Short report

Chondroblastoma of the skull

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SUMMARY A case of chondroblastoma of the temporal bone is reported, and the pathology of the lesion outlined. The rarity of these neoplasms in the skull makes accurate prognosis impossible.

Chondroblastoma, also called “benign chondroblastoma” is an uncommon neoplasm of bone described by Codman and given its present name by Jaffe and Lichtenstein. The tumour usually occurs in the long bones but two cases arising from the skull have been reported. We describe a third case, different from those previously recorded, as the tumour extended through the dura, causing intracranial pressure.

Case report

A 42-year-old female gave a four month history of seizures, and pain in the left ear. On examination, she was drowsy, and had bilateral papilloedema. Ear inspection and clinical hearing tests were normal. Skull radiographs and tomograms of the left petrous bone, showed erosion, and a CT scan showed a contrast-enhancing mass, arising from the floor of the left middle fossa. There was oedema of the surrounding brain and contralateral shift. Angiography demonstrated a tumour blush filling from the external carotid, and the left internal carotid artery was occluded at the skull base. A left temporal craniotomy was performed, and a soft friable extradural mass was found invading the dura and elevating the temporal lobe. The intradural portion of tumour and visibly involved petrous bone was removed. The facial nerve was surrounded by tumour and was sectioned during surgery. Frozen section was not diagnostic; paraffin histology showed a chondroblastoma. Once the nature and locally invasive character of the lesion was known, a further resection was undertaken. At operation, residual tumour was not readily identifiable. The roof and anterior wall of the external auditory canal and mid ear were removed. Apart from a temporary CSF leak from her left ear, the patient made a good recovery. Three years after surgery, she remains well, except for left sided deafness and facial palsy.

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Pathology

Macroscopically the tumour consisted of gritty orange and grey tissue and some white glistening fragments. Undecalcified paraffin sections were stained by the following methods: haematoxylin/eosin, van Gieson, reticulin (Gordon and Sweet), alcan blue/PAS and ferrous ferricyanide. By light microscopy the tumour was composed of closely packed cellular areas alternating with loosely arranged nodules showing cartilaginous differentiation (fig (a)). In the cellular regions, chondroblasts were polyhedral, and had single round vesicular nuclei; many contained cytoplasmic haemosiderin granules. There were unevenly scattered multinucleated giant cells having an average of 12 uniformly sized round nuclei (fig (b)). The giant cells were sometimes seen in relation to foci of haemorrhage. Calcium granules were also present, both within cell cytoplasm, and deposited in lattice like fashion in inter cellular ground substance. Where cells and ground substance were heavily calcified the tissue was necrotic: “calcification necrosis.” The tumour invaded through the dura, and replaced much of the bone removed from the middle ear at the second operation, although tumour had not been identified at surgery.

Electronmicroscopy

(Paraffin blocks were re-processed). Where cells were closely packed, cell membranes were indistinct, but some had indentations or “bays” into which the electron-lucent intercellular matrix extended. Abundant rough endoplasmic reticulum, prominent Golgi complexes and intracytoplasmic granules of iron were other features of these cells. Nuclei were markedly indented (fig (c)). There was a fine gradation between these closely packed cellular regions and areas of cartilaginous differentiation, with increasing collagen in the ground substance and reticular calcium deposition around chondrocytes.

Discussion

The commoner destructive neoplasms involving the skull include; primary carcinomas of ear, sinuses and nasopharynx, metastatic carcinoma, meningioma,
Chondroblastoma of the skull

Fig (a) Alternating cellular and cartilaginous tissue. (HVG × 50)

Fig (b) Chondroblasts and multinucleated giant cells. (H/E × 100)

Fig (c) Highly convoluted nucleus and irregular cell membrane. The cytoplasmic electron dense granules are iron × 33 000.

Schwannoma, glomus jugulare tumour, chordoma and multiple myeloma. Osseous and cartilaginous skull tumours are less common, but chondroma, chondrosarcoma, osteoma, osteosarcoma, and giant cell tumour have all been described. In particular, the sphenoid and temporal bones, whose origin is by endochondral ossification may give rise to cartilaginous neoplasms.

Benign chondroblastoma is an uncommon primary neoplasm of bone, described in the past as “calcifying giant cell tumour” and epiphyseal chondromatous giant cell tumour. There is a predominance of male cases and most patients are between the ages of 10 and 25 years. The long bones, especially the lower end of femur, upper ends of tibia and humerus are the most common sites. The cell of origin is thought to be a primitive cartilage cell. Microscopically the tumour can be confused with chondrosarcoma or giant cell tumour and may be worrying because of its extreme cellularity and variability. Mitoses however, are scanty. The histological hallmark is calcification necrosis where intercel-
lular calcification is dense. This was a pronounced feature of our case.

In long bones the tumour usually has a benign behaviour and treatment by curettage is generally curative, although an overall recurrence rate of 38% has been reported in one series.\(^6\) One case in the humerus developed sarcomatous change 3½ years following treatment by curettage and radiation.\(^7\) Despite the usual benign course, there are reports of metastases to lung, liver and abdominal viscera.\(^8,9\)

In the two previously recorded examples arising from the skull, no long term follow-up is mentioned,\(^4,5\) so the prognosis in this location remains uncertain. The behaviour of the tumour in our case, invading the dura and causing increased intracranial pressure indicates that these may be, at least on occasion, life threatening neoplasms. Therefore, it would seem advisable to attempt a complete surgical removal, even if a second operation is involved, especially in view of the possibility of sarcomatous change in chondroblastoma following irradiation.

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