RADICAL EXCISION OF AN OSTEOBLASTOMA OF THE CERVICAL SPINE

A COMBINED ANTERIOR AND POSTERIOR APPROACH

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We report and discuss a combined anterior, anterolateral and posterior approach to the lower cervical spine. This was used for the radical resection of a recurrent osteoblastoma which involved the lateral mass, pedicle, and lamina of the sixth cervical vertebra.

Primary tumours involving the lateral and posterior elements of a cervical vertebra in adolescent patients are relatively rare (Verbiest 1983), the most common being osteoblastoma, osteoid osteoma and aneurysmal bone cyst. The radical excision of a tumour which involves the lateral mass and posterior elements of a cervical vertebra is technically demanding because of the close proximity of the vertebral artery, the cervical nerve roots and the spinal cord. The use of a standard anterolateral or posterior approach alone may not give the best exposure for resection of the tumour and bone grafting. We report the use of a combined approach for the resection of an osteoblastoma affecting the lateral mass, pedicle and lamina of the sixth cervical vertebra.

CASE REPORT

A 16-year-old girl presented with a one-year history of right-sided pain in the neck, shoulder and upper arm. This pain had increased, and for some months had limited her sleep, though analgesics gave some relief. The only abnormal clinical finding was limitation of neck rotation to the right, but radiographs showed an area of increased density in the right lateral mass of the sixth cervical vertebra (Fig. 1). A provisional diagnosis of osteoblastoma was made and further investigations were performed.

A technetium bone scan showed a localised area of increased uptake in the region of the lateral mass of C6; and computerised tomography showed that the pedicle and the lateral mass were involved. An attempt was then made to excise the tumour through a posterior approach, with posterior fusion from C5 to C7. Postoperatively a soft collar was used for four months. Her symptoms and the loss of rotation resolved completely within weeks of operation.

Three years after the first operation pain recurred in the right side of the neck and the supraclavicular region; this became progressively worse over a period of months. On examination there was limitation of neck rotation to the right, with tenderness over the right lateral mass of C6. Radiographs showed the lateral mass of C6 to be very dense and with more extensive changes than those seen at the first presentation (Fig. 2). A new technetium bone scan again demonstrated a marked increase in local...
Investigations three years after the first operation. Figure 2—An anteroposterior radiograph of the lower cervical spine shows an area of increased density involving the lateral mass of C6 on the right side (arrow). The clips mark the upper and lower limits (C5-C7) of the posterior fusion at the first operation. Figure 3—The bone scan shows increased uptake in the region of the right lateral mass of C6. Figure 4—An angiogram shows that the right vertebral artery enters the foramen transversarium of C5. The increased density of the lateral mass can again be clearly seen. Figure 5—A CT scan at C6 level shows that the tumour involved the pedicle and lateral mass. The defect in the right lamina is related to the first operation.

Diagrams to show the combined approaches and the resection of the lateral mass of the C6 vertebra. The vertebral artery has been retracted medially, and the obliquely descending C6 nerve root has also been retracted.
activity but no evidence of abnormality elsewhere (Fig. 3). Bilateral vertebral angiography showed that the right vertebral artery entered the foramen transversarium of the fifth cervical vertebra; the left vertebral artery was normal (Fig. 4). Computerised axial tomography defined the increased involvement of the pedicle and lateral mass (Fig. 5). Radical excision was then planned and carried out using a combined approach to the lesion.

The operation

Anterior approach. The patient was anaesthetised and placed supine with a sandbag under the upper thoracic spine and the neck extended and rotated to the left. A right-sided approach was made, dividing the skin horizontally and the platysma vertically. Lateral retraction of the sternomastoid and the carotid sheath allowed an anterior approach to the sixth cervical vertebra (Fig. 6), the level being confirmed radiographically. By subperiosteal dissection, the longus colli muscle was detached from the anterior surface of the lateral mass.

Anterolateral approach. Medial retraction of the sternomastoid and carotid sheath then permitted an anterolateral approach to C6 (Fig. 6); the remaining muscle attachments to the anterior surface of the lateral mass were cleared, beginning at the anterior tubercle and proceeding medially. The C6 and C7 nerve roots were identified and gentle retraction was used to improve the exposure of the lateral mass. A McDonald retractor was placed in the foramen transversarium to protect the vertebral vessels and the anterior portion of the lateral mass was resected. In this case the foramen at this level contained only small veins, which were cauterised and divided. A chisel was used in the sagittal plane, with progressively deeper cuts, to detach the lateral mass; bone was then removed piecemeal with a rongeur (Fig. 7). The anterior wound was closed.

Posterior approach. The patient was turned into a prone position and a posterior midline incision was used to expose the laminae of C5, C6 and C7. It was apparent that the old posterior fusion from C5 to C7 was solid and that a large part of the right lamina of C6 had already been excised through the anterolateral approach. Excision of the involved tissue was completed and the wound was closed over a suction drain.

Follow-up. The patient had complete relief of pain and regained neck rotation to the right. Radiographs and a CT scan confirmed a radical excision with no evidence of residual tumour (Figs 8 and 9). Study of the case and the excised tissue by the Bristol Bone Tumour Registry confirmed the diagnosis of osteoblastoma, despite the fact that the active lesion was less than 0.5 cm in diameter. The patient remains free of symptoms one year after operation.

DISCUSSION

Osteoblastoma of the cervical spine commonly involves the lateral and posterior elements of a vertebra. Treatment is by excision combined, where necessary, with bone grafting to stabilise the involved segments. Recurrence is not uncommon (Friedlaender and Southwick 1982); this may, in part, reflect the nature of the tumour, but it is highly probable that recurrence is due to inadequate primary excision. In the case we report, the tumour at first presentation involved the pedicle and the lateral mass; it could not easily be excised through a posterior approach. Failure to identify the lesion in the tissue removed at the first operation supports this view. If recurrence and a further operation is to be avoided it is important that the initial operation be sufficiently radical, and for this, good exposure is essential.

We considered that neither a posterior nor an anterolateral approach alone would give adequate access. A combination of these approaches served well, and had such an exposure been used at the first operation we believe that the second procedure would not have been required. This combined approach could be used in
similar circumstances for the primary excision of a tumour, and certain details are worth elaborating.

Careful pre-operative planning is essential. In addition to plain radiographs, tomography and bone scintigraphy may be useful, and will usually allow the establishment of a good presumptive diagnosis. CT scanning may be invaluable, as in our case, in defining the extent of bone involvement and, therefore, the bone resection necessary.

Angiography of both vertebral arteries must be carried out; knowledge that there is good flow in the contralateral artery provides reassurance should ligature be necessary on the involved side. Angiography also shows the anatomical course of the artery on the side of the tumour, including the level at which it enters a foramen transversarium. This is commonly at C6 but may be at other levels (Argenson et al. 1980). Whether or not the artery is within the foramen transversarium of the C6 or C7 vertebra, the presence of the vertebral vein or an accessory vertebral vein still needs consideration. These veins may be ligated without risk but accidental laceration may cause profuse haemorrhage.

Nerve root retraction, particularly of the root above the lesion, is necessary during resection of the lateral mass, and may cause postoperative neurapraxia. If anterior cervical fusion is being considered as part of prophylactic stabilisation of a segment, then a spreader opened in the involved side of the disc space will help to separate the roots. Traction on the sympathetic chain may cause a partial Horner’s syndrome, and if the chain is divided this will be permanent. The syndrome is characterised by constriction of the pupil and loss of sweating, with ptosis which is incomplete, because the levator palpabreus superioris is also supplied by the oculomotor nerve (Johnson 1983).

We used a transverse anterior skin incision with splitting of the platysma muscle. This provides the best cosmetic result and adequate exposure (Cloward 1981) for an anterolateral approach posterior to the sternomastoid muscle, or an anterior approach in front of it. It is not necessary to divide the sternomastoid muscle, as was recommended by Riley (1983). Stabilisation of a segment may be performed through either an anterior or posterior route; with this combined approach a definitive pre-operative decision need not be made.

A combined approach to the lower cervical spine has proved effective for the radical removal of a recurrent osteoblastoma, and could equally well be used to resect other tumours in this region. It also provides good access for either anterior or posterior segmental fusion should this be required.

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REFERENCES


