Musculoskeletal images. C3 aneurysmal bone cyst

A 56-year-old man complained of neck pain for several months. Radiography revealed a mass in the posterior aspect of the left side of the neck. Open biopsy after computed tomography revealed an aneurysmal bone cyst.

Examination by a team comprising general, orthopedic and spinal surgeons with an interest in surgical oncology, found a full range of motion in the cervical spine. Muscle bulk was symmetrically distributed and tone was normal. Formal motor testing revealed grade 5/5 strength in all muscle groups of both arms and legs. The deep tendon reflexes were symmetrically 2/4, and the patient was neurologically intact to light touch. Coordination and gait were normal.

Magnetic resonance imaging demonstrated a multilobulated enhancing mass involving the left side of the vertebral body of C3, extending posteriorly through the pedicle and infiltrating the C2–3 facet joint as well as the lamina and spinous processes bilaterally at C2 and C3 (Fig. 1). Computed tomography detailed the erosive nature of the tumour (Fig. 2). Along its course the tumour also encased the left verte-

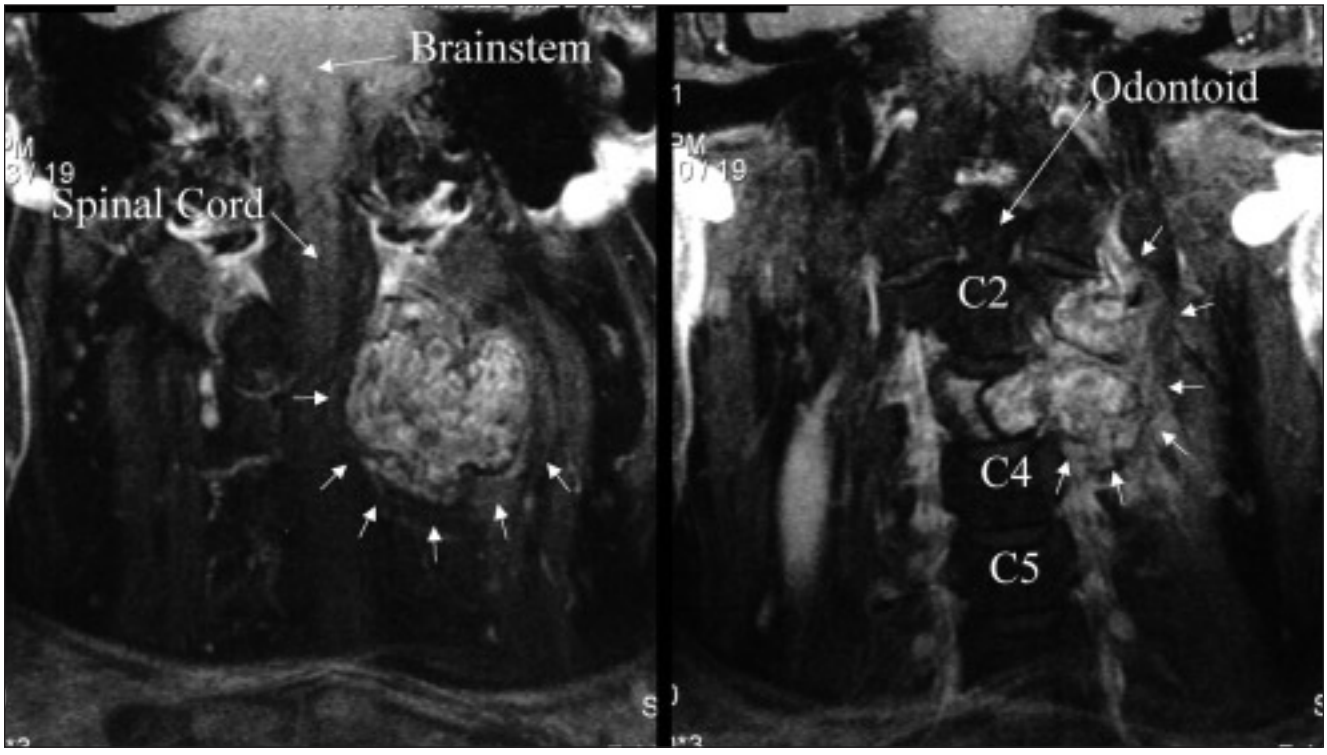

FIG. 1. Gadolinium-enhanced magnetic resonance imaging reveals the extent of the aneurysmal bone cyst. Arrows encircle the lesion.

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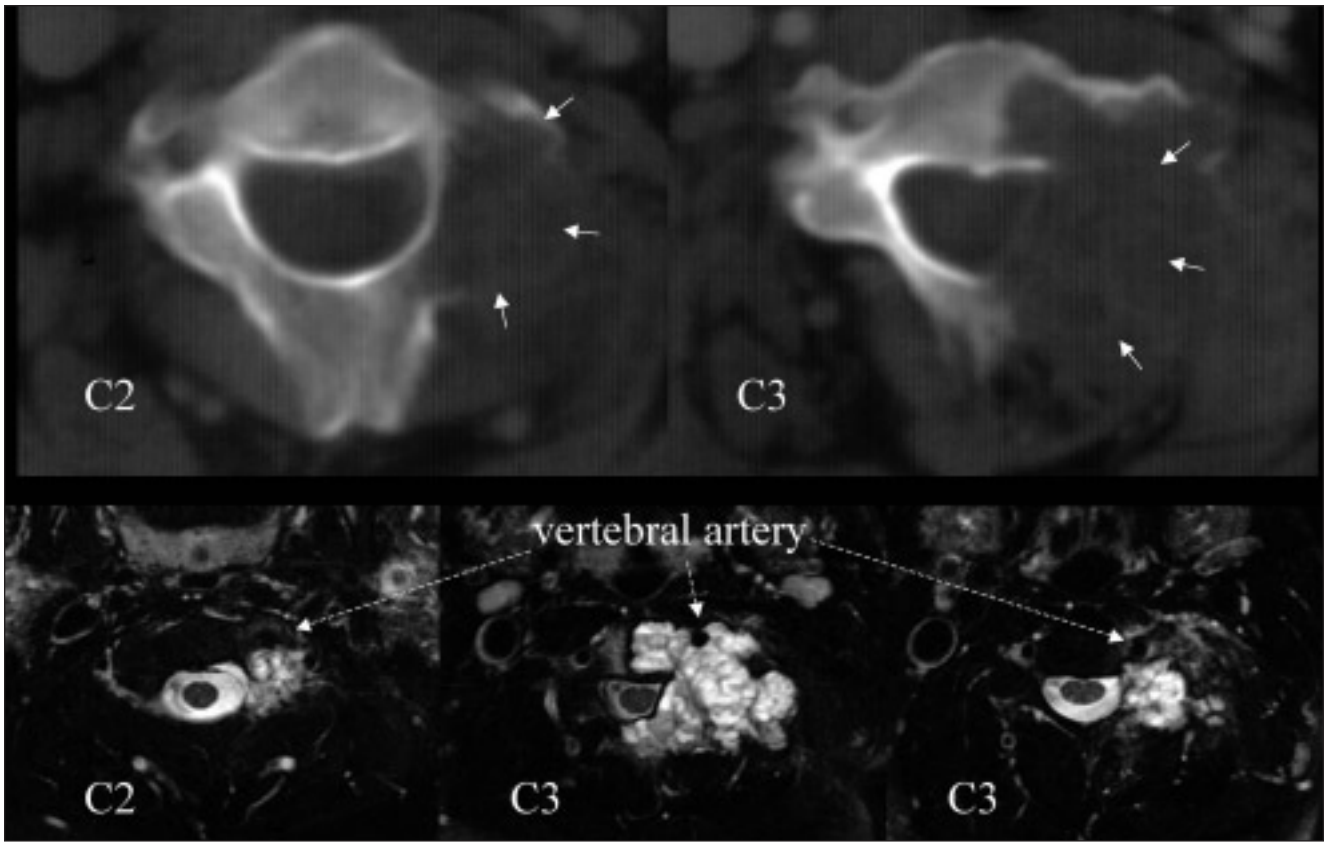

FIG. 2. Top: On computed tomography the erosive nature of the tumour can be seen, destroying the left lateral aspect of C2 and C3. Invasion into the body of C3 is clearly seen. Bottom: Contrast-enhanced axial magnetic resonance images show encasement of the left vertebral artery by the tumour.

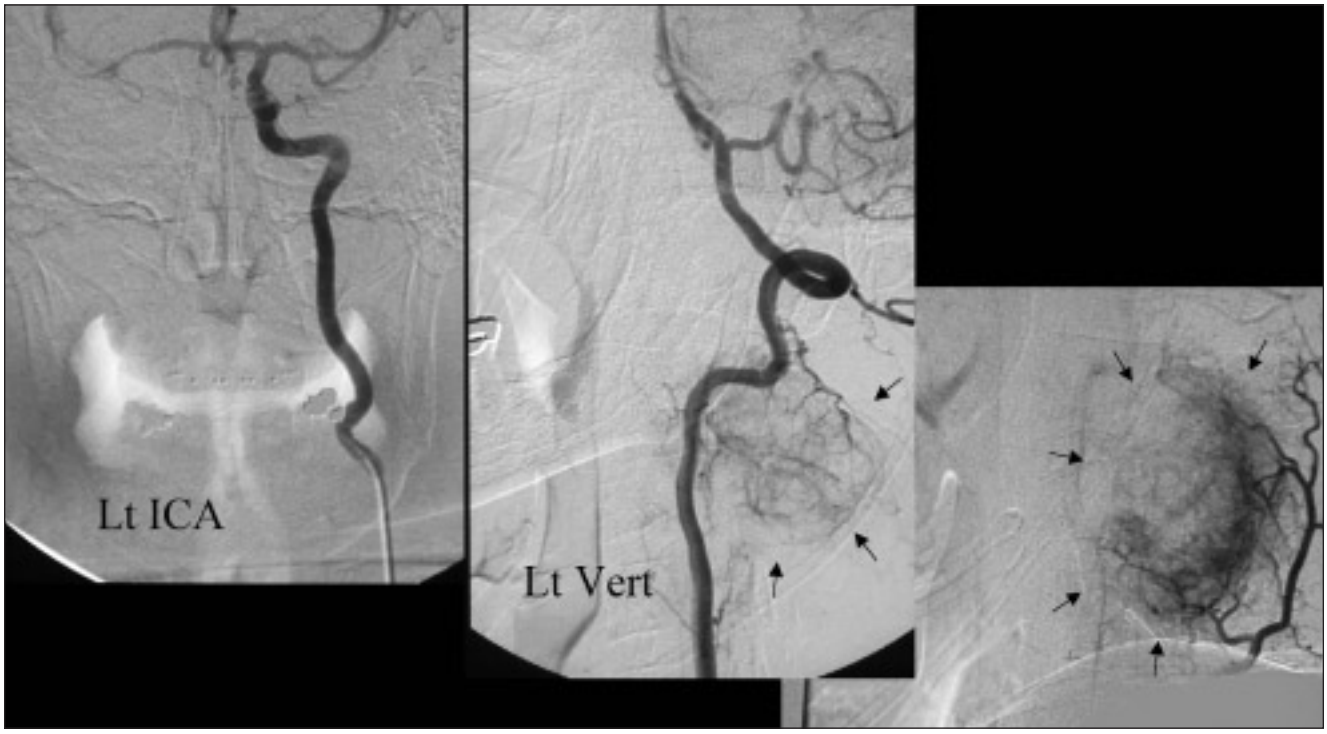

FIG. 3. Angiography reveals the major feeding arteries and the tumour blush (arrows). Lt ICA = left internal carotid artery, Lt Vert = left vertebral artery. Angiogram on right shows the left thyrocervical trunk.

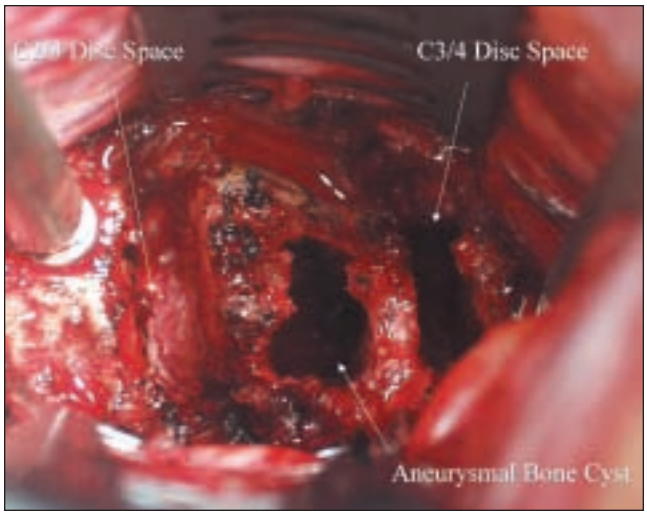

FIG. 4. Intraoperative view demonstrates the regional anatomy of the area.

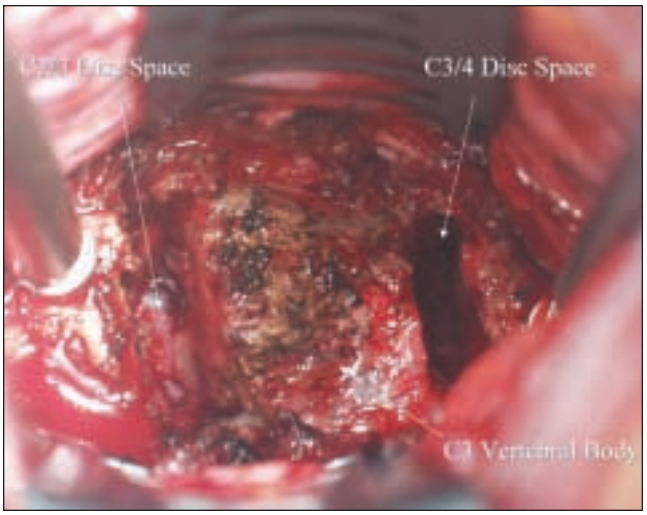

FIG. 5. Microdiscectomies of C2–3 and C3–4 are completed to expose the C3 vertebral body.

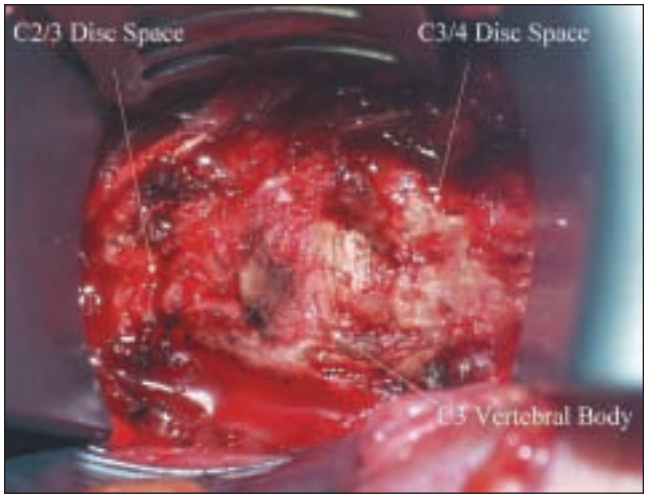

FIG. 6. The thin cortex overlying the left lateral aspect of the C3 vertebral body has been removed, revealing destruction of bone by the aneurysmal bone cyst.

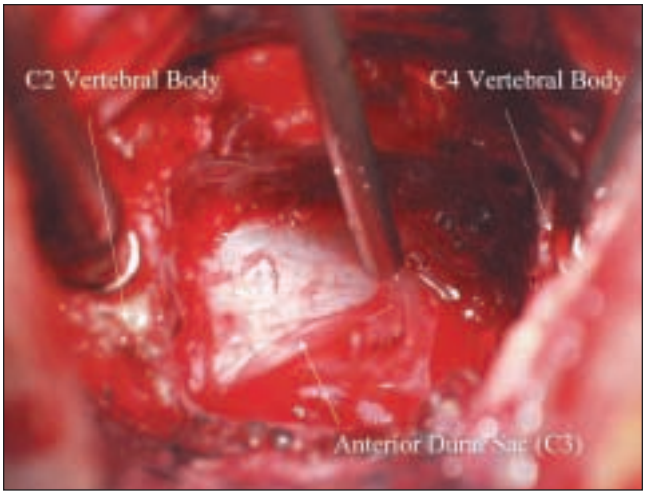

FIG. 7. The anterior dural sac after completion of the C3 vertebrectomy.

bral artery (Fig. 2). The carotid artery, however, was spared. The lesion had just begun to encroach on the spinal canal.

Preoperative angiography was done, first to establish which vertebral artery was dominant, as the left vertebral artery was encased by tumour (the safety of sacrificing this vessel if necessary, could be then determined) and second to assess the feasibility of preoperative embolization. This was not possible owing to the small size of the feeding vessels (Fig. 3).

Surgical excision of the mass was considered to be the primary treatment option. A 2-stage procedure was proposed because the spinal cord would be an obstacle to excision by a 1-stage approach. The first stage involved total excision and curettage of the lesion posteriorly, followed by instrumented fusion of C2 to C4 with a single right-sided lateral mass plate and autologous bone graft. The second stage comprised careful dissection to expose the C3 vertebral body and define the anatomy (Fig. 4). This was followed by C2–3 and C3–4 microdiscectomies (Fig. 5). The thin cortex over the body of C3 was easily removed to expose the aneurysmal bone cyst (Fig. 6). The C3 vertebrectomy was then completed, exposing the anterior dura of the spinal cord (Fig. 7). Fusion with autologous bone graft and anterior plating completed the procedure. Postoperative magnetic resonance imaging showed no residual enhancement (Fig. 8). The patient was placed in a rigid collar. Three months postoperatively he remained neurologically intact, and a solid bony fusion had taken place (Fig. 9).

On microscopic examination of the excised tissue, large vascular

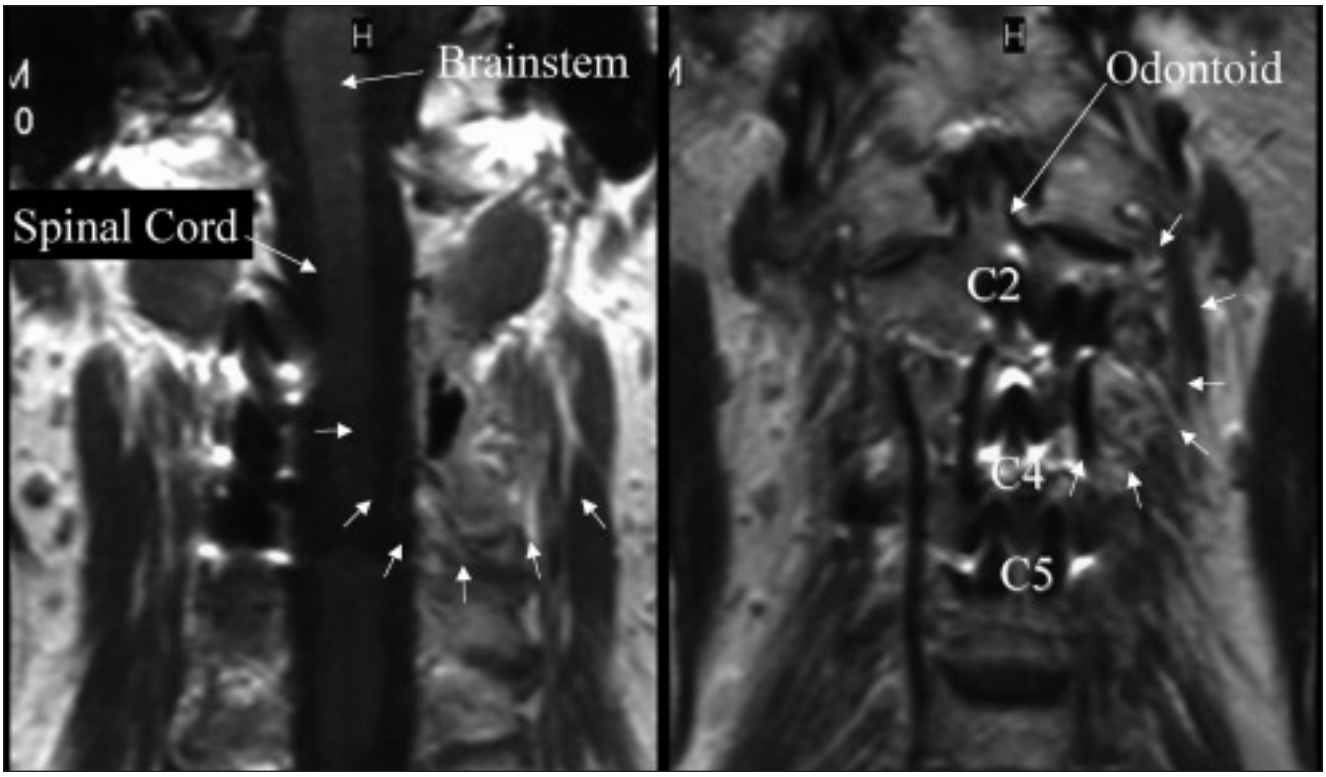

FIG. 8. Postoperative gadolinium-enhanced magnetic resonance images show no residual enhancement. Arrows show preoperative location of the tumour.

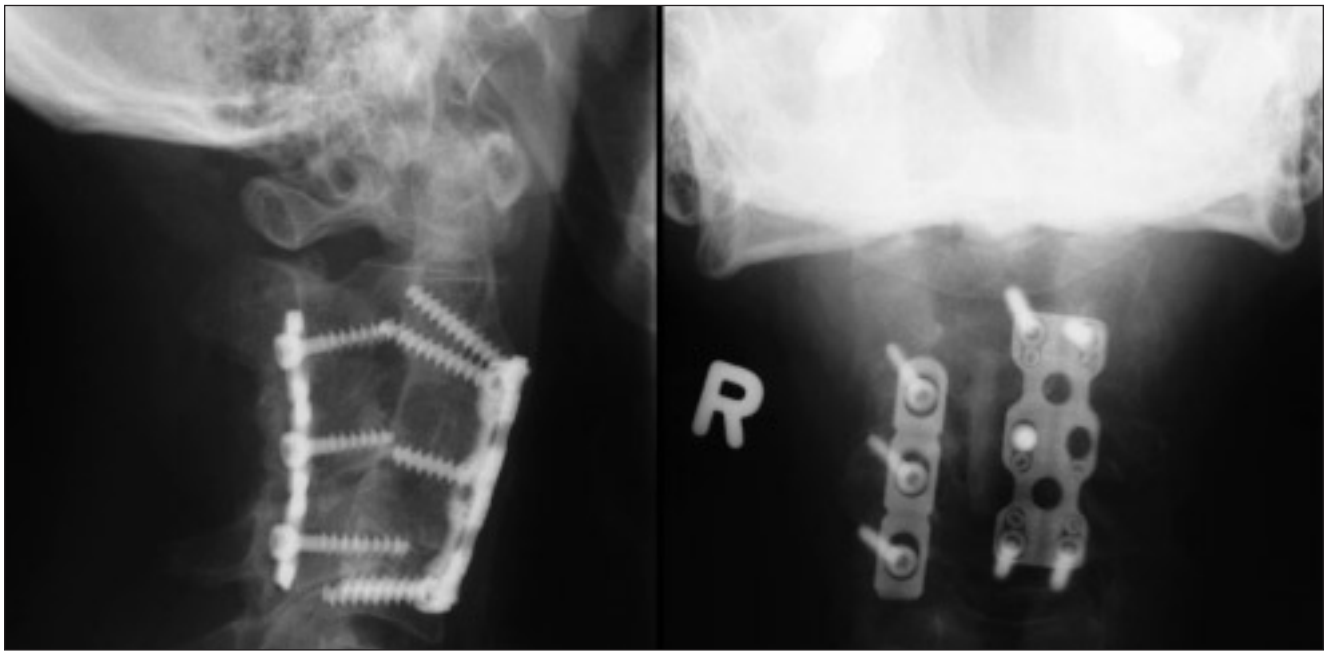

FIG. 9. Radiographs 3 months postoperatively show the final bony construct in lateral (left) and anteroposterior (right) projections.

channels were seen in a connective tissue background. Granulation tissue and smaller vascular channels were attributed to numerous young fibroblasts (Fig. 10). Many of the vascular channels showed endothelial hypertrophy. Free iron pigment in the tissue and macrophages provided evidence of previous hemorrhage. A few giant cells were seen free in the connective tissue (Fig. 11). These histologic features are characteristic of aneurysmal bone cysts.

Aneurysmal bone cysts are benign, expanding, locally aggressive

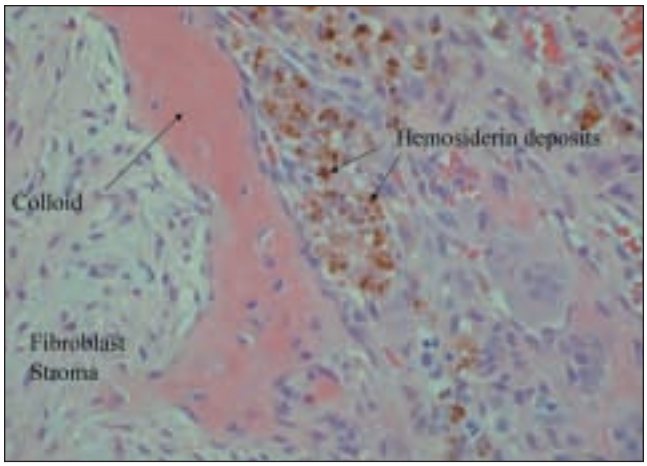

FIG. 10. Section through the excised specimen demonstrates fibrous connective tissue stroma, osteoid deposition and the presence of hemosiderin (hematoxylin–eosin, original magnification ×10).

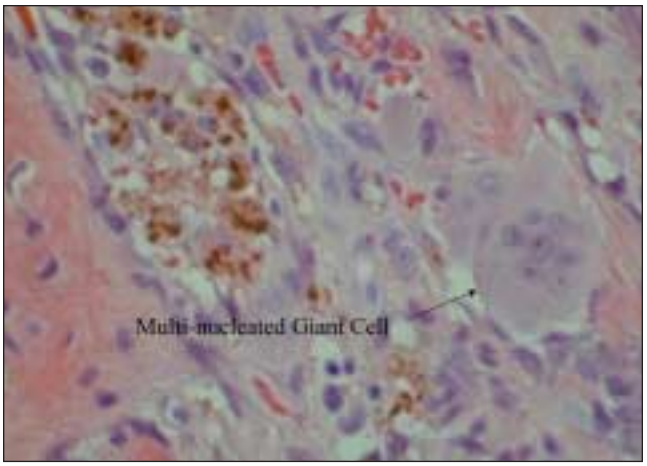

FIG. 11. At higher power, the multinucleated giant cells are clearly visible. These likely represent osteoclasts (hematoxylin–eosin, original magnification ×40).

lesions that often result in a paravertebral mass. The pathogenesis of this primary lesion is unclear. It often presents with hemorrhage after trauma but can bleed spontaneously. These lesions represent roughly 1% of bone tumours. It is estimated that up to 20% occur in the spine. Upper cervical involvement is rare and can be very difficult to manage by conventional methods such as curettage and bone grafting or by alternative therapies such as radiotherapy and embolization. A high rate of recurrence and spinal instability often results.

With improved preoperative imaging and better surgical techniques, primary excision of cervical aneurysmal bone cysts is recommended as the primary treatment option. Because spinal stability is often compromised after excision, a 2-stage procedure to obliterate the lesion and provide stabilization both anteriorly and posteriorly with spinal instrumentation provides good results. Furthermore, supplementing this by placing the patient in a rigid collar provides the optimum environment for fusion and prevention of spinal cord injury, which otherwise can result in devastating consequences.■

Books and Other Media Received
Livres et autres documents reçus

This list is an acknowledgement of books and other media received. It does not preculude review at a later date.

Cette liste énumère des livres et autres documents reçus. Elle n'en exclut pas la critique à une date ultérieure.

Bruce: Surgeon, Soldier, Statesman, Sonofa. Charles Godfrey. 257 pp. Illust. Codam Publishers, Madoc, Ont. 2001. Price not stated. ISBN 0-9684226-1-6

Cancer of the Lung: From Molecular Biology to Treatment Guidelines. Edited by Alan B. Weitberg. 354 pp. Humana Press Inc., Towota, NJ. 2001. US$125. ISBN 0-89603-830-0

Lung Volume Reduction Surgery. Edited by Michael Argenziano and Mark E. Ginsburg. 288 pp. Illust. Humana Press Inc., Towota, NJ. 2001. US$145. ISBN 0-89603-848-3

Reconstructive Surgery of the Esophagus. Mark K. Ferguson. 333 pp. Illust. Futura Publishing Company, Inc., Armonk, NY. 2002. US$105. ISBN 0-87993-494-8