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Mucus circulation between accessory ostium and natural ostium of maxillary sinus

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Abstract
We report a case of one asymptomatic 28-year-old male with mucus circulation between the natural ostium and the accessory ostium of the maxillary sinus. Computerized tomography (CT) revealed a recirculating mucus ring between the two ostia of the maxillary sinus.

Key words: Maxillary sinus; Mucociliary clearance

Introduction

An accessory opening can be found in the posterior fontanelle of the maxillary sinus during endoscopic examination of the nasal cavity in approximately one quarter of patients (Stammberger, 1991). It is not uncommon to find an accessory ostium in a CT scan (Earwaker, 1993). Secretions may come out of the accessory ostium or pass through this opening into the maxillary sinus, only then to leave the maxillary sinus through the natural ostium. There are two reports on the endoscopic findings of the recirculation of secretions between the accessory opening and the natural ostium (Matthews and Burke, 1997; Yanagisawa and Yanagisawa, 1997). There have been few reports on the CT findings of the mucous recirculation. We found a circular flow of mucus in the coronal CT of the paranasal sinuses; and report on the radiological findings.

Case report

A 28-year-old man visited our out-patient department because of otorrhoea. He had had three previous ventilation tube insertions in the left tympanic membrane over five years. He had undergone endoscopic sinus surgery of the left sinuses for a nasal polyp at another hospital. In the right middle meatus, an endoscopic examination showed mucopurulent discharge coming into the maxillary sinus through an accessory opening (Figure 1). Paranasal sinus X-ray showed a retention cyst in both maxillary sinuses. To confirm the remaining sinusitis in the left side, antibiotics were prescribed for two weeks. In a coronal CT of the sinuses, a mucous ring connecting the natural ostium and the accessory ostium was found in the right ostiomeatal area (Figure 2). A small retention cyst was found in the floor of the right maxillary sinus. In the left side, a large patent antral opening from previous surgery was found. A large retention cyst remained in the left maxillary sinus. The patient had no nasal symptoms and was therefore recommended to have the nasal problems observed.

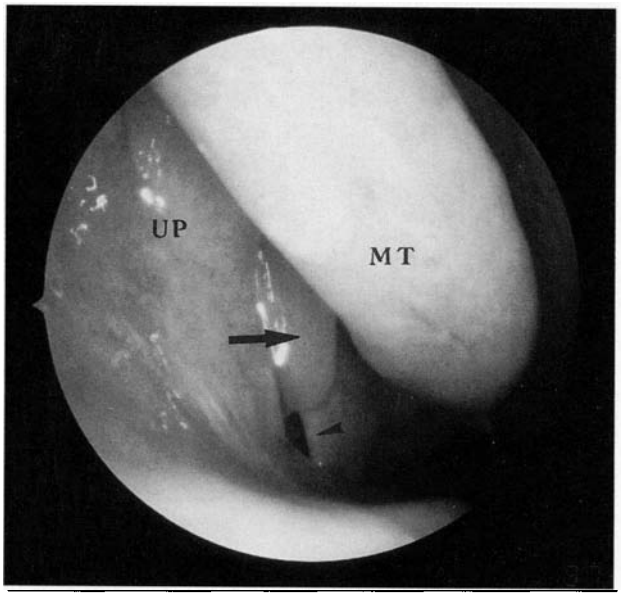

FIG. 1
Endoscopic finding of right middle meatus of another patient. Mucus secretion (arrow) is coming into the maxillary sinus through accessory ostium (arrowhead). MT: middle turbinate, UP: uncinate process.

Discussion

Accessory ostia of the maxillary sinus are frequently found during endoscopic examination of the nasal cavities. Reported incidences of the accessory ostia are between four and 41 per cent (Hollinshead, 1982), and usually more than 20 per cent. The maximum diameter of the accessory ostia was 6.5×10.5 mm (Lang, 1989). Accessory ostia were found in 13.75 per cent of the patients with CT scans, of which six per cent were bilateral (Earwaker, 1993).

These accessory ostia are usually bypassed by normal secretions inside the sinus. Usually, only minor amounts of mucus, which would have passed directly over the centre of

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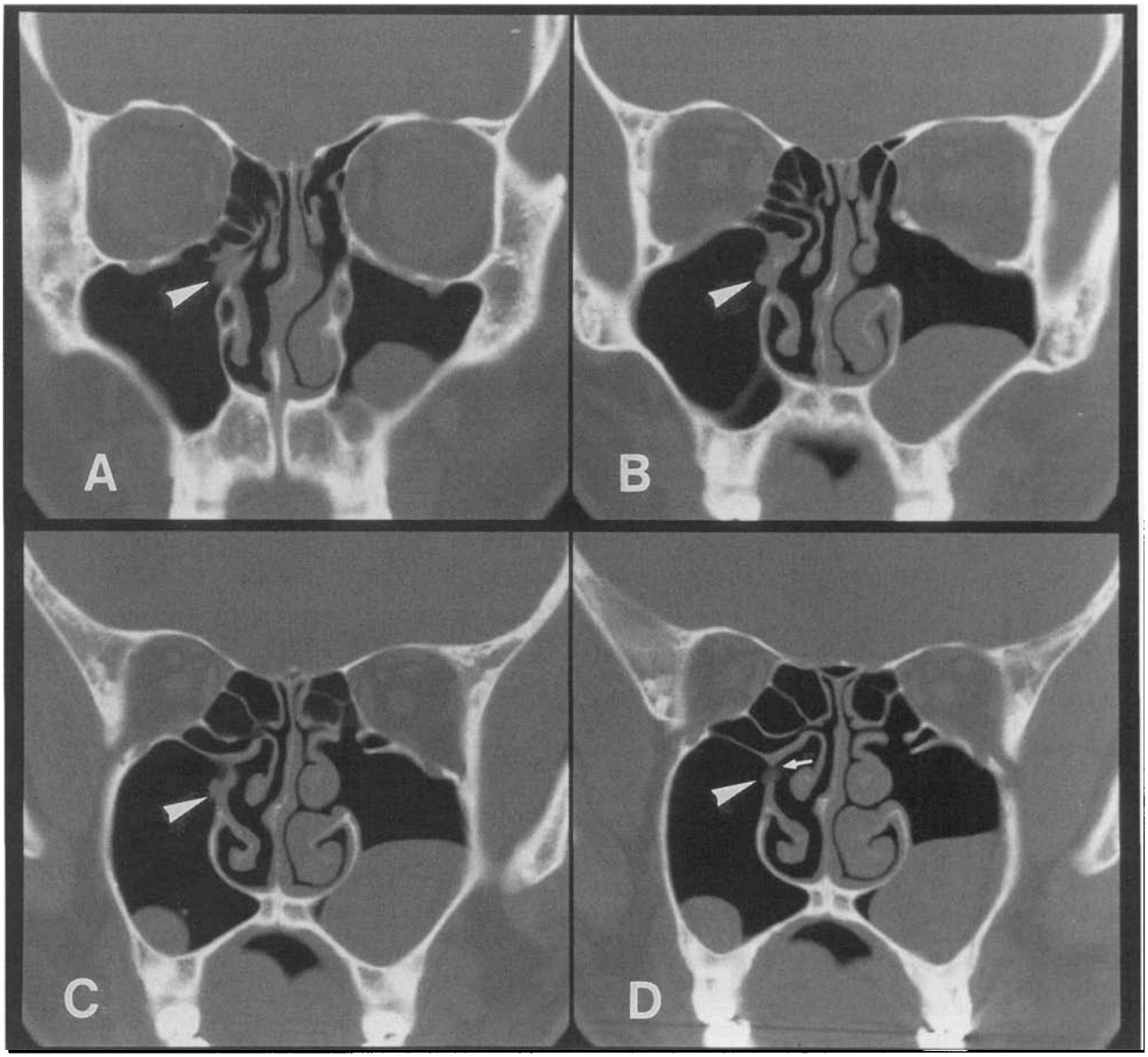

FIG. 2

Coronal CT scans showing a mucus ring (arrowhead) and an accessory ostium (arrow) in the right maxillary sinus. Mucus ring started at the natural ostium (A) and ended at the accessory ostium (D). Large antral ostium due to the previous endoscopic surgery was found in the left maxillary sinus.

the accessory or surgical ostium, are actively transported out. Circular transport of the mucus is possible, usually from the ethmoidal infundibulum into the maxillary sinus through the accessory ostium and out of the natural ostium only to return again into the maxillary sinus through the accessory ostium (Stammberger, 1991).

Although we usually see a patent accessory ostia, sometimes we find the mucus coming out from or moving into the maxillary sinus through these ostia. When we encounter the secretion coming into the maxillary sinus through an accessory ostia, we suspect the possibility of a circular flow.

There are two reports on the endoscopic finding of the mucous recirculation between the natural and accessory ostium using maxillary sinoscopy via the canine fossa (Matthews and Burke, 1997; Yanagisawa and Yanagisawa, 1997). It is impossible to confirm the circular movement with endoscopes in the nasal cavity. It is also difficult to find the circular flow of the mucus by a radiological study, because the pathologic status of the surrounding area is variable and this mucous recirculation may disappear after proper treatment. When the mucosa of the maxillary sinus shows severe swelling, it is hard to differentiate the mucosal swelling from the secretion. This mucous ring can be found when the surrounding mucosa is normal.

Recirculation of the mucus is common in patients who have had prior surgical antrostomies separated from the natural sinus ostia, thereby setting the stage anatomically for such recirculation to occur.

Kennedy described circular flow between two openings in both the experimental rabbit model and patients with chronic sinusitis (Kennedy and Zinreich, 1988; Kennedy and Shaalan, 1989). These openings include a natural ostium, accessory ostium and surgically created opening of the maxillary sinus. Sometimes circular flow was found between openings in the middle meatus and in the inferior meatus (Coleman and Duncavage, 1996). It has been reported that the connection of the two ostia by the removal of the intervening bridge results in the resolution of the disease.

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The incidence of abnormal recirculation of mucus in patients with accessory ostia is unknown. Although the clinical significance of recirculation of the mucus through the accessory ostia is uncertain, it is not unreasonable to speculate that such recirculation may result in an impaired mucociliary clearance with subsequent increased risk of infection.

This mucous recirculation is one of the possible routes by which pathogens may enter the maxillary sinus when the natural ostium of the sinus is occluded (Stammberger, 1991). It should be noted that not all patients with an accessory ostium exhibit circular flow, and not all patients with mucous recirculation through the accessory ostium are symptomatic. However, when patients complain of recurrent sinusitis following an upper respiratory infection, nasal endoscopy is indicated to rule out the recirculation phenomenon. When the appropriate medical treatment including nasal irrigation fails, endoscopic sinus surgery connecting the natural ostium with the accessory ostium may be indicated.

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