

Clinical-Radiological-Pathological Correlation

C-2 Osteochondroma

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Case

A 20 year old female with a several week history of new numbness and tingling in the left upper extremity which is made worse by turning her head to the left. No other neurological symptoms are reported. CT and MR imaging of the cervical spine revealed a large epidural mass lesion at the C1-C2 level causing spinal compromise (Figures 1 and 2 respectively).

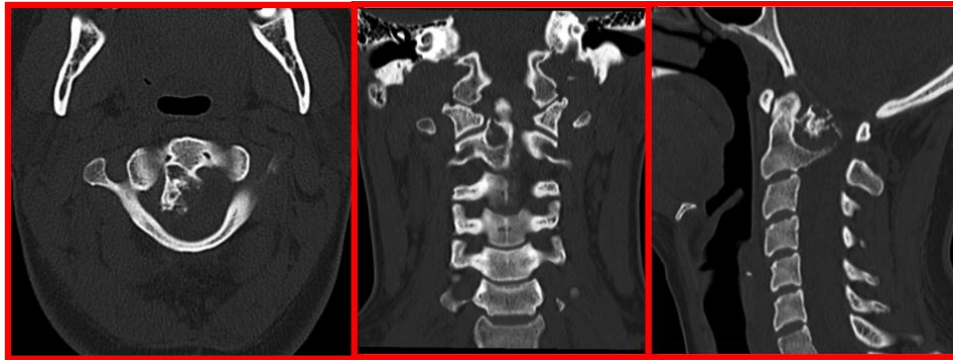


Figure 1: Axial, coronal, and sagittal CT bone windows show a right paracentral pedunculated calcified mass originating from the C2 odontoid process synchondrosis.

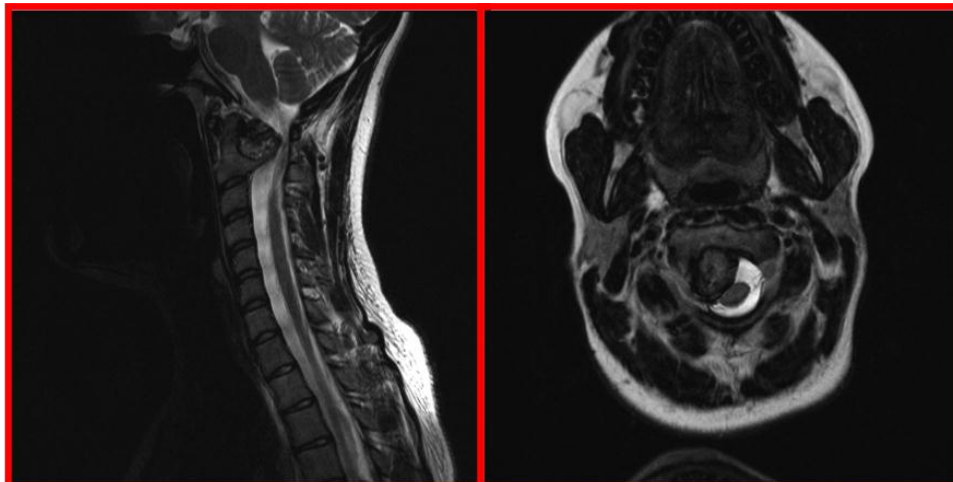


Figure 2: T2 sagittal and axial images showing large right parasagittal epidural mass with mixed iso- to-hyperintensities and hypointensities compressing the right anterolateral cord.

Using a right posterior paramedian approach, the patient then underwent a right C1-C2 hemilaminectomy and resection of a calcified epidural mass without complications. The tumor was sent for surgical pathology, which shows mature hyaline cartilage indicative of a benign cartilaginous tumor (figure 3).

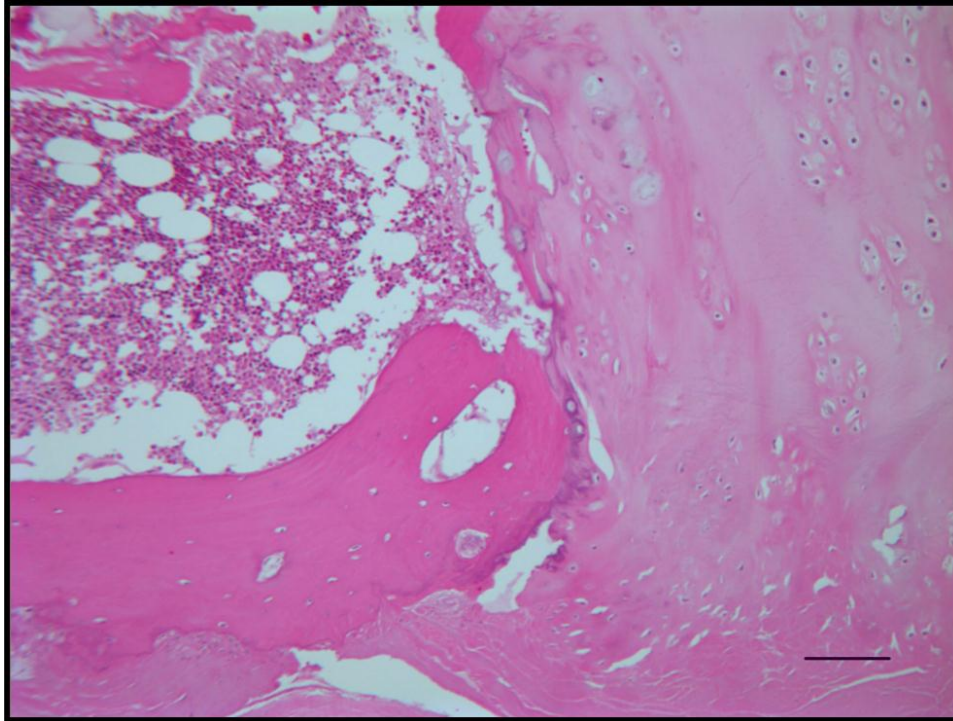


Figure 3: Photomicrograph of a section of the C1-2 epidural tumor shows mature hyaline cartilage that undergoes endochondral ossification; also observed between bony trabecula are areas of hematopoietic bone marrow. Hematoxylin and eosin. Scale bar = 100 micrometers.

An Aspen collar was applied post-operatively. The patient had no neurological deficits following surgery and was deemed to go home with assist on post-operative day #4.

Discussion

An osteochondroma can be considered a cartilage-covered excrescence that arises from the surface of a bone, and may be solitary or multiple (hereditary multiple exostoses). The solitary osteochondroma is a relatively frequent lesion that is regarded either as a true tumor or as a growth disturbance. Nevertheless, it is considered the most common benign bone tumor. Osteochondromas develop in bones that form through the process of endochondral ossification and are intimately related to the physis.

The majority of solitary osteochondromas are found in children and adolescents as a painless, slow growing mass. However, osteochondromas may lead to more

significant signs and symptoms related to fracture of the exostosis, irritation or damage to adjacent nerves or vessels, or spinal cord compression as in this case.

The long tubular bones, especially the femur, humerus, and tibia, are the most frequent sites. The small bones of the hand and foot are involved in approximately 10 percent of cases, and the innominate bone in 5 percent. The spine is affected in less than 2 percent of cases, typically arising from the posterior elements. Approximately half of these occur in the cervical spine; C2 is the most commonly affected segment. Involvement of the spine may lead to compression of the spinal cord.

An osteochondroma is characterized radiographically by a sessile or pedunculated osseous protuberance arising from the surface of bone and containing spongiosa and cortex that are continuous with those of the parent bone. The tip of the osteochondroma is covered by a cap composed of hyaline cartilage and a variable degree of calcification. CT and MR imaging can be used in the detection of continuity of the cortical and medullary bone in an osteochondroma with that of the parent bone. On non-enhanced CT scans the cortex of the parent bone flares into the cortex of the osteochondroma, with which it is continuous. The cartilaginous cap often contains calcific foci. The cartilaginous tissue of the cap of an osteochondroma is of high signal intensity in T2-weighted MR images, allowing measurement of the cap. MR imaging, therefore, may supply information regarding the likelihood of malignant transformation. In children and adolescents, the cap may be as thick as 3 cm. Although the cartilage cap in adults may be entirely absent, the occurrence of a cap thicker than 1 cm in adults should raise the possibility of chondrosarcomatous transformation. In this case, the cartilaginous cap measures 2 cm as can be expected in a very young adult. Malignant transformation of a solitary osteochondroma occurs in approximately 1 percent of cases, in contrast to the 20 percent rate in the familial hereditary form of hereditary multiple exostoses. Histomorphology of the cap of the actively growing osteochondroma shows foci of actively proliferating cartilage cells that closely resemble the normal epiphyseal growth plate.

References

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