

Giant osteoma of the frontal sinus*

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SUMMARY

Osteoma is the most common benign tumour of the nose and paranasal sinuses, and the frontal sinus is its most frequent location. This tumour may be discovered incidentally on radiographs, or may enlarge to produce symptoms and, rarely, complications referable to its location near the orbit and anterior cranial vault.

A 61-year-old man presented with right proptosis was found to have a giant osteoma involving frontal sinus. The aetiology, presenting features, and treatment of this tumour are reviewed.

Key words: osteoma, frontal sinus

INTRODUCTION

Osteoma of the frontal sinus is uncommon, but certainly not rare (Samy and Mostafa, 1971; Smith and Calcaterra, 1989). Recent surveys confirm that the frontal sinus is the most common sinus location of these benign neoplasms (Fu and Perzin, 1974; Gil-Carcedo et al., 1987). They are frequently asymptomatic, discovered only as a co-incidental radiographical finding, but may occasionally present with ocular symptoms or facial pain (Whittet and Quiney, 1988). The histopathological nature of paranasal sinus osteoma has been reviewed in an extensive clinico-pathological study (Fu and Perzin, 1974). A paranasal osteoma consists of well-defined mature osseous tissue found in the wall of the sinus and filling its cavity. There are two characteristic histological types. The "ivory" or eburnated osteoma is composed of hard, dense bone that contains only a minimal amount of fibrous tissue. The "mature" osteoma, or osteoma spongiosum, contains mature cancellous bone and may be found at the periphery of ivory osteomas. Occasionally, a third variety called "mixed" osteoma contains features of both the ivory and mature osteomas. Osteomas are benign, generally well-localized and discrete, and show little tendency to recur after excision unless incompletely excised.

A differential diagnosis of frontal sinus osteoma can be formed by consideration of other fibro-osseous lesions of the paranasal sinuses. These lesions, which include fibrous osteoma, fibrous dysplasia, and ossifying fibroma may have a similar radiographical appearance, but their borders are less well-defined than those of osteomas (Margo et al., 1986).

CASE REPORT

A 61-year-old male presented with a 4-year history of progressive swelling of the right upper eye lid. There was no previous history of trauma, nasal surgery, or major paranasal sinus infection. He had diplopia in the upward gaze with impaired mobility in that direction.

Examination revealed an irregular and bony hard mass of the right upper lid. Vision was normal. Sinus X-rays showed a radio-opaque mass arising from both frontal sinuses, occluding almost completely the right frontal and ethmoid sinuses. CT scanning confirmed a bony dense enlargement in the frontal sinuses with extension into the ethmoid sinus and right orbita (Figures 1 and 2). Biochemical investigations showed no abnormalities.

In order to provide adequate exposure an osteoplastic approach was performed, utilizing the eyebrow incision. It revealed an obstructing mass typical of bone in both macroscopical appearance and consistency, filling the right frontal sinus, the ethmoid sinus, part of the left frontal sinus, and also extending into the right orbital and retro-orbital spaces. There was a defect in the posterior wall of the right frontal sinus; CSF leakage was observed and controlled by absorbable gauze (Surgicel). Complete removal of the mass was achieved. The mucosa of both frontal sinuses was polypoid. The whole mucosa was removed by curettage and drill. The defect in the posterior frontal wall and the ostia of both frontal sinuses were covered with fascia latae, which was harvested from the patient's leg, and the whole sinus was obliterated with adipose tissue.

* Accepted September 13, 1992

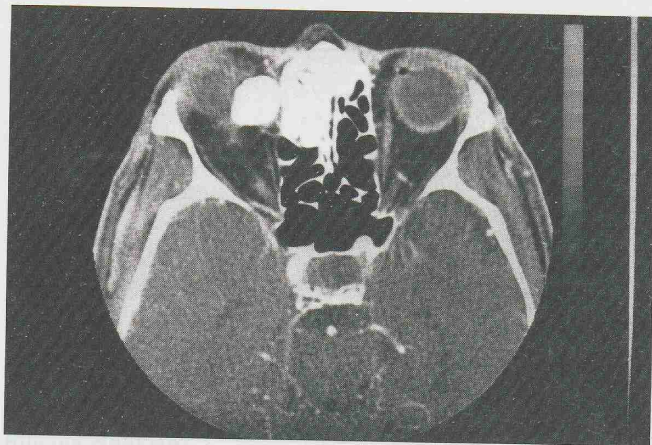


Figure 1. CT scan showing giant frontal sinus osteoma.

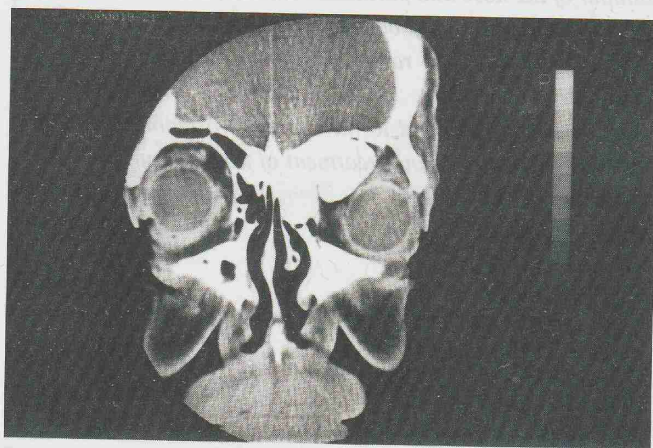


Figure 2. Coronal CT scan of same patient.

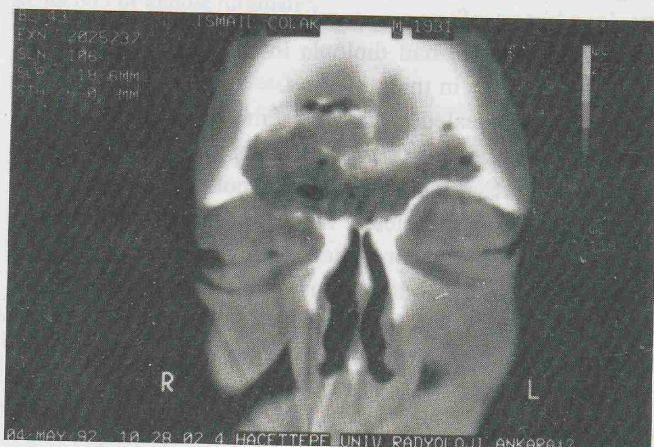


Figure 3. Post-operative CT scan shows no residue and obliterating materials.

The patient subsequently made a complete and uneventful recovery with excellent post-operative cosmetics. Histological examination after decalcification showed typical benign osteoma. Post-operatively, control CT scanning showed no residue and obliterating materials (Figure 3).

DISCUSSION

Osteoma is a benign, slow-growing bone tumour which may be either cancellous or ivory. Cancellous osteoma are found

more frequently within the maxillary and ethmoidal sinuses whilst the compact or ivory type occurs mostly within the frontal sinus (Whittet and Quiney, 1988).

The origin of frontal sinus osteomas is unknown and speculative. Three main theories have been proposed including developmental, traumatic or infectious causes (Wilkes et al., 1979). The developmental theory postulates that osteomas arise at the junction of the embryonic cartilaginous ethmoid and membranous frontal bones. However, many frontal sinus osteomas are located far from the fronto-ethmoid junction. Traumatic origins of frontal sinus osteomas do not explain the large number of patients with this tumour who lack a history of trauma (Wilkes et al., 1979). Infection also plays a role; several series cite a 30% incidence of infection associated with frontal sinus osteomas (Wilkes et al., 1979; Rawlins, 1938). It is difficult to tell if infection is primarily or secondarily associated in these cases. Whatever their causes, these tumours do occur and have a more predictable growth pattern.

The clinical presentation of frontal sinus osteoma covers a wide spectrum. This probably is related to the slow growth of these tumours. Many are asymptomatic and discovered only with skull radiography (Childrey, 1939). The most common symptoms are frontal or facial pain and headache (Atallah and Jay, 1981). Frontal sinus infection also is commonly seen in association with frontal sinus osteoma (Samy and Mostafa, 1971). The enlarging osteoma can outgrow the confines of the frontal sinus anteriorly, inferiorly, or posteriorly. Anterior extension produces deformity of the forehead contour. With inferior growth, orbital symptoms of proptosis, diplopia, or amaurosis fugax are seen (Soboroff and Nykiel, 1966; Smith and Calcaterra, 1989). Posterior intracranial extension may lead to meningitis, seizures or hemiparesis (Bartlett, 1971).

In most cases, the indication for surgery in the treatment of frontal sinus osteomas are well agreed on (Atallah and Jay, 1981). The finding of an osteoma in the presence of symptoms is most generally the situation in which surgical intervention is justifiable. The known growth history of osteomas, with potential for orbital or intracranial complications, requires surgery to prevent development of these problems. However, in the case of an asymptomatic osteoma the indications are not as clear.

The techniques of surgical management of frontal sinus osteomas merit a detailed review. Prior to use of the osteoplastic flap, the standard fronto-ethmoidectomy approach to the frontal sinus was used (Teed, 1941). The technique of osteoplastic flap approach to the frontal sinus was described in 1894. It went through several modifications (Bibson and Walker, 1951) and since being popularized by Goodale and Montgomery (1961) in the 1950s and 1960s, has been a standard approach to diseases of the frontal sinus. After removal of pathological tissues from the frontal sinus, the issue of obliteration of the frontal sinus is considered. The technique of obliteration of the frontal sinus with adipose tissue has been reviewed by several authors (Hardy and

Montgomery, 1976; Mugliston and Stafford, 1985). Montgomery (1964) has shown in dogs that transplanted fat tissue remains viable and osteogenesis does not occur.

In our case, sinus obliteration was accomplished by harvesting of adipose tissue from the patient's leg after removal of all vestiges of sinus mucosa by curettage and drill. Before placing the adipose tissue in the sinus cavity, fascia latae was placed on the sinus floor covering the nasofrontal ducts and over the defect in the posterior wall. The complete removal of the sinus mucosa has been strongly emphasized (Schenck, 1975).

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