CHAPTER **48**

OSTEOCHONDROMA OF THE DISTAL TIBIA

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Osteochondroma, historically called osteocartilaginous exostosis, is a cartilaginous capped bony overgrowth most often found in long bones such as the femur or tibia. It is the most common benign bone tumor, accounting for approximately 50% of all non-malignant osseous tumors.

Osteochondromas may present as solitary lesions or in multiples known as multiple hereditary exostoses. Although benign, they do have the ability to undergo malignant degeneration, most often as chondrosarcomas. This is an uncommon consequence, but the incidence of transformation increases from 1% to 10% when osteochondromas appear as multiple lesions. This potential for malignant transformation is also increased when multiple calcifications of cartilage are present throughout the lesion.

Osteochondromas have a predilection for metaphyseal bone and usually appear adjacent to the growth plate. They are usually found in patients less than 20 years of age and occur in males at a 2:1 ratio over females.

DIAGNOSIS

The diagnosis of osteochondroma is usually a clinical one based on patient history and radiographic findings. Radiographically, osteochondromas can be either pedunculated or sessile (wide bodied). The tumor generally appears as trabeculated bone, and having a radiolucent cartilaginous cap, may appear radiographically smaller than it actually is.

Occasionally these benign tumors may become malignant. Therefore, it is important to make an accurate and early diagnosis. The differential diagnosis for osteochondroma includes myositis ossificans, juxtacortical chondroma, parosteal osteosarcoma, and peripheral chondrosarcoma. Carcinomas from remote sites rarely metastasize below the knee, therefore, a malignancy found in the foot or ankle is usually a primary neoplasm.

CASE STUDY

An 18-year-old male with no significant past medical history presented with a chief complaint of right ankle pain with an associated mass. He related that his discomfort was significantly worse after engaging in sporting activities. The mass was first noted by the patient 1 year prior to his initial presentation. The patient previously incurred a right ankle injury a few months prior to noticing the mass.

Physical examination revealed a hard mass along the posterior aspect of the distal fibula (Fig. 1). The mass was approximately 6 cm in diameter but was not painful on direct palpation. There were no appreciable secondary neurological or muscular deficiencies noted. The range of motion of the ankle and subtalar joint appeared to be unaffected.

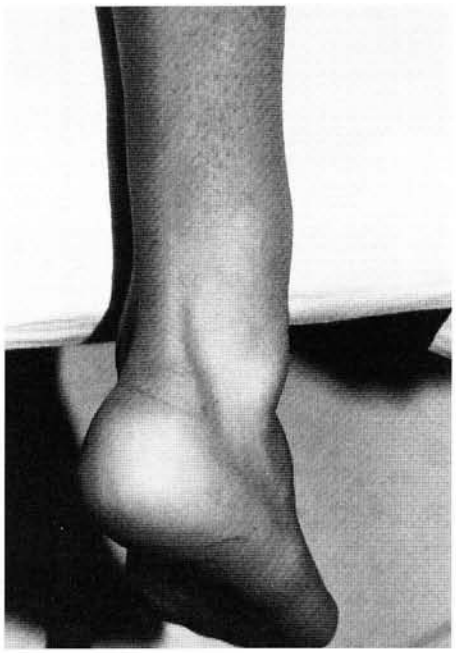

Figure 1. Appearance of the right ankle preoperatively. Note the protuberance at the posterior aspect of the fibula.

Radiographic examination revealed an exostosis arising from the lateral aspect of the distal tibia which deformed the distal fibula (Figs. 2A, 2B). There appeared to be an overlying cartilaginous cap consistent with an osteochondroma. Since there was a complaint of pain, the possibility of malignant transformation was considered.

Figure 2A. Anterior-posterior radiograph of the right ankle demonstrating the osteochondroma. Note how the lesion has created lateral bowing of the fibula.

Figure 3A. Frontal plane MRI of the lower extremity.

An MRI of the right ankle was obtained to rule out malignant degeneration and determine the extent of the lesion. The mass measured 2 x 4 cm (Figs. 3A, 3B). A 3-4 mm overlying cartilaginous cap was identified without any thickening or irregularity. The lesion appeared contiguous with the adjacent tibia and no cortical breaks suggesting malignancy were identified. However, there was an area of increased signal intensity in the muscle adjacent to the superior margin of the lesion. With

Figure 2B. Lateral radiograph of the right ankle demonstrating the osteochondroma. This view shows the widening of the fibula at the site of deformation.

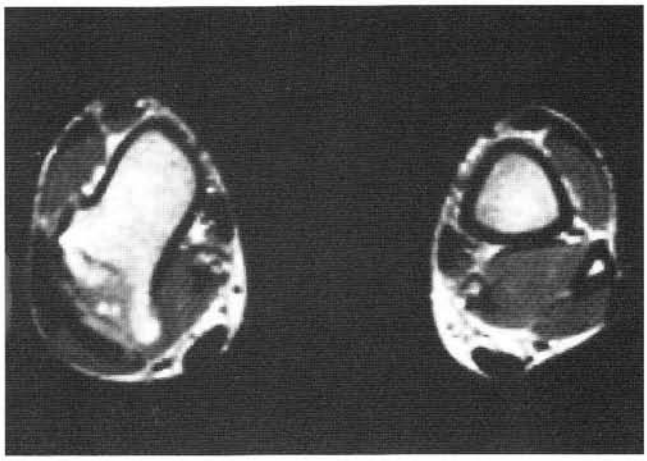

Figure 3B. Transverse plane MRI showing the osteochondroma protruding from the posterior aspect of the tibia.

no associated findings to suggest malignant transformation, the area of increased signal intensity was thought to represent an area of inflammation secondary to chronic irritation.

Procedure

Because of the patient's symptoms and the deformation of the fibula, the decision was made to excise the mass. This was accomplished through a linear incision along the posterolateral aspect of the right fibula with the patient in the prone position. Hemostasis was achieved with a pneumatic thigh tourniquet.

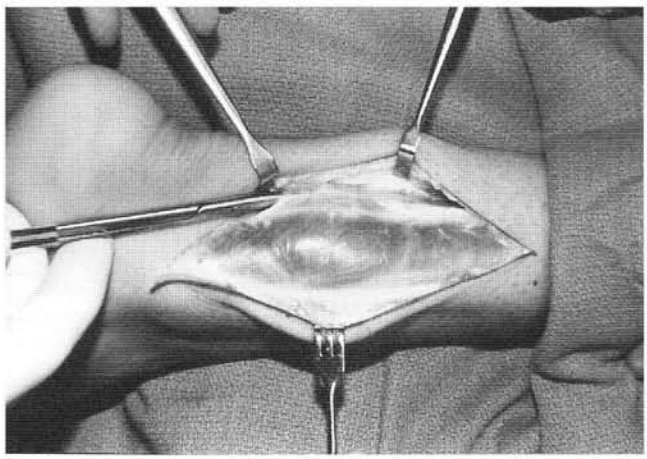

Figure 4. With the patient in a prone position, a posterolateral approach is used to access the tumor.

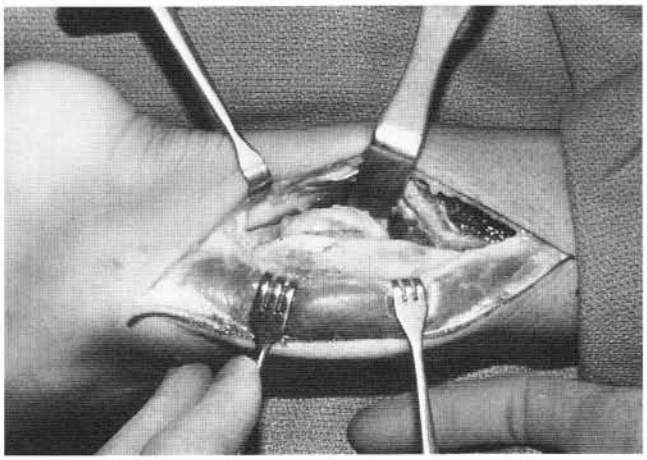

Figure 5. After the deep fascia is incised, the peroneus brevis muscle is retracted laterally, exposing the deformed fibula and osteochondroma.

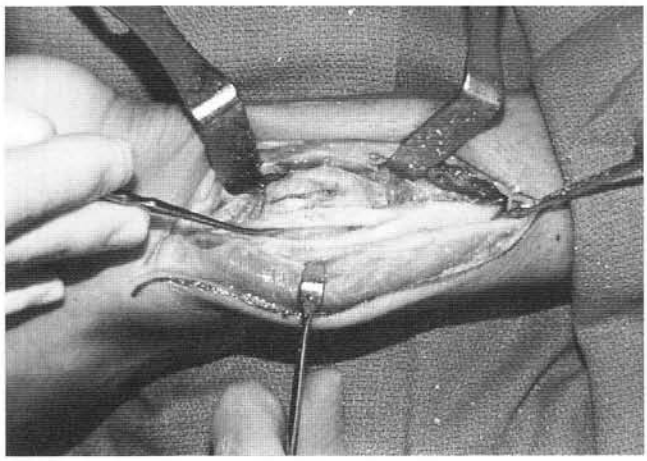

Figure 6. Due to the size of the osteochondroma, a section of the widened fibula is removed to gain access for resection.

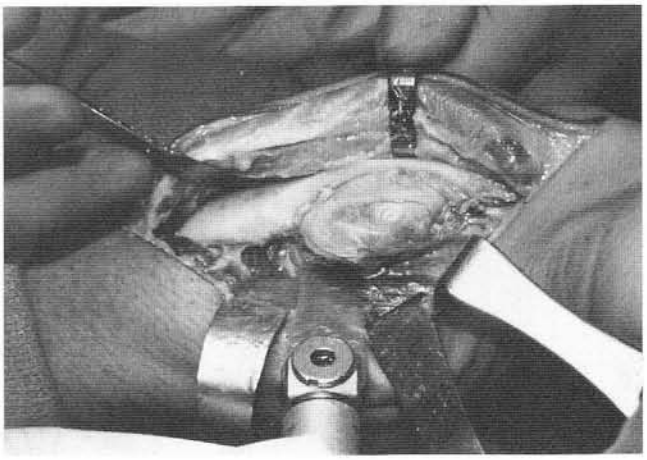

Figure 7. Following removal of a section of the fibula, the osteochondroma is resected with the use of an oscillating saw.

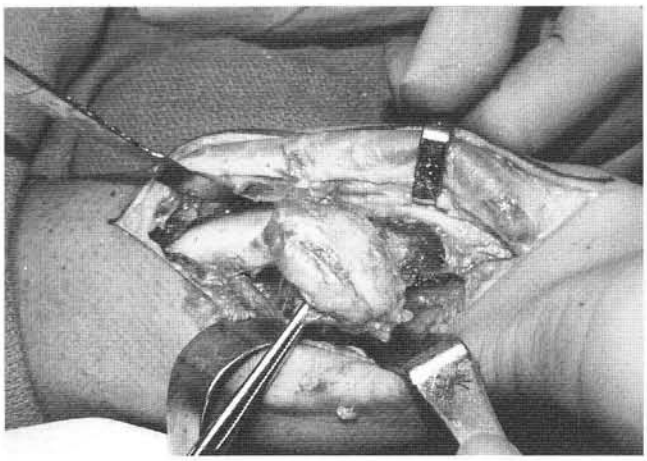

Figure 8. Removal of the lesion following complete resection.

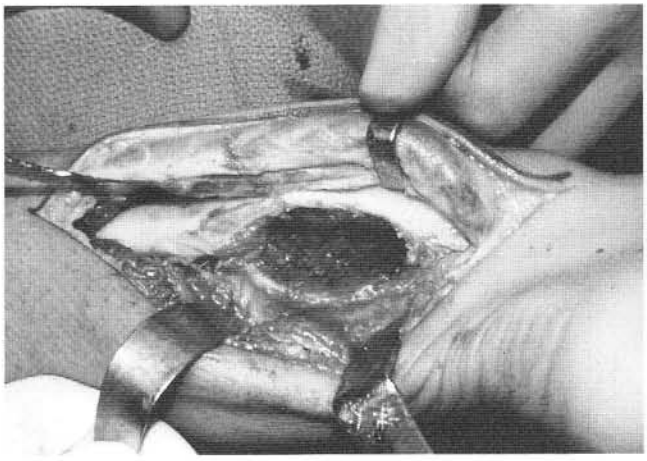

Figure 9. The area is then curetted to expose normal bone.

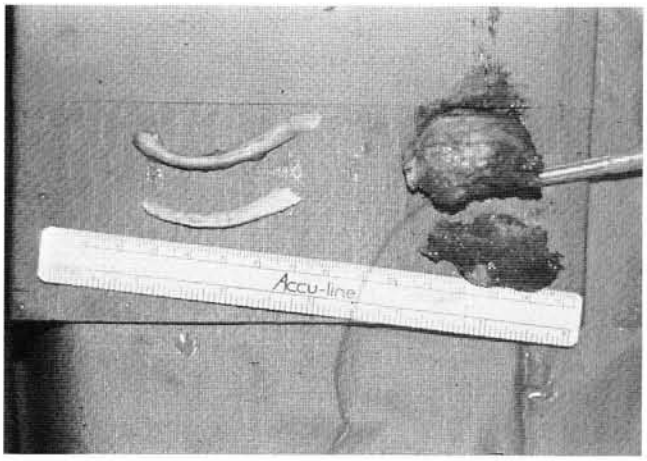

Figure 10. Note the size of the removed osteochondroma. Also shown are the sections of fibula that had to be removed to gain access to the lesion.

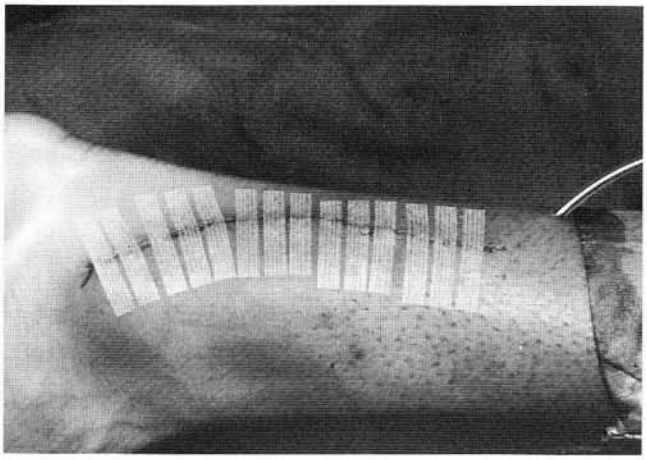

Figure 11. The surgical site is closed in layers over a closed suction drain. A drain is used to evacuate the dead space created by the resection of the osteochondroma.

Figure 12. Postoperative radiograph demonstrating the void created by resection of the tumor.

Microscopic examination of specimens revealed a cartilaginous cap overlying cortical and cancellous bone. There was some calcification of the cartilaginous cap, however, there was no demonstration of atypical features. The histological features were consistent with osteochondroma.

SUMMARY

Osteochondromas can undergo malignant transformation, and although the incidence is low, it is important to be aware of symptoms that might suggest transformation. Complaints of increasing pain or a dramatic increase in size of the lesion must not be ignored. If the physician is confident that the lesion is benign and chooses not to resect it, the patient should be monitored periodically with serial radiographs in order to identify degenerative changes that might suggest malignant transformation.

Since osteochondromas are usually associated with the growth plate of a long bone, there exists the potential for steady growth. This increase in size takes place through the process of enchondral ossification until closure of the epiphyseal plate occurs. After cessation of growth, remnants of the cartilaginous cap may remain, possibly explaining the occasional development of peripheral chondrosarcomas later in life. When and if a chondrosarcoma develops, early recognition and wide excision are of the utmost importance.

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