SHORT REPORT

Popliteal Pseudoaneurysm as a Rare Complication of a Solitary Tibial Osteochondroma

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Introduction

Osteochondromas are the most frequent benign bone tumours, observed in 1–2% of the population.1–4 These bone abnormalities appear during a growth period as a result of subperiostal displacement of adjacent epiphyseal plane cartilage.1,2 Osteochondromas are usually asymptomatic and can be detected accidentally on the plain radiographs of the bones.3 Complications such as: neurological compromise, skeletal defects or vascular lesions occur in about 4% of osteochondromas.1–3,5,6

Most of vascular complications appear in the second decade of life. Vascular complications are 4 times more frequently in men than in women.1–3,5 About 90% of vascular lesions as result of osteochondromas affect the arteries and up to 60% result in a false aneurysm, by far the most frequent lesion.1–3 Bone tumours which lead to the development of false aneurysm are usually located in the distal femur metaphysis, less often in other bones.1,3

We report our experience in the management of popliteal pseudoaneurysm appearing as a result of popliteal artery wall injury caused by a tibial osteochondroma.

Case Report

A 14-year-old girl was admitted to our hospital following a 2-month period of pain in the left popliteal fossa. The pain was exacerbated during extensive activity of the affected leg. On physical examination a pulsating mass, 8-cm in diameter, was found in the left popliteal fossa. Neither sensory nor motor deficits were found, and normal peripheral pulses were present. Ultrasound colour-duplex examination demonstrated 39-mm by 72-mm popliteal artery aneurysm, and a 4-mm defect of the artery closely related to a tibial bone tumour (Fig. 1).

A radiological examination showed a spiked bone tumour located on the tibial proximal metaphysis. An arteriogram revealed a contrast jet into the false aneurysm chamber and patent peripheral arteries (Fig. 2). An elective operation was performed under general anaesthesia. We used a posterior approach and revealed a 4-cm by 7-cm false aneurysm developed from a 4-mm hole in the posterior side of the popliteal artery, which was closely related to a spiked tibial tumour. Using proximal and distal clamping the false aneurysm was resected and the artery was repaired with 6/0 polypropylene primary suture. The tibial

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bone tumour was removed and the remaining bone edges were smoothed.

The postoperative period was uneventful, except for a slight distal oedema. Histopathological examination of bone tumour (no. 103540, 103541) showed: *Exostosis osteochondromatosa*. The girl was discharged 7 days after the surgery with primary healing wound and normal peripheral pulses. A subcutaneous application of the low weight molecule heparin was recommended.

The girl remains asymptomatic with no limitations on her physical activity after 24-months follow-up. Ultrasound colour-duplex examination showed normal flow in popliteal artery 24 months after surgery (Fig. 3).

**Discussion**

Osteochondromata are developmental abnormalities usually arising from femur, humerus and occasionally from other bones such as: tibia, fibula, scapula, clavicle, rib and vertebra.\(^1\)\(^-\)\(^3\)\(^,\)\(^5\) They can occur as solitary (in about 90% of cases) or multiple tumours (in about 10%). Multiple osteochondromata are 10 times more likely to degenerate into malignant chondrosarcoma than the solitary ones.\(^1\) Apart this, osteochondromata, may to lead to bone growth abnormalities, bursa formations and development of neuro-vascular complications. The symptoms depend on the location and size of the bone tumour and its surrounding tissues. The compression of an osteochondroma on the single nerve or plexus can produce sensory or motor defects.\(^1\)\(^,\)\(^3\)\(^,\)\(^5\)

Vascular complications are usually seen in young people in the second decade of their lives (ranging from 6 to 58 years). This is usually related to the ossification of the cartilage cap of the osteochondroma that can injure an adjacent vessel.\(^1\)\(^,\)\(^3\) The compression of the adjacent vein can lead to a deep vein thrombosis, usually of the lower extremities, however Eschelman reported a subclavial vein thrombosis, too.\(^1\)\(^,\)\(^3\)\(^,\)\(^6\)

Osteochondromata produce more arterial than venous complications. Arterial complications described are: embolism, thrombosis, false aneurysm and hemothorax as a result of a pericardiacophrenic artery injury.\(^1\)\(^,\)\(^3\)\(^,\)\(^7\) The osteochondroma may lead to the arterio-venous fistula formation.\(^1\)\(^,\)\(^3\)
False aneurysms appear to be the most frequent complications caused by osteochondromata, and most of them are located in the popliteal space, rarely in other regions, for example in the brachial one. The popliteal false aneurysm formation is related to local compression of the popliteal artery by an osteochondroma. This artery, which is fixed between the Hunter’s canal and its trifurcation, has little mobility and can be injured by an adjacent osteochondroma. Another mechanism of a false aneurysm formation, related to an osteochondroma, is fracture and a subsequent injury of the artery caused by an irregular bone spike.

A mass in the popliteal space is the most popular symptom found in a clinical examination. About 30% of patients had a history of trauma or vigorous exercise prior to the appearance of a pseudoaneurysm. The development of pain in relation to an osteochondroma should be a consequence of a fracture or vascular compression. A patient with a false aneurysm can develop signs of a distal venous thrombosis (in about 2% of cases) and acute limb ischemia. The distal venous thrombosis appears as a result of the compression of the distal veins, caused by a false aneurysm’s mass. The acute limb ischemia can be related to embolisation of intraaneurysm thrombus to the distal arteries or to a rupture of a pseudoaneurysm.

The vascular diseases occur very seldom in the young people, so different causes of the above mentioned symptoms should be explored in this group of patients. Performing additional diagnostic procedures should aim to exclude: coagulation abnormalities, a popliteal cyst, a popliteal artery entrapment syndrome, Buerger disease and also soft tissue tumours. A plain X-ray of the bone shows an osteochondroma in 100% of cases. However this kind of bone tumour can also be seen on an ultrasound examination. If clinical signs of vascular complications are presented, a colour Doppler ultrasound examination is indicated, as it can reveal the type and localisation of vascular disorders. The angiography is indicated if symptoms of limb ischemia appear, whereas computed tomography or magnetic resonance imaging is recommended to precisely assess the relationships between an osteochondroma and adjacent tissues.

The diagnosis of a false aneurysm related to an osteochondroma is an indication for the simultaneous repair of the aneurysm and excision of the bone tumour. If vascular complications appear, urgent surgical treatment is recommended to avoid distal embolism or phlebitis. In the case of the a popliteal false aneurysm surgery, a posterior approach is recommended. This approach allows good exposure to the popliteal neurovascular structure and allows an appropriate arterial repair depending on the size of the wall lesion. In the cases of a single, less than 5 mm hole primary closure of the artery is preferred. If the defect is larger than 5 mm a vein or the synthetic patch closure or partial artery resection followed by the reconstruction with end-to-end anastomosis is preferred. When an end-to-end anastomosis cannot be performed, a graft replacement with the autologous vein or synthetic graft is recommended.

When contraindications to open surgery appear, Wong recommends closure of a false aneurysm by a coil insertion into its lumen. However this procedure is controversial because of the possibility of coil migration to the systemic circulation, leaving out the bone tumour, which can produce complications. False aneurysms of the popliteal artery are much less common than true aneurysms in this location. Therefore a false aneurysm diagnosis, especially in young people should implicate the performing of the plain X ray examination of the bone in order to exclude bone tumours which can be responsible for its formation.

When the exostoses are diagnosed, a resection is necessary because of the possibility of their transformation into malignant tumours or the occurrence of life threatening complications.

References


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