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Popliteal pseudoaneurysm secondary to osteochondroma of femur: Case report

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Abstract
An 18 year old boy with no significant trauma presented with gradually developing swelling over right knee for 2 years. Recently he started noticing increased in size of swelling with pulsatile swelling over right knee. X-ray showed pedunculated bony outgrowth from distal femur suggesting osteochondroma but pulsatile nature of swelling was not explained. CT angiogram and MRI was done which showed large popliteal pseudoaneurysm and a spiked bone tumor arising from distal femur. Popliteal pseudoaneurysm secondary to osteochondroma was suspected and open surgery was done with pseudoaneurysm excision and end to end repair with tumor excision. There was no signs of recurrence or neurovascular involvement in 2 years follow up. Although rare, popliteal pseudoaneurysm should be in surgeons differential in a case of painful knee swelling/ pulsatile mass in adolescent even without history of injury and timely intervention should be done to prevent irreversible damage.

Keywords: Osteochondroma, pseudoaneurysm, pulsatile swelling

Introduction
Osteochondroma is one of the commonest benign bone tumor commonly seen in adolescence. Association of osteochondroma with vascular complication is rare and usually missed. Due to growing tumor in adolescence, spike of tumor may injure vessel nearby forming a pseudoaneurysm [1]. Treating surgeon should know about vascular complications of osteochondroma and timely intervene before to prevent irreversible damage.
Here, we present a case report of progressive pulsatile knee swelling in an adolescent male who was diagnosed with popliteal pseudoaneurysm due to osteochondroma and was surgically managed.

Case Report
An 18 year old boy with no significant trauma presented with gradually developing swelling over right knee for 2 years. Recently he started noticing increased in size of swelling with pulsatile swelling over right knee. On examination, bony hard pedunculated swelling over posteromedial and posterolateral aspect of distal thigh. Pulsatile swelling palpated over medial aspect of right distal thigh.
Initial radiographic of right knee with thigh showed bony outgrowth around posteromedial and posterolateral aspect of distal femur (figure 1). Contrast enhanced MRI showed pseudoaneurysm of popliteal artery and a spike of bony tumor arising from right distal femur (figure 2).CT angiography demonstrated contrast jet with narrowed neck and a corresponding arterial defect at level of osteochondroma (figure 3).
Popliteal artery pseudoaneurysm due to osteochondroma was suspected and open surgery was planned by both medial and lateral approach to distal thigh. First medial exposure was performed and after getting proximal and distal control of vessel, popliteal pseudoaneurysm was explored. Around 5 cm of pseudoaneurysm with redundant vessel wall was excised and intraluminal thrombus was removed (figure 4). Given laxity of popliteal artery intra operatively, end to end anastomosis was done. This was followed by tumor excision through medial and lateral approach (figure 5).

Post-operative period was uneventful. Anticoagulant was continued 6 month post operatively early weight bearing was started and normal range of motion was achieved over time (figure 6). Two years follow up showed no recurrence of tumor and no neurovascular complications (figure 7).

Fig 1: X-ray right knee with thigh showing bony outgrowth around posteromedial and posterolateral aspect of right distal femur

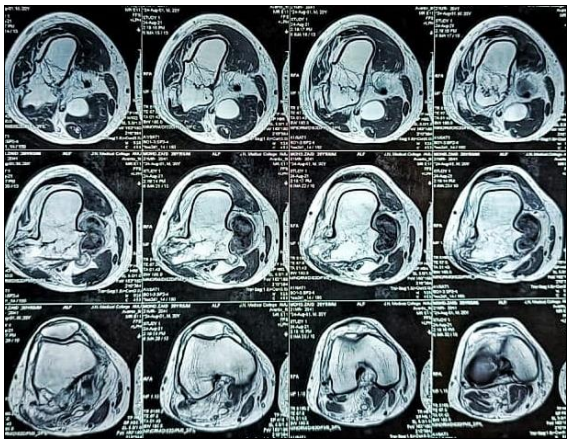

Fig 2: Contrast enhanced MRI showing pseudoaneurysm of popliteal artery and a spike of bony tumor arising from right distal femur

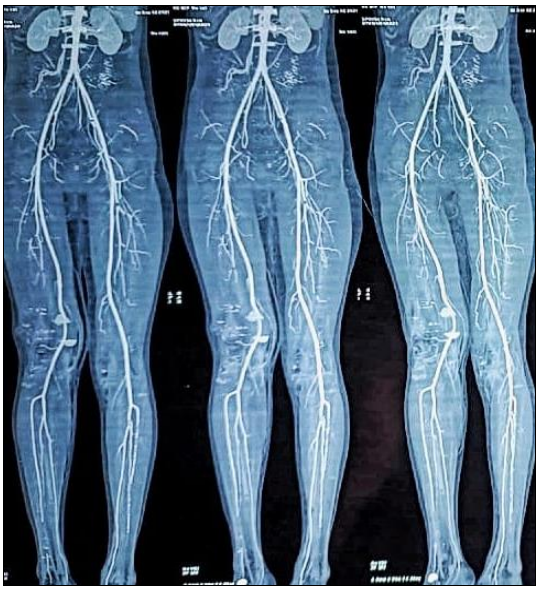

Fig 3: CT angiography showing contrast jet with narrowed neck and a corresponding arterial defect at level of osteochondroma

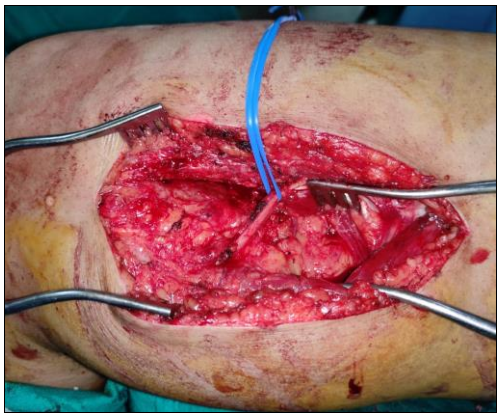

Fig 4: Showing redundant vessel wall excision and end to end anastomosis was done

Fig 5: Showing tumor excision through lateral approach

Fig 6: Showing normal range of movement of affected limb

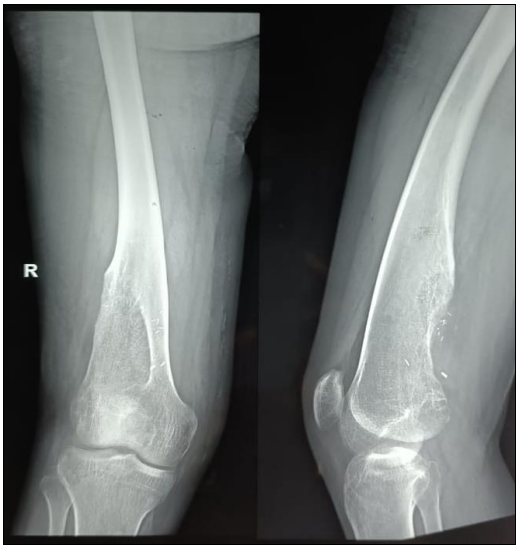

Fig 7: Plain x-ray at 2 years follow-up showing no tumor recurrence.

Discussion

Osteochondroma, one of the most common benign bone tumor developed during adolescence. Complication of osteochondroma include nerve compression, growth defect and malignant transformation [2]. Vascular complications are rare and commonly due to external compression. Most common vascular complication associated with osteochondroma is pseudoaneurysm formation. Popliteal artery is most common site of pseudoaneurysm due to osteochondroma [3]. This could be explained by higher incidence of osteochondroma around distal femur and proximal tibia. Moreover popliteal artery is fixed proximally at subsartorial canal and distally at trifurcation of vessel. Thus increased of injury to popliteal vessels by osteochondroma spike [4]. Other vascular complications include deep vein thrombosis, arteriovenous malformation, limb ischaemia, vessel rupture [5].

Plain x-ray that showed osteochondroma of distal femur in case of associated pulsatile popliteal mass must raise suspicion of popliteal pseudoaneurysm [6]. CT, MRI, angiography, bone scan are used to diagnose it with variable success, where CT angiogram and MR angiogram are preferred investigations [5].

It require a multidisciplinary team approach of orthopaedic surgeons, vascular surgeons and radiologist for diagnosing and appropriate management. Pseudoaneurysm with osteochondroma requires timely surgical intervention to repair aneurysm along with excision of tumor to reduce recurrence of vascular injury. Ultrasound guided compression and endovascular coiling have been used but have multiple comorbidities. Open surgery is advisable for treatment of vascular complications associated with osteochondroma. We can address vascular injury by excision of pseudoaneurysm, removal of thrombus and end to end repair or graft bypass along with tumor excision to reduce chances of recurrence of future vascular insult [7]. Anticoagulant should be continued post operatively to reduce risk of thrombosis.

Due to compression of vein by popliteal pseudoaneurysm there is increased risk of deep vein thrombosis [8]. Limb ischaemia is also reported as complication of neglected popliteal pseudoaneurysm secondarily to pseudoaneurysmal thrombosis or rupture [9]. Nerve palsy could be explained by compression effect of pseudoaneurysm [4]. Ruptured pseudoaneurysm due to osteochondroma have also been reported and may present with shock [10].

Differential diagnosis of knee swelling without history of significant trauma included popliteal cyst, buerger disease, soft tissue tumor with malignant transformation although pulsatile swelling indicates to vascular anomaly. We need additional diagnostic investigation other than plain x-ray to rule out these differentials.

Conclusion

Although pseudoaneurysm of popliteal artery is rare but are reported due to compression effect and continuous rubbing of spike of osteochondroma. It should be in surgeons differential in a case of painful knee swelling/ pulsatile mass in adolescent even without history of injury. CT or MR angiography is excellent to make diagnosis and understand anatomy. Multidisciplinary team approach is required and surgical intervention is advised as an urgent basis to prevent irreversible damage.

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