

Radiology in Focus

Acquired involution of the maxillary antrum

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Abstract

Maxillary sinus shrinkage can occur secondary to acquired benign osteomeatal disease. This may be associated with an external deformity and sinus wall sclerosis.

Key words: Maxillary sinus; Radiology

Case 1

A 37-year-old man presented with a one-year history of progressive facial asymmetry due to depression of the right infra-orbital area. He was pain free, with no disturbance of facial sensation and had only been alerted to the altered appearance by friends. There was no history of trauma nor dental disease but he did experience right nasal obstruction. Other than confirming the cosmetic deformity when compared with photographs two years previously, examination was unremarkable.

Plain sinus X-rays merely suggested opacity of the right antrum, ethmoids and frontal sinuses with no bony erosion. Coronal CT scanning (see Figure 1) was reported as showing hypoplasia of the maxillary antrum with displacement of the lateral wall of the nasal cavity into the sinus space. Biochemistry of serum revealed no abnormality of calcium metabolism.

Via a Caldwell-Luc approach, the antrum was entered to obtain a bone biopsy. A slit-like cavity with no obvious ostium nor bony defect but with healthy mucosa was exposed. The histology reported cortical bone with grossly fibrotic marrow, suggestive of previous reactive changes, but with no evidence of malignancy or inflammation.

Discussion

Expansion of the bony walls of a paranasal sinus, with or without erosion, is a familiar radiological finding seen in neoplasms or mucocoeles (Lloyd, 1989). Equally, congenital hypoplasia of the antrum is well recognized and rarely symptomatic. In the case presented, however, the history, radiology and pathology all suggest progressive involution of a previously normal cavity. External compressive changes in the size of a sinus may result from the pressure effect of adjacent tumours, but in the case presented all borders of the antra have tended to collapse, suggesting intraluminal disease.

A similar external appearance can result from progressive hemifacial atrophy (Parry-Romberg disease) but a very different pathological process emerges. Characteristically arising in female juveniles, this condition involves progressive atrophy of facial skin, subcutaneous fat, muscle and, only rarely, bone. If the maxilla is involved, exploration reveals bone defects rather than the sclerosis and intact walls noted above (Goldhammer *et al.*, 1981).

Low grade repeated infection of bone may result in thickening or buttressing, termed osteoblastic osteitis (Graney, 1986) possibly interspersed with areas of lysis. This is best demonstrated on CT scanning rather than by magnetic resonance imaging which shows soft tissues and secretions optimally. A tendency to antral collapse is also illustrated in the case presented above and is, we believe, a valuable radiological sign of benign disease secondary to osteomeatal occlusion. Diffuse bony thickening due to fibrous dysplasia, Paget's disease, osteoma or systemic myelofibrosis is distinguished by a tendency to sinus expansion. Inverted papilloma can be associated with soft tissue calcification and sclerosis of either the adjacent turbinates or ethmoid sinus walls, but expands its bony boundaries. The radiological appearance may mimic that of erosive malignancy. In the author's experience, occlusion of the maxillary ostium by tumour can produce a similar involution of the antrum to that presented. The reduction in volume of the sinus and progressive sclerosis of its bony walls indicates the benign nature of the disease. Fungus infection



FIG. 1
Coronal CT demonstrating involution of antrum and obliteration of lumen.

should also be considered: aspergillosis can present with an antranasal mass with diffuse calcification but again sinus shrinkage is not described (Lloyd, 1988).

Proops (1983) first drew attention to this phenomenon of antral involution and described four characteristic features: (1) inability to penetrate the wall to perform lavage; (2) greater thickening of the anterior and posterior walls; (3) a reduction in overall dimension of the antrum; and (4) overall shrinkage of the maxillary bone itself. Lysis mimicking a malignant process interspersed with areas of sclerosis was not evident in his cases.

We feel this case represents primary antral involution. Occlusion of the maxillary ostium has produced a low grade osteitis and the exact reverse of a 'mucocoele effect'.

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