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Patient Characteristics and Frequent Localizations of Rhinoliths

Original Investigation

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Abstract

Objective: A rhinolith is a rare entity affecting all people in all age groups. It is defined as a mineralized foreign body. The purpose of the present study was to reveal the distribution in age and gender and the localization, side, and prominent symptoms of rhinoliths to identify the risk groups and characteristics of the rhinoliths in a large case series.

Methods: A retrospective review was performed from the medical charts of 28 patients who were diagnosed with rhinolith and underwent surgery between May 2011 and January 2015 in Ankara Research and Training Hospital. All data, including age, gender, duration of symptoms, localization of the lesion and accompanying pathologies, were documented.

Results: In total, 28 patients (18 females and 10 males) with a mean age of 26.2±16.6 (5-62) years who were diagnosed with rhinolithiasis were reviewed. Nasal obstruction (71.4%) and nasal discharge (64.3%) were the most common complaints. The rhinolith was located in the right nasal cavity in 24 patients and in the left in four; this difference was statistically significant ($p<0.001$). There were 11 accompanying pathologies including nasal septal deviation (n=6), nasal polyposis (n=2), concha bullosa (n=2), and adenoid vegetation (n=1). In 21 (75%) patients, the most common site was the nasal base of the cavity between the inferior turbinate and the nasal septum.

Conclusion: If unilateral right-sided nasal obstruction with foul-smelling purulent discharge is detected in a young adult and a nasal examination reveals a mass in the floor of the cavity, a rhinolith should be strongly considered in the differential diagnosis.

Keywords: Rhinolith, nasal cavity, foreign body, diagnosis

Introduction

A rhinolith is a rare entity affecting patients in all age groups. It is usually seen as a mineralized foreign body that may cause nasal obstruction, a foul-smelling nasal discharge, nasal/oral malodor, and headaches, as described in the literature (1-3). The uncommon cause of unilateral nasal fullness may interfere with or be accompanied by other nasal pathologies (nasal polyposis, sinusitis, or malignancies) and may lead to complications (4-9). Rhinolith formation starts with a nidus, which could be endogenous in origin, such as bone fragments, ectopic teeth and epithelial debris or exogenous in origin, such as fruit seeds, paper fragments, batteries, stones, buttons, or plastic material (1, 7, 10). Nidus formation leads to mineralization, which forms a hard capsule that may erode the nasal mucosa. Granulation tissue due to chronic discharge and inflammation around the rhinolith is a common finding in patients. An exogenous nidus resulting from foreign objects is often responsible for these lesions. Depending on the duration of nidus presence, localization, and type, various symptoms, from nasal discharge to epistaxis, may be observed, and clinical findings, from sinusitis to erosion of the maxillary, nasal and palatal bones, may be seen in some cases (4, 11).

The incidence of rhinoliths differs in each country. In the literature, large series on rhinoliths have been reported from developing countries, suggesting a relationship with socioeconomic level, although there have been case reports from other regions (6, 8, 12-16). The purpose of the present study was to identify the risk groups and characteristics of rhinoliths by an examination of the

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distribution of age and gender and the localization, side, and prominent symptoms of rhinoliths in a large case series.

Methods

The study comprised of an examination of the charts of 28 patients aged 5-62 years who were diagnosed with rhinolith and underwent surgery between May 2011 and January 2015 at Ankara Research and Training Hospital. Approval for the study was granted by the Local Ethics Committee (Ref No: 4810). Written informed consent was obtained from all patients who participated. A record was generated using the data retrieved from patients' charts, including information on age, gender, complaints of patients (nasal obstruction, nasal malodor, oral malodor, facial pain, epistaxis, nasal discharge), duration of symptoms, localization of the lesion (between the inferior turbinate/nasal septum, middle turbinate/nasal septum, inferior/middle turbinates, and totally obstruction of nasal cavity) and side (right/left nasal cavity). From the operation notes, findings on concomitant pathologies, which were simultaneously operated on, and the type of nidus, if found, were retrospectively reviewed.

Because not all patients were evaluated with preoperative imaging, paranasal computed tomography (CT) reports were not used in the current evaluation. Paranasal CT was performed in patients when there was a mass lesion in their nasal cavities. Patients with rhinoliths placed anteriorly that were easily removed without endoscopic guidance were excluded.

Statistical analysis

Statistical analyses were performed using IBM SPSS for Windows, version 21.0 software (IBM Corp.; Armonk, NY, USA). Numerical variables were expressed as mean±standard deviation (SD) and median (min-max). Categorical variables were presented as number (n) and percentage (%). The one-sample chi-square test was used to show the difference between group distributions and $p<0.05$ was considered statistically significant.

Results

The mean age of the patients was 26.2±16.6 years (median, 25 years), and the mean duration of symptoms was 15.5±9.2 months. The patients were divided into two age groups: <40 years and ≥40 years. There were more patients in the younger age group than in the older one which was statistically significant ($p=0.002$). The total sample of 28 patients comprised 18 females (78.6%) and 10 males (35.7%). No statistically significant difference was determined in gender ($p=0.131$). The distribution of symptoms is presented in Table 1. Nasal obstruction (71.4%) and nasal discharge (64.3%) were the most common complaints.

The rhinolith was located in the right nasal cavity in 24 patients and in the left in four. The tendency for right-sided involvement rather than left-sided involvement was statistically significant ($p<0.001$) (Table 1). No other pathologies were reported in the nasal cavity of 19 patients. In 11 patients accompanying pathologies observed were nasal septal deviation (n=6), concha bullosa (n=2) (Figure 1), nasal polyposis (n=2) (Figure 2) and adenoid vegetation (n=1). This information was obtained from the operation records, and there were no interventions regarding chronic sinusitis recorded in the operation notes. In nine patients with accompanying nasal pathologies, the rhinoliths were located between the inferior turbinate/nasal septum in three patients, between the inferior and middle turbinates in four, between the nasal septum and middle turbinate in one, and totally obstructed the nasal cavity in last patient (Figure 3).

The distribution of localization is shown in Table 2. In 21 (75%) patients, the most common site was the nasal base of the cavity between the inferior turbinate and nasal septum. The intergroup comparison based on localization showed a significantly higher incidence of inferior turbinate/nasal septum involvement than other parts of the nasal cavity ($p=0.008$). In 22 patients, no clear nidus was detected (Table 2).

Discussion

A rhinolith consists of a mass that grows with the precipitation of mineral salts over a long time period that develops surrounding a nidus intranasally (2). However, in almost all patients, the most prominent complaints were unilateral nasal obstruction and nasal foul-smelling discharge and various levels of nasal discharge, facial pain, nasal/oral malodor, or epistaxis. In this study, nasal obstruction and nasal foul-smelling discharge were the most prominent symptoms, which is consistent with

Table 1. Patient demographics and rhinolith characteristics

		Mean±SD	Median (Min-Max)
Age		26.2±16.6	25 (5-62)
Symptom duration		15.5±9.2	12 (4-36)
		Number	**Percentage**
Age groups, years	<40	22	78.6%
	≥40	6	21.4%
Gender	F	18	64.3%
	M	10	35.7%
Complaints	No symptom	2	7.1%
	1. Nasal obstruction	20	71.4%
	2. Nasal malodor	13	46.4%
	3. Oral malodor	7	25.0%
	4. Facial pain	6	21.4%
	5. Epistaxis	4	14.3%
	6. Nasal discharge	18	64.3%
Side	Right	24	85.7%
	Left	4	14.3%
Accompanying pathologies	None	19	67.9%
	Nasal septal deviation	6	21.4%
	Nasal polyposis	2	7.1%
	Concha bullosa	2	7.1%
	Adenoid vegetation	1	3.6%

SD: standard deviation; Min: minimum; Max: maximum; F: female; M: male

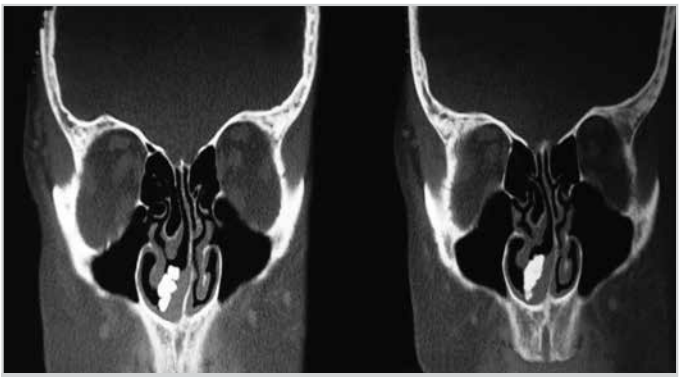

Figure 1. Paranasal CT of a patient with a rhinolith located in the nasal cavity between the inferior turbinate and the nasal septum. Additionally, nasal septal deviation and right concha bullosa are present in the same patient

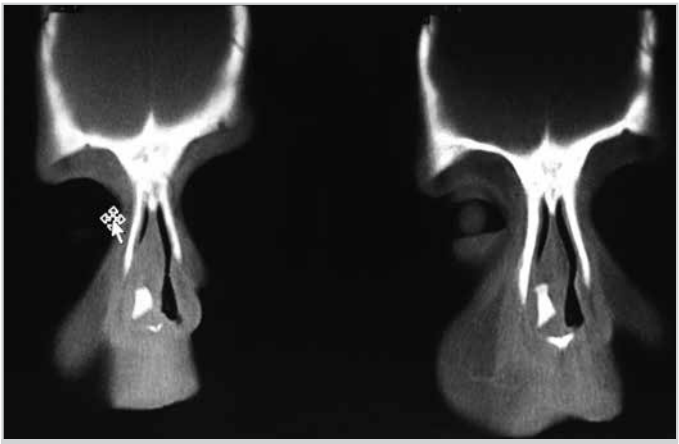

Figure 2. Paranasal CT image of a right-sided rhinolith embedded into a nasal polyp of the nasal cavity

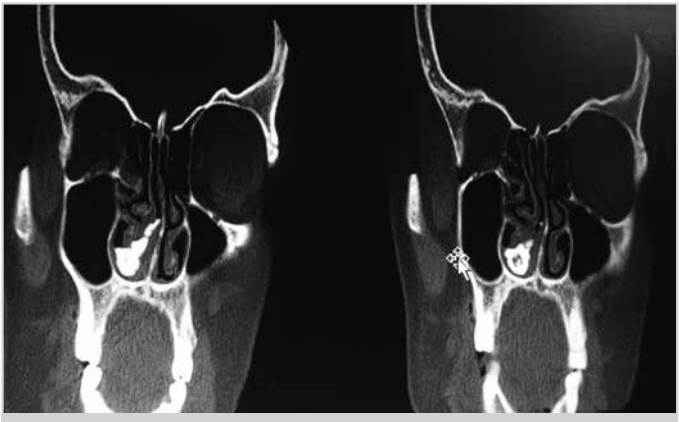

Figure 3. Paranasal CT view of a rhinolith obstructing the nasal floor and extending along the middle turbinate and septum. The septum is deviated to the opposite side of the nasal mass

the literature (17). The occurrence of a deviated nasal septum, nasal polyp, or conchal hypertrophy may blur or delay the diagnosis. Usually, nasal symptomatology and a careful examination of the nasal cavity would result in the clinician making the diagnosis. Although localization, depth, accompanying pathologies, and size of the mass can be detected by flexible fiberoptic nasopharyngoscopy, in suspicious cases, paranasal sinus CT is a useful tool for the differential diagnosis (5, 13, 17). Rigid nasopharyngoscopy and CT findings are quite helpful for the differential diagnosis from a neoplasm, including hemangioma, enchondroma, osteoma, chondrosarcoma, or osteosarcoma, to other pathologies, such as fungal infections, chronic granulomatous infections, or polyps, for documenting lesion extension and planning treatment (2, 15, 18).

Table 2. Distribution of rhinolith localization and of identification nidus

		Number of patients	Percentage
Localization	Inferior turbinate/nasal septum	21	75.0%
	Middle turbinate/nasal septum	1	3.6%
	Inferior/middle turbinate	4	14.3%
	Total occlusion	2	7.1%
Nidus	Not found	22	78.6%
	Stone	1	3.6%
	Fiber	2	7.1%
	Paper	1	3.6%
	Battery	1	3.6%
	Tooth	1	3.6%

In the current study, accompanying pathologies were observed in nine patients, and nasal septum deviation was the most common diagnosis, which was expected because of the high frequency of this pathology in a healthy population. Most rhinoliths were located on the nasal floor between the nasal inferior turbinate and the nasal septum, although they may also be observed more posteriorly between the maxillary sinus ostium/middle turbinate and the nasal septum or as giant lesions obstructing the anterior part of the nasal cavity (2, 19). Another interesting finding of this study was the correlation between rhinolith localization and secondary pathologies. Even though a majority of the rhinoliths were located between the inferior turbinate and the nasal septum, patients with a secondary nasal pathology had different localizations in the nasal cavity, as mentioned above. With regard to localizations other than the inferior turbinate/nasal septum, only one patient with a rhinolith totally obstructing the nasal cavity had no accompanying pathology.

When the current literature was investigated, no correlation was reported between the side of the nasal cavity and the incidence of rhinoliths. Ozdemir et al. (8) reported the presence of a rhinolith on the right side of the nasal cavity in 11 patients and on the left side in 10. Yaşar et al. (3) reported a slight difference of 11 right-sided and seven left-sided pathologies in a relatively large case series. However, in the current study, an extremely high dominance of the right nasal cavity was observed. This could be attributed to foreign body insertion with the dominant hand, which is usually the right hand in the general population.

In most cases, the treatment option is endonasal surgical removal of the rhinolith with post-surgical antibiotherapy. But in rare instances, external techniques may be required depending on the clinical findings (20).

Conclusion

If unilateral right-sided nasal obstruction with foul-smelling purulent discharge is detected in a young adult and nasal examination reveals a mass on the floor of the cavity, a rhinolith should be strongly considered in the differential diagnosis.

Ethics Committee Approval: Ethics committee approval was received for this study from the local ethical committee (Ref No: 4810).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

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