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EXTREMELY RARE CASE OF BILATERAL EXOGENIC RHINOLITHIASIS WITH 16 YEARS HISTORY

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The article describes a rare case of bilateral rhinolithiasis. The presence of a foreign body in the nasal cavity comprised 16 years. Pathogenetic aspects of the occurrence of the rhinoliths and their chemical composition are presented. Frequent recurrent acute exacerbations of chronic rhinitis, sensations of unpleasant smell, partial loss of smell, breathing problems due to nasal congestion and durable ineffectiveness of previous treatment triggered the patient to address to the clinic. CT revealed the presence of a foreign body on both sides of the nasal cavity. The patient underwent the surgery on bilateral rhinolithiasis with the application of precision technology and optical zoom. The nidus of rhinolith became plastic bullets of a toy gun. Intraoperative complications were not observed. The duration of hospitalization was 5 days. Follow-up evaluation by CT of the nasal cavity and paranasal sinuses in the period of 4 months after surgery revealed the absence of foreign bodies and nasal symptoms.

Keywords: *Foreign body, bilateral rhinolithiasis, nasal cavity, CT scan.*

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КРАЙНЕ РЕДКИЙ СЛУЧАЙ ДВУХСТОРОННЕГО ЭКЗОГЕННОГО РИНОЛИТА 16 ЛЕТНЕЙ ДАВНОСТИ

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Introduction

The foreign body (corpora aliena) of the nasal cavity can be found frequently, especially in the practice of pediatric otorhinolaryngologist, but rhinoliths are always a rare finding, while occurrence of bilateral rhinoliths is a very rare episode [1].

Rhinolith (rhinolithus: rhino – nose + lithos – stone) – mineralized mass, that results from the deposition of phosphoric acid and carbonate salt of calcium and mucus on the surface of a foreign body which localizes in the nasal cavity for a long period of time [2].

Rhinolith is mainly detected unilaterally [3]. In the most cases, rhinolith is located in the lower nasal meatus. Predominantly (78%), rhinoliths embedded in the posterior part of the nasal cavity and less often (22%) – in the anterior part [4]. Bilateral rhinolithiasis can be found very rarely, there are only 5 cases described in the literature [1, 5].

Durable existence of a foreign body within the intranasal structures may follow by the formation of rhinolith which causes structural changes such as nasal septum deviation, hypotrophy of the lower nasal concha and displacement of the bone part of the nasal septum base [6, 7].

The symptoms of rhinolith are non-specific [8, 9]. They usually cause prolonged unilateral or bilateral congested nasal passages and nasal discharges of a mucopurulent character. In the case of a long presence of a foreign body in the nasal cavity, there is a possibility of inflammatory diseases in paranasal sinuses, dystrophic and atrophic changes in the mucous membrane, perforation of the walls of the nasal cavity, nasal bleedings, neurological facial pain, orbital and intracranial complications [2, 6].

Every individual report of rhinolith sheds light on the pathogenesis of the disease. Considering the rarity of this pathology, we presented our own clinical observation – detection of bilateral rhinolith with existence of 16 years, and the nidus of which was the plastic bullets of a toy gun.

Clinical case

Patient K, 19 years old, addressed to the Republican Clinical Hospital of Dangara with complaints for frequent exacerbations

of rhinitis, nasal discharges, unpleasant odors, partial loss of smell, difficulties in breathing and night snoring. From the anamnesis (according to the parents) it turned out that the child in the age of 3, during playing a game, pushed in a foreign body in the nasal cavity which presumably was a bead or bullet of a toy gun. For this reason, the parents consulted with a doctor from local outpatient department where the foreign body was not detected. After 9 years, at the age of 12, with complaints on a nasal stuffiness and difficulty in nasal breathing, the patient was examined again and received a long-term treatment for sinusitis. The effect of the treatment was a short-term. Lack of any improvement from the conducted medical treatment caused the patient to be consulted by a local healer who prescribed some herbs according to the recipes of traditional medicine. However, this method of treatment was an ineffective either.

External nose had a natural shape and size. Breathing difficulties and congestion were observed on both sides of the nose. The loss of smell was reported by the patient. The nasal passages were not obstructed. An unpleasant foul smelling nasal discharge came from the nose. During anterior rhinoscopy in both inferior nasal passages a round shape mass of grey-yellow color with uneven surface was detected. Visualization of the mass in the left nasal passage was relatively difficult compare to the right nasal passage due to the deeper localization of the mass on the left side. Nasal septum was deviated mostly to the left side with formation of the ridge adjacent to the inferior turbinate. The mucous membrane of the nasal cavity was swollen and hyperemic. Inferior turbinate hypertrophy and enlargement in the left nasal passage was detected. During posterior rhinoscopy the mucous membrane was of pink color and moist, the choanal openings and nasopharengeal vault were not obstructed.

CT of the nasal cavity and paranasal sinuses in all three projections with 3D-modeling was performed (Fig. 1-3). As a result, the radiopaque substances of spherical shape sized 6×6 mm were detected in the lower nasal passages on both sides of the nasal cavity.

In addition, lower nasal turbinate hypertrophy along with deformation and deviation of the nasal septum to the left were observed. Thus, on the basis of an anamnesis, local examination, anterior rhinoscopy and CT, the patient was diagnosed with “Foreign bodies of the nasal cavity – bilateral rhinolith”.

After the pre-operation preparation, the patient under the general endotracheal anesthesia underwent the surgical removal of foreign bodies (rhinolith) from the nasal cavity, as well as left-side conchectomy and the resection of anterior nasal spine with closed access using precision technology and optical enlargement. Rhinolith on the right side of the nasal cavity was located in the lower nasal meatus at a distance of 18 mm from the nostril. The tightly fused rhinolith was hardly isolated by using a special curettage spoon and was crushed into particles and furthermore removed. The similar method was used to remove the rhinolith from the lower left nasal meatus, which was located deeper at a distance of 25 mm inward from the nostrils. After removal of foreign bodies, a left-sided conchectomy and resection of the deviated part of the anterior nasal spine with closed access was additionally performed. The nasal cavity was washed and tamponed with the gauze moistened in glycerin.

Fig. 1 *CT of the nasal cavity, axial section: a, b – rhinolith in the left nasal passage with a core diameter of 6 mm in the center, at a distance of 25 mm from the nostrils; c, d – rhinolith in the right nasal passage with a core diameter of 6 mm in the center, at a distance of 18 mm from the nostrils*

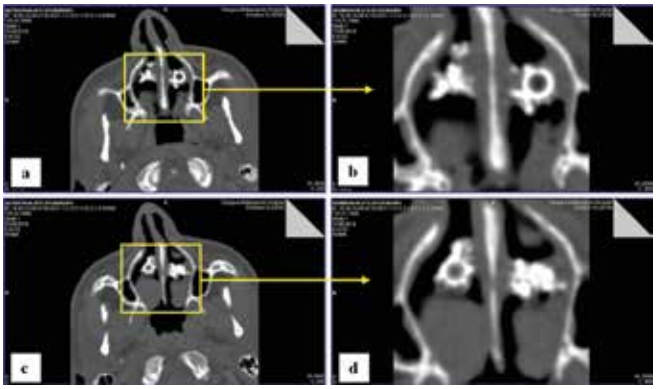


Fig. 2 *CT of the nasal cavity, coronary section: a, b – radiopaque formation – rhinolith, inlaid with calcification in the right nasal passage with a spherical core; c, d – rhinolith, inlaid with calcification in the left nasal passage with a spherical core*

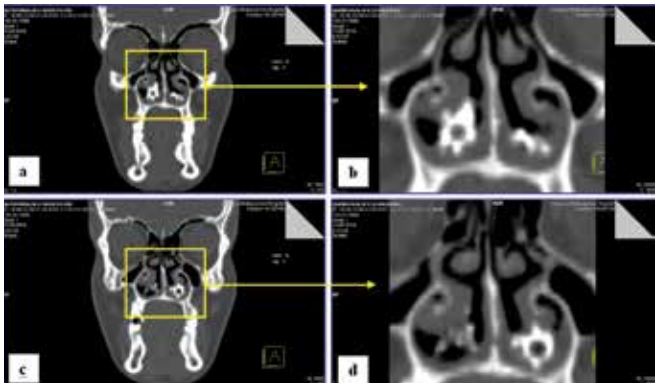
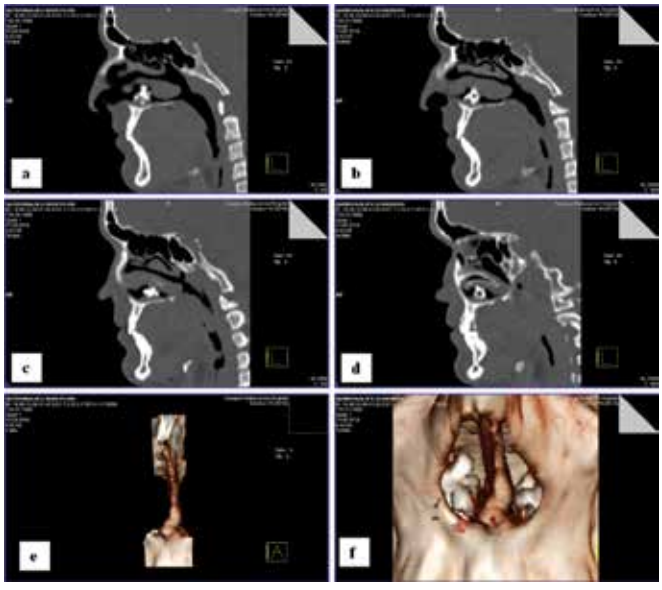


Fig. 3 *CT of the nasal cavity, sagittal section and 3D model of nasal septum deviation in the bone part of the nasal septum: a – irregular rhinolith under the lower nasal concha in the right nasal passage; b – rhinolith with a spherical nucleus in the right nasal canal; c – rhinolith under the lower nasal concha in the left nasal passage; d – rhinolith with a spherical nucleus in the left nasal canal; e – a curved septum of the nose with a pathological bone crest; f – 3D model of the nasal cavity with radiopaque formations on both sides*



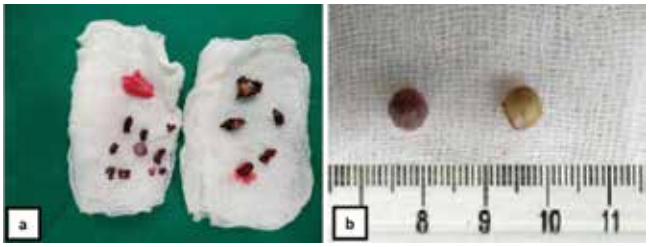


Fig. 4 *Removed foreign bodies – bilateral rhinolith: a – crushed into pieces and extracted rhinolith on both sides; b – peeled from calcifications of rhinolith nucleus – toy gun bullet with a diameter of 6 mm*

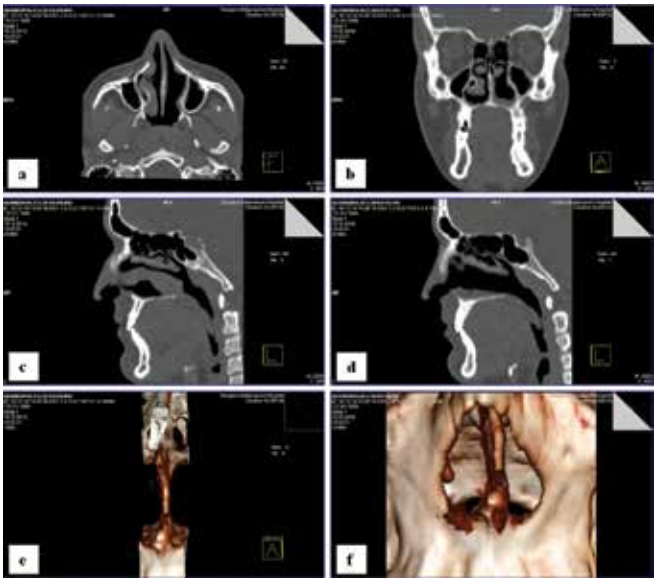


Fig. 5 *CT of the nasal cavity in 3 projections and a 3D model of the bone part of the nasal septum in the postoperative period (4 months): a – axial section – there are no traces of the presence of rhinolitis; b – coronary section – nasal passages are clean, free, there is no lower nasal concha on the left; c, d – sagittal sections – nasal passages are free, passable, there is no lower nasal concha on the left; e – pathological bone crest is absent ; f – 3D model of the nasal cavity – no traces of the presence of foreign bodies are observed*

Macro-preparation: removed rhinolith were cleaned from layers of inlaid mineralized nasal masses. The plastic bullets of a toy gun were the core of the rhinolith (Fig. 4).

In the postoperative period, the patient underwent comprehensive anti-inflammatory and antibacterial therapy for 5 days. The postoperative period was smooth. The patient noted the restoration of nasal breathing and the disappearance of all «nasal» complaints immediately after the removal of the packed gauze. During the monthly follow-up examination in the first three months after the operation, complaints were absent, the condition was satisfactory, positive dynamics were observed.

On the control CT of the nasal cavity performed four months later after the operation, the nasal passages were clean, free, without left lower nasal concha and any signs of foreign body presence (Fig. 5).

Discussion

The first reliably documented case report of a calcified foreign body in the nasal cavity was published by a Danish medical scientist Bartholin in 1654, when he described a foreign body encrusted with calcification and grown around a foreign body – a cherry bone. For the first time the encrusted calcifications from nasal cavity were subjected to the chemical analyzes by Axmann in 1829. In 1845, for the first time, for the description of partially or fully calcified foreign bodies of the nasal cavity was provided the term "rhinolith". Later, in 1943, Polson wrote a monograph in which he described about 384 cases of rhinolithiasis [4].

In general, rhinilith compose of calcium phosphate (44.7%), calcium carbonate (20.69%), magnesium phosphate (19.46%), organic elements (13.2%) and water (2.5-4.95%) [8, 10]. The mineral composition of the studied rhinoliths is a non-stoichiometric hydroxyapatite carbonate. The structural features of apatite can be explained by the heterogeneity of the organic components secreted by the mucous membrane in the nasal passage [11].

Previously, the calcified foreign bodies in the nasal cavity were designated as "false" or "true" rhinoliths. Currently, depending upon the type of nidus around which inlay occurs, those terms were replaced by exogenous and endogenous rhinolithiasis. Those rhinoliths formed around inorganic material which inserted inside the nasal cavity, such as fruit bones, small parts of toys, small household items, and etc, are called exogenous. Endogenous rhinoliths are those which are formed around organic materials, such as clotted blood, products of cell lysis and necrosis of the mucous membrane, ectopic teeth, bone fragments [6, 12].

Rhinolith in nose develop as a result of foreign body presence in early age, most often in children of 2-3 years old, when they insert into their nose small objects. Elder children can already speak and complain to their parents about getting in to their nose foreign bodies. Accordingly, parents tend to remove a foreign body or seek for a medical care. In case of detection of rhinolith with a nucleus in a patient of 25 years old, then apparently a foreign body existed in the nose until the formation of rhinolith approximately for 21-22 years [7, 13].

The anterior rhinoscopy, rigid endoscopy, conventional radiography and CT scan are applied for diagnosis purposes of rhinolithiasis and used for identification of volumetric masses. Rhinolith should be differentiated from calcified polyp, ossified fibroids, single tumor, osteoma, chondrosarcoma, chondroma and carcinoma. Thus, CT of the nose and paranasal sinuses determines the precise location and size of the rhinolith, and also reveals the concomitant pathologies of this area, which in case of necessity can be corrected in one step [2, 14].

Conclusions

As a result, the clinical case of bilateral rhinolithiasis demonstrated in the article is of scientific interest due to the extreme rarity of this pathology, and also proves that rhinolithiasis can be the cause of prolonged difficulty in nasal breathing, mucopurulent discharge from the nose and unpleasant odor. Due to similar complaints with other pathologies of the nose, rhinolithiasis often remains undiagnosed for a long time and is treated for years with inappropriate diagnoses – sinusitis, allergic rhinitis, etc. CT application in such cases appreciates an accurate determination of the pathology and therefore allows a correct treatment.

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