Solitary bone cyst in the odontoid process and body of the axis

A CASE REPORT AND REVIEW OF LITERATURE

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A four-year-old boy presented with a solitary bone cyst in the odontoid process and body of the axis. Plain radiographs showed a radiolucent lesion with extreme thinning of the cortex and MRI demonstrated a high signal intensity in the interlesional matrix. The cystic component extended into the body of the axis through a defect in the epiphyseal plate.

At operation, the cavity of the cyst was found to contain serosanguineous fluid, and histological examination showed that it was lined by a thin layer of connective tissue. The cyst may have originated from a defect in the epiphyseal plate.

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Solitary bone cysts are rare in the spine and there are only six reported cases which have been proven histologically. They involved the body of C4 and C5, the spinous process of L2 and L3 and the body of L1 and L2. We report a case of a solitary bone cyst in the odontoid process and body of the axis extending into the lamina and pedicle. We have been unable to find a previous report of such a cyst.

Case Report

A four-year-old boy was seen in Changzheng Hospital, Shanghai with a history of recurrent occipitocervical pain for four months and torticollis for 25 days. Radiographs showed a radiolucent lesion in the odontoid process and body of the axis with extreme thinning of the cortex (Fig. 1). Examination confirmed torticollis, with local tenderness over the occipitocervical region and limitation of movement of the neck in all directions by pain, but there was no neurological abnormality. Radiographs showed a well-defined radiolucent lesion expanding the bone and T1-weighted MRI demonstrated a high signal intensity within the lesion and the absence of an adjacent soft-tissue mass (Fig. 2). Haematological tests were normal and the diagnosis was a solitary bone cyst.

After several days in cervical traction, an anterior approach was used to expose the odontoid process and body of the axis. There was a thin shell of bone over a cavity filled with serosanguineous fluid. The lesion was treated by curettage and bone grafting (Fig. 3). The postoperative recovery was uneventful, but the child wore a plaster collar for three months.

Histological examination of specimens showed that the wall was partly lined by a thin layer of connective tissue, with some infiltration by inflammatory cells and some epiphyseal cartilage (Fig. 4). At two years and six months after operation the patient had a full range of movement of the neck. Radiographs showed that the shape and radiological density of the axis and its relation to the atlas were normal (Fig. 5).

Discussion

Solitary (simple, unicameral) bone cysts are most commonly seen in children and adolescents at the distal end of the femur and the proximal and distal ends of the tibia in the second decade. They are benign, non-neoplastic, cystic lesions, more common in males usually in the metaphyseal region. With growth, they gradually move toward the diaphysis. They have been reported in the pelvis, foot, mandibular condyle and in the vertebrae.

The pathophysiology is unknown, although a vascular aetiology has been suggested. Malawer and Markle describe a patient with involvement of the proximal femoral epiphysis showing an increased pulsatile pressure in the cyst. A traumatic basis has been postulated suggesting that bleeding within the intramedullary space and failure of the
clot to organise may leave a cavity within the bone. Continued expansion of the cysts may be explained by increased pressure resulting from oedema and restricted venous drainage. Many authors, however, favour an epiphyseal origin due to a developmental defect of the epiphyseal plate, which may, in time, grow away from the cyst. Given the unusual anatomy of the axis, this seems the most likely explanation in our case. At operation we found increased pressure of the fluid within the cyst, and the thinning of the cortex suggested local erosion. The expansive force may explain the extension across the epiphyseal plate.

An anterior approach, curettage and bone grafting gave a satisfactory result in our patient, but such a potentially hazardous procedure should be undertaken only in a specialised unit.

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References