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AJNR Am J Neuroradiol 1981, 2 (4) 371-373
http://www.ajnr.org/content/2/4/371.citation

This information is current as of April 19, 2024.

Giant Nasal Rhinolith

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Nasopharyngeal rhinoliths are uncommon lesions that result from the complete or partial encrustation of an intranasal foreign body with mineral salts, mainly calcium and magnesium [1]. The first radiologic diagnosis of a rhinolith was made by MacIntyre (1900) [2], only 4 years after Roentgen's discovery of x-rays. Radiology is an invaluable investigation in the diagnosis of foreign bodies, and this is particularly true for rhinoliths. Foreign bodies of high radiodensity are easily identified and localized using conventional radiography; however, tomography and especially computed tomography (CT), may be extremely helpful in localizing foreign bodies of lower radiodensity. We present a patient with a giant nasal rhinolith, with a discussion of the clinical and radiologic features.

Case Report

A 19-year-old man had pain in the right maxilla and the palate, right nasal obstruction, and an odorous right nasal discharge. He had suffered from numerous episodes of epistaxis as a child. Three years earlier, he underwent surgery, at which time a mass interpreted as an angiofibroma was excised from the medial wall of the right maxillary antrum. Just before the present admission, epistaxis recurred and he was referred to our hospital with the diagnosis of a recurrent angiofibroma.

Physical examination revealed a healthy young man with no facial deformity. Examination of his nasal cavity showed a normal left side. The nasal septum was deviated to the left side. The right nasal vault was occupied by a pale, shining mass which was firm to palpation and nonfriable. In the nasopharynx there was a pale, yellowish-brown mass protruding through the right choana with surrounding purulent material. The examinations of the mouth (especially the palate and teeth), larynx, eyes, and ears, were all normal.

Radiographs of the paranasal sinuses demonstrated a large, densely calcified and well circumscribed mass occupying the right nasal cavity and protruding into the nasopharynx (fig. 1A). Tomography confirmed these findings, as well as displacement of the nasal septum to the left, bowing of the medial wall of the right maxillary sinus laterally, and opacification of the right maxillary sinus secondary to obstruction of the ostium (fig. 1B).

CT of the paranasal sinuses confirmed all these findings. In addition, it added a further dimension with regard to the relation of the mass to the surrounding paranasal structures (fig. 1C). The surrounding bony displacement rather than destruction confirmed its benign nature. The density of the mass was 450 Hounsfield units.

In view of the previous diagnosis of an angiofibroma, bilateral selective external and internal carotid angiography was performed. This revealed anterior displacement of the branches of the ascending pharyngeal and internal maxillary arteries in keeping with the size of the densely calcified mass. However, there were no abnormal vessels nor any evidence of a tumor stain.

Before surgery, the patient's parents were again questioned. They recalled that when he was 4 years old a button had become embedded in his nose, and an unsuccessful attempt was made to retrieve it.

Surgical removal of the mass was initially attempted through the vestibule. This proved to be impossible; an incision and osteotomy through the palate created a portal through which the rhinolith could be delivered. The nasal septum was reduced to the midline. The pathologic examination of the mass confirmed it to be a rhinolith measuring 4.5 × 3.5 × 3.5 cm in its greatest dimensions (fig. 1D). A nasal polyp found during the operation proved to be an angiofibroma.

Discussion

Rhinoliths, or nasal calculi, are calcareous concretions that arise secondary to the complete or partial incrustation of intranasal foreign bodies [1]. The foreign body incites a chronic inflammatory reaction with deposition of mineral salts, mainly calcium and magnesium [3]. The foreign body is usually exogenous in origin and may include beads, buttons (as in our patient), fruit stones, pieces of paper, and retained nasal packing [1]. Less commonly, endogenous foreign material may form the nidus of the rhinolith. These include misplaced teeth, sequestra, and possibly blood clots, dried pus, and desquamated epithelium [1]. The route of entry of the foreign body is usually anteriorly, but some may enter through the choanae secondary to vomiting or coughing [4].

Rhinoliths are rare, and for no apparent reason have a higher incidence in females [5]. The foreign body most commonly is placed in the nasal cavity during childhood

Received October 2, 1980; accepted after revision November 14, 1980.

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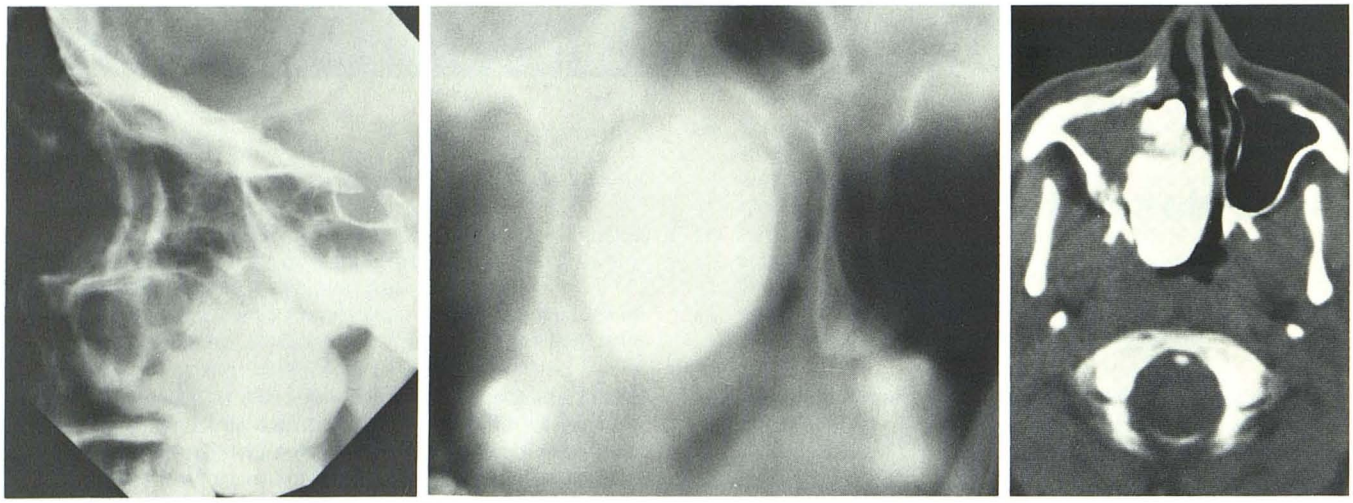
AJNR **2:371–373, July/August 1981** 0195-6108/81/0204-371 $00.00 © American Roentgen Ray Society



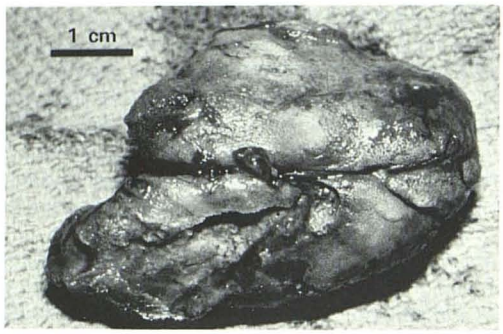


Fig. 1.—**A**, Lateral radiograph. Large, densely calcified lesion in region of nasopharynx. **B**, Anteroposterior tomogram. Large, densely calcified, oval tumor occupies right posterior nasal cavity. Nasal septum displaced to left side. **C**, Precontrast CT scan. Large, extremely dense ovoid mass in right nasal cavity, extends into postnasal space. Opacified right maxillary antrum well demonstrated. **D**, Surgically removed oval specimen, 4.5 cm long and yellowish-brown, proved to be giant rhinolith.

[4]. There is a wide range of age of presentation, with the highest incidence in the third decade [5]. Rhinoliths are usually unilateral and single, and are usually situated on the floor of the nose in the inferior meatus or between the inferior turbinate bones and the nasal septum, about midway between the anterior and posterior nares [5].

The nasal calculi vary widely in size with reports of giant rhinoliths attaining large proportions [6]. They are gray, brown, or greenish-blackish [7]. They are usually hard but may be friable and of chalklike consistency [7]. They vary in shape but usually conform to the shape of the nasal cavity [7].

The vast majority of rhinoliths produce clinical symptoms [5]. The symptoms at the time of entry of the foreign body are usually minor and are often long forgotton by the patient. This is followed by a variable latent period during which time the rhinolith develops and enlarges [4]. When symptoms do develop, they are usually unilateral nasal discharge and unilateral nasal obstruction [4]. The discharge is often purulent and fetid and may be blood stained [4]. Other signs and symptoms include epistaxis, swelling of the nose or face, anosmia, epiphora, headache, sinusitis, perforation of the palate, and deviation of the nasal septum [1, 4]. The history of a previously resected angiofibroma of the maxillary antrum complicated the diagnosis in our patient. At operation, in addition to the giant rhinolith, a small angiofibroma was found which was situated high in the nose attached to the middle turbinate.

The diagnosis may be suspected if there is a history of a foreign body. The radiologic findings are very helpful, especially with smaller rhinoliths. A densely calcified mass in the nasal cavity is suggestive of a rhinolith. The central nucleus may have a greater or lesser density, depending on the nature of the foreign body [5]. Radiography further demonstrates the extent of damage and compression of the bony nasal cavity and septum as produced by the stone. Expansion of the nasal cavity and displacement and perforation of the nasal septum may be clearly demonstrated. In this regard, tomography and computed tomography are extremely helpful.

The radiographic differential diagnosis would include a calcified nasal polyp, an osteoma, chondroma, chondrosarcoma, and osteosarcoma. Although the definitive diagnosis is made at the time of surgery and by the pathologist, CT is helpful in confirming the benign nature of the lesion with displacement rather than destruction of the bony margins of the nasal cavity.

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