Rhinolithiasis: A Misleading Entity

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Abstract

Introduction: Rhinolithiasis is a rare entity; it entails a stone located in the nasal cavity. The entity presents with different signs and symptoms that can be easily confused with other more common clinical entities such as chronic rhinosinusitis. However, it can also mimic sinonasal tumors, making its proper diagnosis crucial.

Materials and Methods: In this article, we present a case series of 15 patients over the past 13 years between 2002 and 2015 who were seen in the clinics at the American University of Beirut Medical Center. We will shed light on the common presenting symptoms, physical examination findings, proper diagnostic modalities, and treatment options. Our data will be compared to the literature.

Conclusion: Rhinolithiasis could present with a wide spectrum of signs and symptoms and could be overlooked or mistaken for other diagnosis such as sinusitis or malignancy. It could be differentiated from other entities by rigid nasal endoscopy and computed tomography scan. The diagnosis of rhinolithiasis requires a high index of suspicion.

Keywords

endoscopy, rhinolith, computed tomography scan

Rhinolithiasis is a rare entity entailing a stone located in the nasal cavity. The usual position is below the inferior turbinate.¹ It is typically identified by rigid nasal endoscopy, which reveals a grayish concretion.² The pathogenesis of rhinolithiasis is unclear. It could arise from an endogenous or exogenous nidus upon which the concretion is built. Studies have reported that such a nidus could vary from an ectopic tooth, sinusitis, foreign body, blood clot, vegetables, fruit seeds, and so on.³,⁴ The patient might present with a wide spectrum of symptoms making the diagnosis challenging and difficult.

Rhinoliths are only mentioned in literature in case series, the most recent is by Özdemir et al.⁵ whereby it involved 21 patients. Hadi et al. in 2002 reported 1 case series of 13 patients.³ Over the past 13 years, we have encountered 15 patients with rhinolithiasis. We will discuss the presentation, symptoms, diagnosis, and treatment modalities.

Materials and Methods

The study is observational retrospective in nature. It involves identifying rhinolithiasis patients through a chart review. We looked at presentation, symptoms, physical examination findings, tests ordered, and surgical procedures done to relieve the patients. The charts were collected from the medical records in the main hospital of American University of Beirut Medical Center (AUBMC) after obtaining the institutional review board approval from our institution (AUBMC). We identified 15 patients over the past 13 years between 2002 and 2015. Presenting symptoms studied were headache, unilateral purulent rhinorrhea, anosmia, fever, epiphora, epistaxis, and halitosis. We looked at the patients’ computed tomography (CT) scans to evaluate the size, location, and associated pathologies with rhinolithiasis (Figure 1). All patients were treated with endoscopic surgical removal of the stone in the operating room.

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under general anesthesia after which the symptoms resolved.

**Results**

We identified 15 patients, of which 1 was lost to follow-up after the diagnosis. The ages ranged from 20 to 75 years where the mean age was 40 years. There was a female preponderance, constituting 60% of the patient population. We found that the most common presenting symptoms are nasal obstruction and unilateral rhinorrhea (Figure 2). They occurred in all of our patients. Nasal discharge was purulent in 80% of them, unilateral foul smelling nasal discharge in 75%, headache and halitosis in 45%, epistaxis in 33%, and anosmia and epiphora and nasal pain less than 10%.

None of our patients recalled foreign body insertion in the nose. Half of our patients had associated chronic sinusitis for which they underwent endoscopic sinus surgery in addition to rhinolith extraction. Septal deviation and allergic rhinitis occurred in 30% of the patients, and 1 patient had an associated mucopyocele where the rhinolith was found incidentally intraoperatively below the middle meatus obstructing the osteomeatal complex (Figures 3 and 4).

All of our patients underwent rigid nasal endoscopy for proper diagnosis and evaluation of the stone. The stone was found to be hard in consistency. It was grayish and irregular (Figure 5). Its manipulation was painful, tender to palpation, and associated with crusting in 80% of our patients. More than two-thirds of our patients had associated inferior turbinate hypertrophy and almost half had septal deviation to the opposite side of the stone. One of the patients suffered severe crusting, bleeding, and friable mucosa, which was suggestive of malignancy; further workup including physical examination and CT scan revealed that this reaction was induced by a rhinolith (Figure 6). Most of the stones were located below the inferior turbinate; 1 patient had it extending to the nasopharynx and 1 had it below the middle turbinate.

CT scans were ordered for 13 of our patients. Of these, 10 had the rhinolith diagnosed by nasal
endoscopy, and accordingly, a CT scan was ordered to better evaluate it and to rule out any associated pathologies; the other 3 underwent imaging to evaluate chronic sinusitis, whereby the rhinolith was an incidental finding. Pathologic evaluation of all the stones revealed granular debris and calcifications. The size ranged from 0.6 cm to 4 cm, most commonly 1 to 2 cm. Only 1 was sent for stone analysis, which revealed phosphorus and calcium.

Discussion

The etiology of rhinolithiasis is unclear; it could be due to a foreign body acting as a nidus. This foreign body would produce chronic inflammation and mineral salt deposition leading to stone formation. Dogan et al.\(^6\) stated that “the stone in the nasal cavity” was first reported by Bartholini. The presenting symptoms may include nasal obstruction, epistaxis, purulent nasal discharge, fetor, anosmia, headache, epiphora, and halitosis.\(^7\) Not all patients present with the same symptoms, some may be asymptomatic if the stone is small in size. It could be discovered accidentally on an X-ray for dental workup or during routine CT scan for the evaluation of chronic rhinosinusitis. Occasionally, the diagnosis of rhinolithiasis is challenging due to its rarity and overlap with other clinical entities. However, its proper diagnosis is crucial to avoid confusion with sinonasal tumors and to avoid unnecessary surgical manipulation.

The nidus in rhinolithiasis could be a foreign body whether endogenous or exogenous. However, none of our patients recall inserting a foreign body in their nose, although this could be due to a childhood incidence long forgotten. Kodaka et al.\(^8\) analyzed the stone by electron microscopy and energy disperse X-ray analysis and found mainly phosphorus, magnesium, and calcium as a nucleus. In our series, the stone we sent for analysis showed only calcium and magnesium.

The entity affects females more than males. The literature reports an incidence of 55% to 60% in females.\(^5\) In our series, females constituted 60% of the patient population. The most common presenting symptoms are nasal obstruction and purulent nasal discharge.\(^5\) However, an interesting finding was nasal pain in one of our patients, and this was not mentioned in previous studies.

The modality of choice for the proper diagnosis is a rigid nasal endoscopy, which showed a grayish concretion mainly below the inferior turbinate with one exception where it was located below the middle turbinate.\(^9\) Manipulation of this concretion elicited pain. Another important modality for diagnosis is obtaining a CT scan.\(^10,11\) It will assess the size of the rhinolith and any associated pathologies. In Hadi et al.’s review, X-rays were noted not to be always diagnostic of rhinolithiasis, possibly because some stones are not radio-opaque; thus, CT scans should be the preferred modality for evaluating such an entity.

The majority of our patients underwent surgical removal of the rhinolith. One of them was asymptomatic and was lost to follow-up after refusing the surgery. Small stones less 0.7 cm were removed as a whole, but most of the others were removed piecemeal under endoscopic guidance. Unlike recent articles, which advocated removal in the clinic settings, we preferred removing them under controlled operating room settings and under general anesthesia to be able to better control bleeding and patient pain.\(^12\) If the patient had an associated pathology, it was dealt with during the same procedure. Some patients underwent septoplasty, bilateral inferior turbinate reduction, or endoscopic sinus surgery. The most common associated pathology was sinusitis.

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**Figure 5.** An endoscopic view of the rhinolith with the associated crusting.

**Figure 6.** CT scan of the patient with a fronto-ethmo-maxillary mucopyocele who intraoperatively was found to have an incidental rhinolith obstructing the osteomeatal complex.
In addition, 1 patient was found to have a fronto-ethmo-maxillary mucopyocele, who intraoperatively was discovered to have an incidental rhinolith obstructing the osteomeatal complex.

Several explanations can be contemplated as to the formation of a rhinolith. Some of these rhinoliths were noted to be located posterior to a septal deviation, raising the possibility of stagnation in the nose and thus perpetuating the precipitation of nasal debris and foreign bodies on a trapped nidus. Another possibility is that “eddy currents” that arise around a septal deviation and spur might enhance such a process. The other possibilities for stone formation might be due to the lack of appropriate mucociliary clearance resulting in stagnation of the exogenous debris that will act as a holding platform for the buildup of such stones. The rarity of these conditions makes it difficult to run experiments evaluating these possibilities. In addition, the creation of an animal model could be interesting to identify and experiment with.

**Conclusion**

Rhinolithiasis is a rare entity. It could present with a wide spectrum of signs and symptoms and could be overlooked or mistaken for other diagnosis such as sinusitis or malignancy, which suggests rhinolithiasis is a history of foul smelling discharge with unilateral nasal obstruction. It could be differentiated from other entities with similar presenting symptoms, such as sinusitis and unilateral choanal atresia, by unilateral endonasal calcification discovered on rigid nasal endoscopy and CT scan. However, the diagnosis of rhinolithiasis requires a high index of suspicion.

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