimentsyndroom en exostoses niet te bestaan.

RÉSUMÉ

J. VAN OOST, J. FEYEN, J. OPHEIDE. Syndrome des loges suite à ostéochondrome.

Les auteurs présentent un syndrome de loge touchant le compartiment postérieur profond de la jambe chez un garçon de treize ans, suite à une perforation de l'artère poplitée par un ostéochondrome. Les difficultés du diagnostic sont discutées. L'association d'un syndrome de loge et d'un ostéochondrome ne semble pas avoir été décrite dans la littérature.