The Journal of Laryngology and Otology
April 1983. Vol. **97.** pp. 369–373

The unilateral thick-walled antrum

A previously unrecognized entity?

by

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Introduction

The value of computed tomography in the study of disease of the paranasal sinuses is becoming increasingly widely appreciated (Proops and Phelps, 1981). This is a report of two cases that presented to an ENT Department with some of the symptoms of maxillary sinusitis. Certain features of both the clinical history and plain radiographic views prompted computed tomography of these patients. Both cases showed a unique and previously unreported unilateral thickening of the antral wall.

One of the cases had a Caldwell-Luc operation performed and the results of the histology and a discussion of the possible aetiology are presented.

Case 1

Male P.C., aged 32 years, attended complaining of nasal obstruction, sneezing and rhinorrhoea. Conventional sinus radiographs showed an opaque right antrum but the attempted antral lavage was unsuccessful owing to failure to penetrate the lateral wall of the nose with the Lischtwitz's trochar and cannula. There was no history of previous sinus surgery. The CAT scan showed the wall of the right antrum to be thickened (Fig. 1). The patient improved on medical management, declined any further treatment, and was lost to follow-up.

Case 2

Male R.B., aged 35 years, attended complaining of facial pain, nasal obstruction and intermittent blood-stained rhinorrhoea for six months. Conventional sinus radiographs showed uniform opacification of his left antrum which was taken to be indicative of sinusitis. Antral puncture was attempted but it was impossible to pass the trochar and cannula through the lateral wall of the nose.

The CAT scan showed the gross thickening of the bony antral wall; the lining was also so greatly thickened as to obliterate the air space (Figs. 2 and 3). Overall dimensions of the affected side were smaller than those on the normal side. He had had no previous sinus surgery.

As the patient's symptoms persisted, it was decided to explore the antrum by the Caldwell-Luc approach. The outer bony wall seemed to have two components—a dense outer table and a thick but less hard inner table. The lining of the antrum was thick and fibrous but stripped off the bone with ease. An intranasal antrostomy was fashioned, the patient made an uneventful recovery and he has been asymptomatic since surgery. The histology of the bone and antral lining are shown in Figs. 4, 5 and 6.

Measurements

The radiographs were traced onto paper and the difference in size of the two sides in the three planes were measured for both internal and external dimensions. In all dimensions the affected side was smaller than the contralateral 'normal' side.

Discussion

The maxilla is formed by the process of intramembranous ossification and the antrum develops during childhood within the maxilla.

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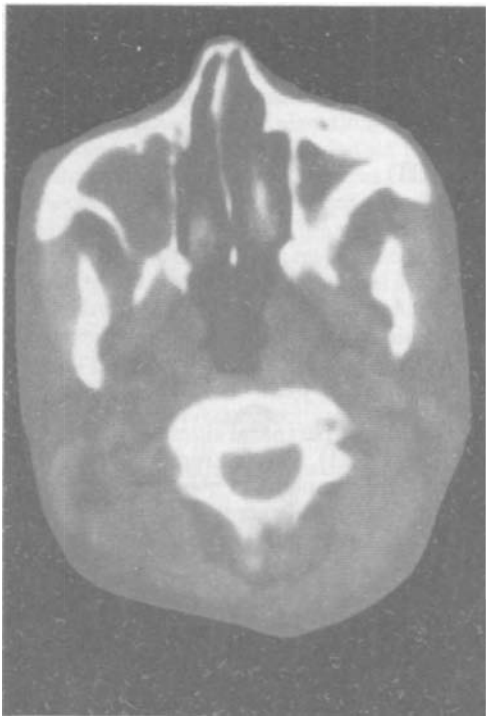


FIG. 1

CT scan of Case 1. Walls of right antrum considerably thickened. Both antra are air containing but there is marked mucosal thickening, especially on the left side.

Variations in the shape and size of the sinus have been reported and cases of unilateral aplasia are also recorded (Alberti, 1976).

These two cases are reported because of the unique appearance on computed tomography of these virgin antra. As more ENT Departments gain access to scanning facilities then presumably more such cases will be seen of which there appear to be four distinctive features:

1. Difficulty in passing a trochar and cannula through the lateral nasal wall; this may be the first indication that one is dealing with a 'thick-walled antrum'.
2. All the bony walls of the affected antrum are markedly thickened but this may be especially so on the anterior and posterior walls.
3. The dimensions of the antrum are less in all three planes than on the contralateral side.
4. The overall dimensions of the affected maxillary bone would seem to be less than those on the unaffected side, but this is less marked than the difference in antral size.

Noyek and Zizmor (1976) have demonstrated



FIG. 2

High resolution CT scan of Case 2. Gross thickening of the bony walls of the left antrum. There is no air within the antrum and the lining is thickened. Overall dimensions of the affected side are smaller than on the normal side. Note the two types of bone; the thick cortical bone and the normal lamellar bone.

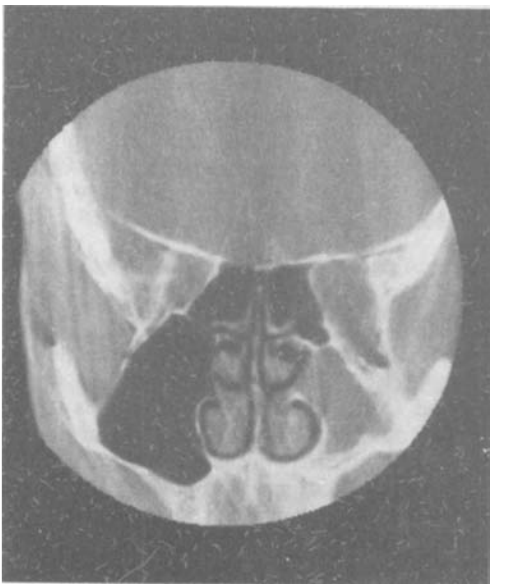


FIG. 3

High resolution coronal section of CT scan of Case 2. Shows the overall reduction of antral size in a second plane but that the nasal architecture seems unaffected.

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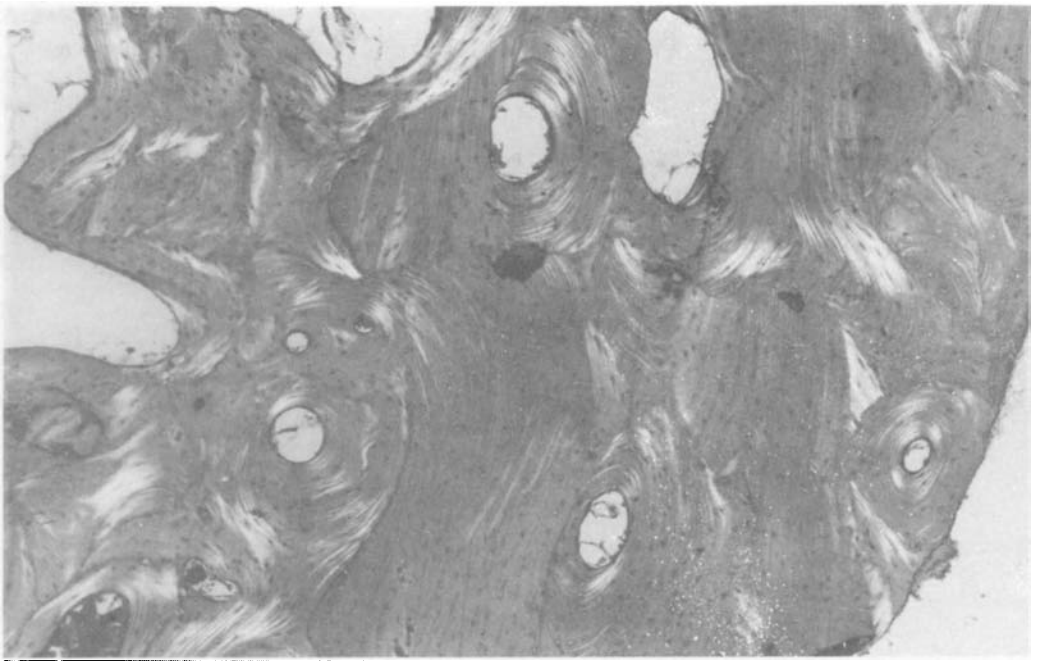


FIG. 4

Thick cortical bone from Case 2. Shows the birefringent lines characteristic of lamellar bone under the polarizing microscope.

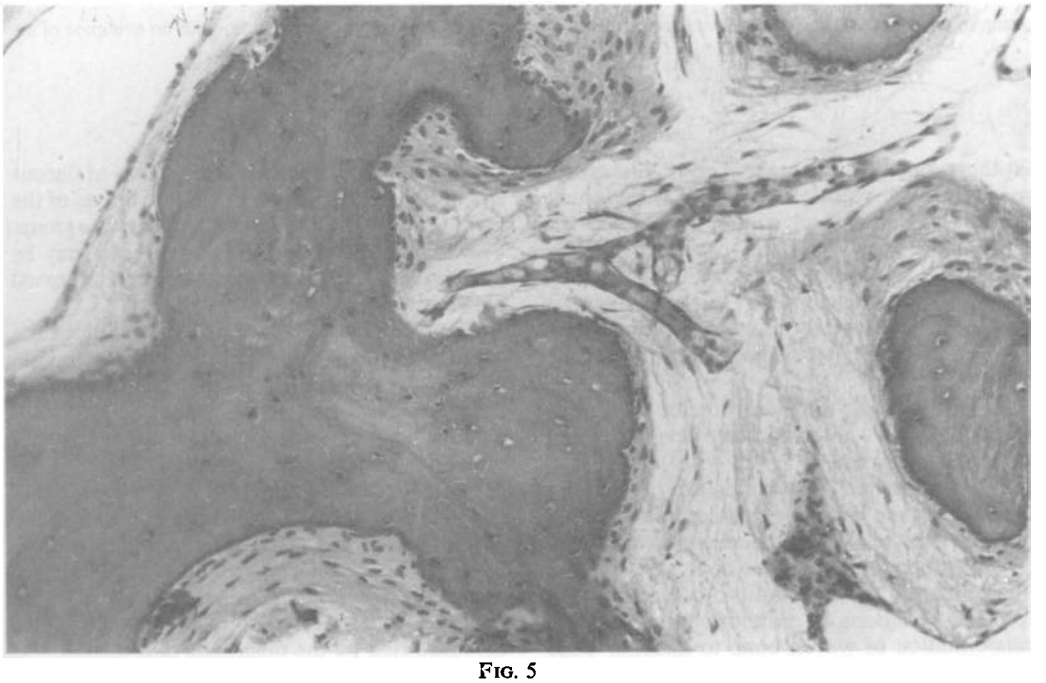


FIG. 5

Dense but normal lamellar bone. The inter-trabecular tissue is prominently vascular, with large thin-walled blood vessels.

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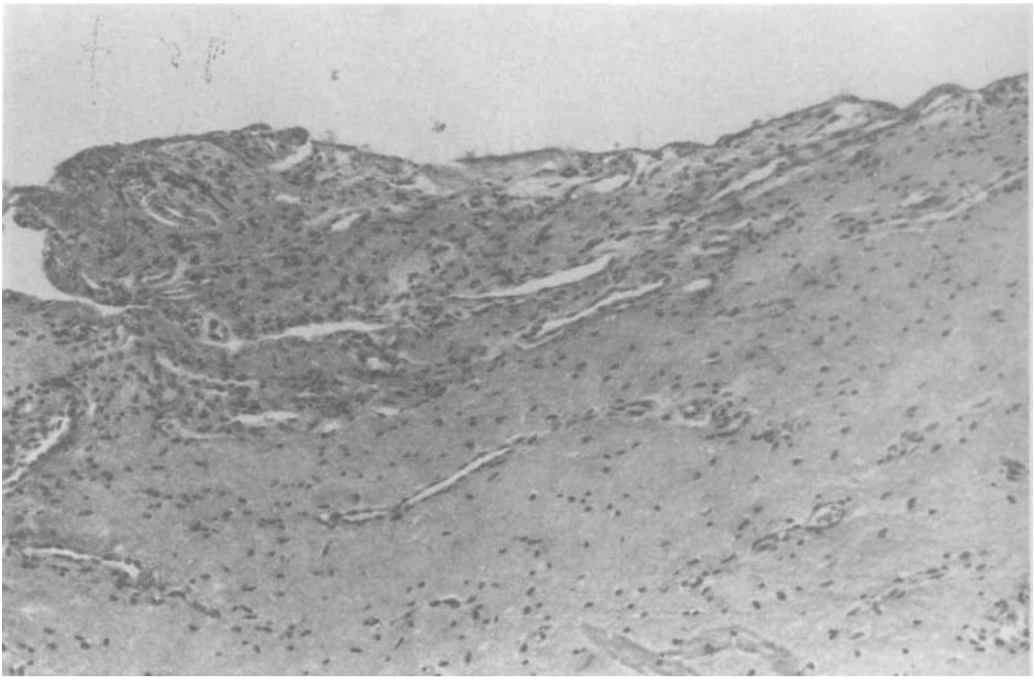


FIG. 6

Lining of cavity consisting of reactive fibrous tissue with a slight lymphocytic infiltration, with no evidence of an epithelial lining.

that there may be quite marked bony thickening, especially on the posterior wall of the antrum, following Caldwell-Luc surgery. Cable *et al.* (1981) have shown that this can only be fully demonstrated by computed tomography; they further suggested that this bony thickening may be due to a periosteal reaction initiated by inadvertent stripping of the periosteum during the procedure.

The differential diagnosis includes fibrous dysplasia, Paget's disease, ivory osteotoma and Gardner's syndrome.

Intramembranous ossification initially produces woven bone but osteoblasts line up along the surface of the trabeculae and transform the woven bone into lamellar bone.

It is believed that all the fibro-osseous lesions represent variations of maturation arrest in the transformation of woven bone to lamellar bone (Van Norstrand, 1976). When reviewed under the polarizing microscope such tissues show randomly arrayed birefringent fibres.

The more common monostotic form of fibrous dysplasia usually affects the outer surface of the maxilla and tends to occur in a younger age group. The rarer polyostotic fibrous dysplasia may be associated with melanin pigmentation and sexual precocity (Albright's syndrome).

The histology of the reported lesion does not conform to Paget's disease, and ivory osteomata are sharply defined, localized, highly calcified homogeneous lesions. Gardner's syndrome exhibits bony tumours in the facial skeleton with premalignant intestinal polyposis.

The histology of the case herein reported is suggestive of a reactive process because of the dense fibrosis and some residual inflammation. The possibility that this might be a variant of monostotic fibrous dysplasia is diminished by the regular arrangement of the lamellar lines demonstrated by the polarizing microscope.

It is suggested that this condition may be the end stage of a chronic sinusitis since childhood resulting in a hypoplastic thick-walled antrum.

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Acknowledgements

Many thanks to Dr. P. D. Phelps, Mr. G. Rice and Mr. J. M. Stansbie, for permission to publish these cases; and to Dr. T. G. Ashworth and Professor L. Michaels, for their histological help.

Miss G. A. Cloake kindly typed the manuscript.

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