Turk J Med Sci
32 (2002) 273-275

Short Report

Maxillary Sinus Aplasia

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Received: November 20, 2001

Key Words: Maxillary sinus, Aplasia, Computed Tomography

Unilateral opacified maxillary antrum on plain films may be due to mucosal thickening in infectious diseases and tumoral involvement, atelectasis of the sinus due to chronic sinusitis, and severe hypoplasia or aplasia of the sinus (1-3). Computed tomography (CT) scanning and endoscopic examination are necessary diagnostic tools to detect the underlying abnormality. In this report, we present a case with maxillary sinus aplasia associated with absence of uncinate process and infundibular passage on CT images. Major difficulties concerning the CT technique in detecting the underlying congenital defect in the case of a plain film finding of opacified maxillary antrum are discussed.

Case report

A 24-year-old male presented to our hospital with headache. His chief complaint was intermittent headache of several years' duration. Routine otorhinolaryngological examination revealed hypertrophy of bilateral inferior conchae. Neurological examination was found to be normal. Water's view showed an opacified right maxillary sinus antrum (Figure 1). Due to the plain film findings and clinical symptoms, he was diagnosed as having maxillary sinusitis. However, the patient was unresponsive to antibiotic treatment, and, to confirm the diagnosis, coronal CT examination was performed by Schimadzu SCT 700 TX with 5 mm slice thickness. CT showed absence of the maxillary antrum, uncinate process, and maxillary infundibulum (Figure 2, A-F). To confirm the preliminary diagnosis of maxillary sinus aplasia, repeat examination was done with a 2 mm slice thickness and images were reexamined with a bone window.

During the third month of fetal life the uncinate process projects medially from the ethmoid bone, forming a groove between it and the lateral nasal wall–the infundibulum. This is the site for maxillary sinus cell or bud. The cell enlarges over time and the maxillary sinus becomes radiographically seen by 4 to 5 months. By the age of 12, pneumatization extends to the orbital wall laterally and to the level of the nasal cavity inferiorly. As

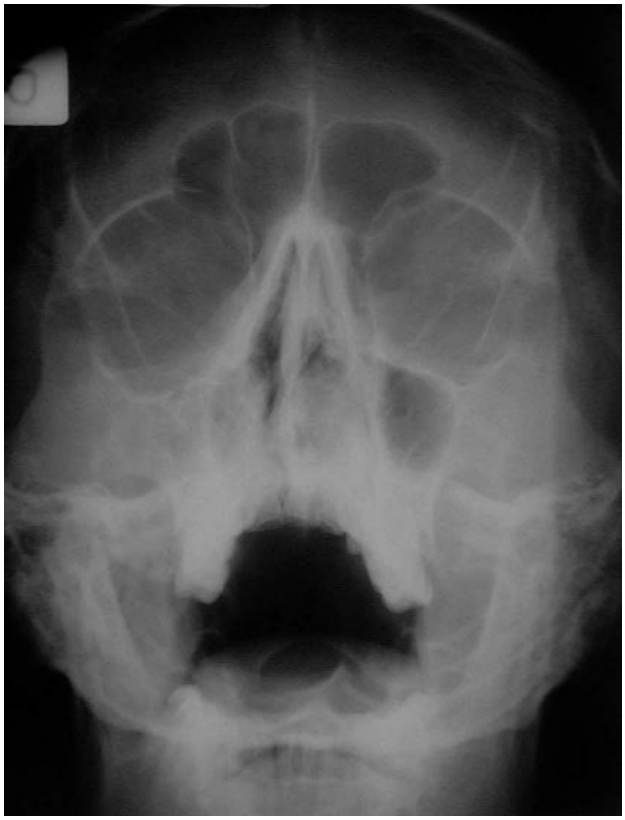

Figure 1. Water's view shows an opacified right maxillary sinus antrum.

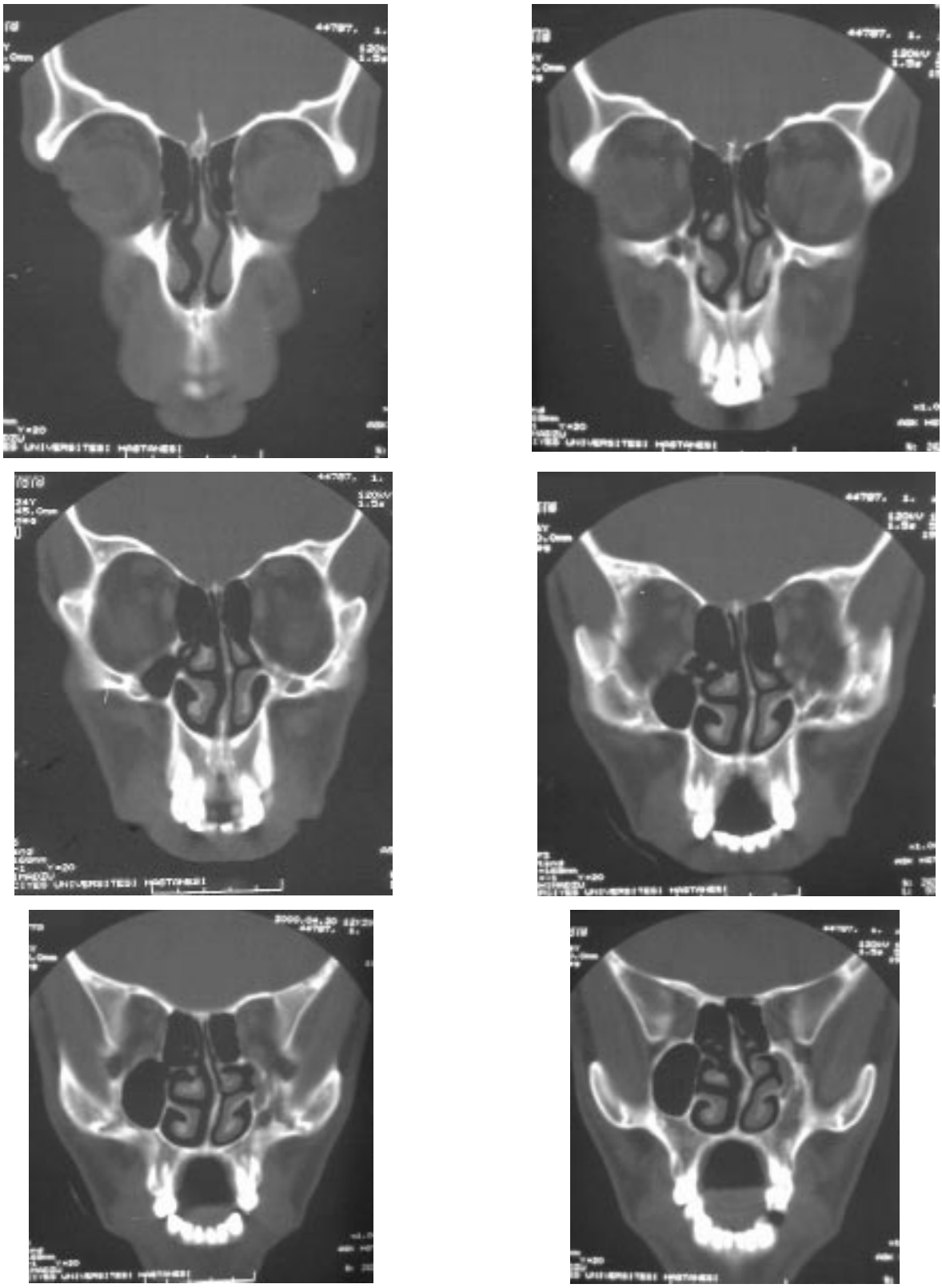

Figure 2. Coronal CT examination with 5 mm slice thickness showed absence of the right maxillary antrum, uncinate process, and maxillary infundibulum.

permenant dentition occurs, the inferior level of the sinus descends 4-5 mm below this level (2).

Discussion

A completely opacified maxillary sinus on plain films is due to mucosal thickening in infectious diseases and tumoral involvement, atelectasis of the sinus, and severe hypoplasia or aplasia of the sinus (1,3-5). Maxillary sinus atelectasis results from chronic sinusitis and is characterized by maxillary bone loss, collapsed antrum, inward bowing of antral walls and secondary changes in the facial skeleton like enophtalmos (3). All together, these features represent an acquired disorder, rather than a congenital anomaly. Since plain films are unreliable for differentiating these entities, coronal CT examination is the ideal method for detecting the underlying pathology. In our patient, the absence of the right maxillary antrum on CT images was associated with ipsilateral absence of the uncinate process and maxillary infundibulum. Bolger et al. have classified the structural alterations of the uncinate process and maxillary infundibulum in patients with maxillary sinus hypoplasia as follows (4): As hypoplasia becomes more pronounced, the uncinate process becomes more hypoplastic and the infundibular passage is more ill-defined. The uncinate process and infundibular passage were absent in our case, supporting the fact that development of these structures are part of a common embryological process.

In our case, the main diagnostic obstacle was to differentiate sinus aplasia from severe hypoplasia. Maxillary sinus aplasia is a very rare congenital anomaly. Only a few cases have been reported in the English literature (5-7). Although maxillary hypoplasia is relatively common, thin slices may be obtained to rule out a severely hypoplastic sinus cavity and a rudimentary infundibular passage into the nasal cavity, which were not evident in our case (8). In a case of maxillary sinus hypoplasia, thin slices also help in better identification of the uncinate process abnormality, thereby helping the endoscopic sinus surgeon to modify the approach to the ostiomeatal complex (8). In our patient, endoscopic examination was deferred to future checkups due to the strong debate among clinicians about whether the procedure is ethical or not.

In conclusion, maxillary sinus aplasia should be kept in mind in the differential diagnosis of a completely opacified maxillary antrum on plain films. Thin coronal CT slices and reexamination with a bone window may be used to confirm the aplasia. In a case of hypoplastic or aplastic sinus, CT also helps to delineate the associated structural abnormalities of nasal fossa, which have utmost importance in endoscopic treatment planning.

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