

## CASE REPORT

# Accidental finding prior to rhinoplasty: Rhinolith—A rare case report

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## Key Clinical Message

Through this case report, we review a rare radiographic finding within the nasal cavity and its histopathological findings in order to emphasize the importance of familiarizing oneself with all radiographic findings, regardless of their rarity.

## KEYWORDS

nasal cavity, nasal obstruction, rhinolith, rhinoplasty

## 1 | INTRODUCTION

A rhinolith, also referred to as a nasal calculus, is an infrequent occurrence characterized by a dense calcified mass that forms around either external substances such as stones, batteries and plastics, or internal materials such as dental epithelium and dried blood clots, within the nasal cavity.<sup>1–5</sup> However, the exact cause of rhinolith formation remains unclear.<sup>2</sup> Although there is no statistically significant gender bias in the diagnosis of rhinoliths, a significantly higher number of patients under the age of 40 diagnosed with rhinolith compared to those over 40 years old.<sup>5</sup> Typically, rhinoliths are found either between the maxillary sinus wall and the inferior turbinate or between the nasal septum and inferior turbinate.<sup>1</sup> they are commonly singular, unilateral and possess an irregular shape.<sup>6</sup>

Various sizes and internal structures have been reported based on the composition of the rhinolith's core, including homogeneous or heterogeneous radiopacities.<sup>7</sup> While the occurrence of rhinoliths in the oral and maxillofacial structures is rare,<sup>1</sup> they are more frequently observed in young adults, females, and individuals with a lower socioeconomic status.<sup>2</sup> Symptoms associated with rhinoliths include headache, anosmia, nasal blockage, discharge, swelling, unpleasant nasal odor, halitosis, epistaxis, localized pain, and fever, are reported in approximately one out of 10,000 patients who consult ear, nose, and throat (ENT) specialists in relation to rhinoliths, which may persist for months or even years.<sup>4,7</sup> Although rhinoliths often go unnoticed<sup>8</sup> and are incidentally discovered through routine radiographic imaging.<sup>6</sup> Conventional radiographs are useful for distinguishing rhinoliths from other lesions and

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for identifying their location, particularly when the foreign body has a high radiodensity.<sup>6,8</sup> However, computed tomography (CT) scans are more effective in accurately localizing rhinoliths with lower radiodensity in the core.<sup>3</sup>

This case report presents the incidental discovery of a rhinolith using radiographic imaging in a 20-year-old patient who was undergoing evaluation for aesthetic rhinoplasty.

## 2 | CASE HISTORY/ EXAMINATION

A 20-year-old female patient presented at the outpatient department seeking rhinoplasty. The patient's general medical history and head and neck examinations were unremarkable. There were no nasal obstruction or discharge symptoms reported, and the patient did not recall any instances of foreign body introduction into the nasal cavity, including during childhood. Furthermore, there was no reported history of any accidents. The facial examination revealed no sensory disturbances, and the patient's face was symmetrical, except for the deviation of the nasal septum. Cone beam computed tomography (CBCT) was ordered to evaluate the septum deviation. The CBCT scan revealed an s-type deviation of the nasal septum, open ostia, and a clear maxillary sinus cavity. Additionally, a solitary, highly dense heterogenic calcified mass measuring 9.3 mm in width, 14.4 mm in height, and 8.7 mm in anteroposterior size was identified in the right nasal fossa, positioned between the inferior turbinate and nasal septum. The mass was found to be attached to the septum, as well as to the superomedial portion of inferior nasal concha and the inferomedial part of the middle nasal concha. The mass was well defined and consisted of a mixture of opacity levels, predominantly opaque, with a laminated internal view (Figure 1).

## 3 | METHODS

Based on the radiographic findings, the potential diagnoses considered for the patient were rhinoliths, paranasal osteoma, and nasal foreign body.

The treatment procedure entailed the removal of the lesion under general anesthesia. The excision of the lesion, which was attached to the perichondrium, was successfully performed through a nostril approach. The excised lesion was sent for histopathological evaluation, and a routine septorhinoplasty was conducted using an open approach. To accomplish this, incisions were made in the columella and infracartilage. Subsequently, nasal skeletonization was carried out, followed by septal subpericondrial dissection from the anterior septal angle. The rhinolith was grasped using Takahashi forceps and excised along with the overlying mucosa. Prior to harvesting the cartilaginous graft, the amount of avulsed mucosa and the integrity of the septal mucosa in the contralateral site were evaluated. A septal graft was then harvested. However, it should be noted that the preserved L-strut was found to be located superior to the mucosal perforation, and the cartilage was harvested adjacent to the perforated mucosa. The unilateral perforations on the mucosa of the septum and inferior and middle conchae resulting from the lesion removal, were left unsutured due to their size, allowing them to heal through secondary intention. Routine procedures including hump reduction and L-strut septoplasty were carried out. In addition, tip plasty was performed using lateral steal sutures and a medial crura strut. Turbinate outfracture or cauterization were not conducted, although traditional turbinectomy was performed. The perforated site of the septal mucosa was sutured to the contralateral septal mucosa. Finally, an internal splint was applied to prevent synechia and was removed after 7 days.

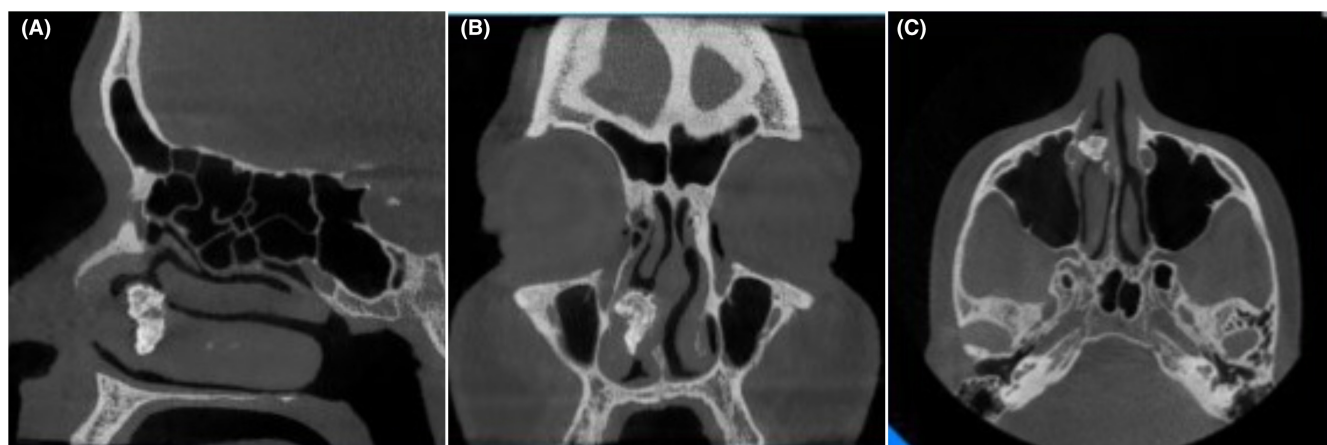
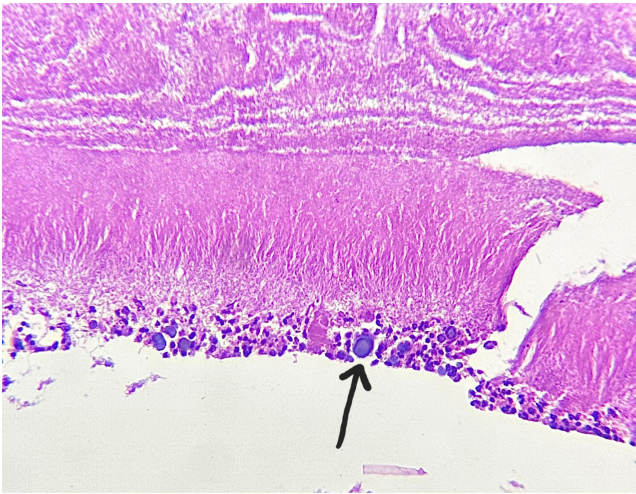


FIGURE 1 Preoperative CBCT. (A) sagittal view; (B) coronal aspect; (C) axial section.

The histopathological analysis revealed the presence of polypoid respiratory epithelium with exocytosis. In the subjacent vascular connective tissue, there was evidence of chronic inflammatory cells infiltration, eosinophils, and glands. Other notable findings included the presence of foreign body materials and nonvital material with peripheral calcification. Additionally, bacterial colonies, actinomycosis, and curetted bone were identified. Importantly, no signs of malignancy were observed (Figure 2).

#### 4 | CONCLUSION AND RESULT

Follow-up appointments were scheduled at 1 week, 1 month, 3 months, and 6 months after the operation.



**FIGURE 2** Histopathological micrograph demonstrating the presence of nonvital materials acting as the nidus. The arrow indicates the presence of calcifications in this section (H&E staining-  $\times 400$  magnification).

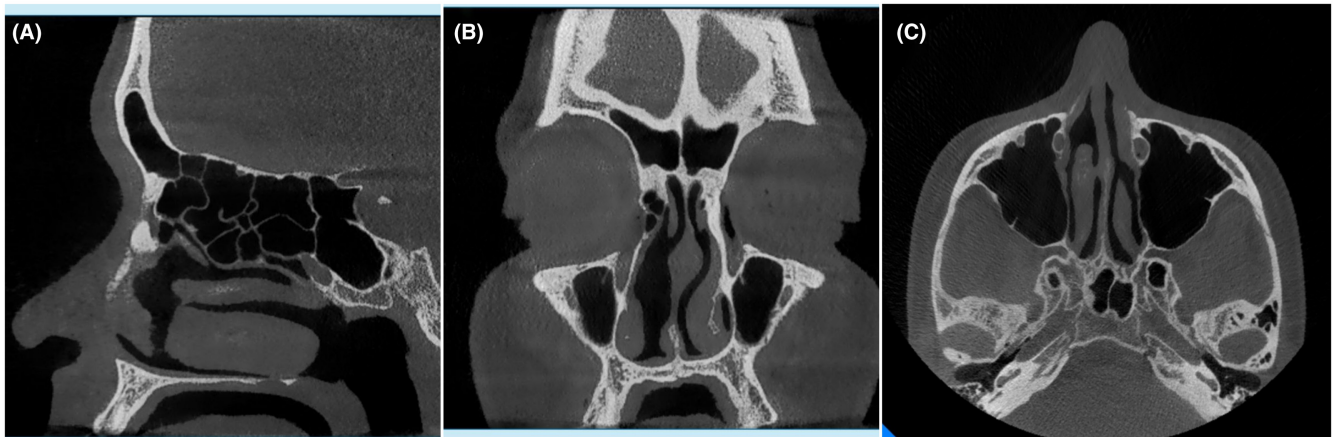
The patient expressed satisfaction with the postoperative outcomes, reporting no nasal obstruction. Additionally, the patient noted improved breathing, despite having had no difficulties in breathing prior to the surgery. No asymmetry was noted upon evaluation.

A CBCT scan was ordered 3 months after the surgery to validate the histopathologic findings and confirm the complete excision of the lesion. The CBCT assessment confirmed the successful and complete excision of the lesion, providing further support for the diagnosis of rhinolith. Synechia was found to be limited (Figure 3).

#### 5 | DISCUSSION

Rhinoliths are infrequent discoveries that are believed to result from the accumulation of mineral salts around a central core, such as a foreign body.<sup>9</sup> It is important to maintain a high level of suspicion and consider alternative causative factors, such as osteoma, calcified nasal polyps, and ossifying fibroma in order to determine the most appropriate treatment approach.<sup>10</sup> The symptoms experienced can vary depending on the location and size of the lesion, encompassing unilateral nasal obstruction, epistaxis, headache, anosmia, epiphora, and purulent rhinorrhea.<sup>2,10</sup> However, it is also possible for rhinoliths to be asymptomatic.<sup>7</sup> In instances where there are no symptoms present, the use of radiographic scans can aid in the diagnosis of rhinoliths.<sup>4</sup> A radiopaque lesion with lesser radiopacity in the center, observed in either the nasal cavity or maxillary sinus, can serve as a reliable indicator for the presence of a rhinolith.<sup>6</sup> However, rhinoliths may also exhibit a homogeneous radiopaque view due to the presence of a radiopaque nidus.<sup>2</sup>

In the present case, CBCT evaluations revealed a combination of radiopaque and radiolucent radiographic



**FIGURE 3** Postoperative CBCT. (A) sagittal aspect; (B) coronal view; (C) axial section. Note the limited synechia in comparison with pre-operative CBCT.



findings. Furthermore, in the absence of any symptoms, a histopathological examination was conducted to establish a definitive diagnosis.

In cases where there is a coexistence of septal deviation and rhinoliths, it is typically observed that the septum deviates towards the opposite side of the rhinolith.<sup>2</sup> This can be attributed to the influence of the rhinolith on the cartilaginous septum during its growth.<sup>2</sup> This finding corresponds with our case.

While Alksakal has reported the concurrent performance of septoplasty or septorhinoplasty and removal of a rhinolith,<sup>2</sup> the specific details of the septoplasty procedures used is unclear. In this case presentation, we have provided a detailed description of the septorhinoplasty procedure to assist surgeons in surgical planning.

The defects in the intranasal mucosal lining may remain asymptomatic and require no additional treatment measures.<sup>11</sup> However, the intranasal exposure of the spreader grafts may occur as a result of mucosal defects. Therefore, large defects may necessitate various techniques to cover the grafts and protect them from intranasal exposure.<sup>12</sup>

A range of surgical interventions have been developed to address perforations of the septal mucosa in cases where there is also underlying septal perforation. These interventions are grouped into two categories: those employing local flaps only, and those involving the use of interposition grafts.<sup>11</sup> The local flap can be used either unilaterally or bilaterally, as well as either a unipedicled or bipedicled manner, and with a base positioned either anteriorly or posteriorly.<sup>13</sup> The interposition graft can be harvested from various donor sites, including temporalis fascia, conchal cartilage, and tragal cartilage.<sup>11</sup> In the present case, despite the absence of supporting septal cartilage, the unilateral perforation of septal mucoperichondrial tissue was left unsutured because the contralateral mucoperichondrial tissue of the septum was intact. Moreover, an internasal splint was employed to prevent synechia, or the unwanted adhesion of tissues, following the unsutured perforation of the mucosa of the septum and inferior and middle conchae. Favorable outcomes observed indicate that healing occurred successfully through secondary intention.

It is important to note that endoscopic evaluations were not possible in this study due to financial constraints, which can be viewed as a limitation of the study. Moreover, there is insufficient evidence currently available regarding the critical threshold of septal mucosa perforation that is associated with the prevention of synechia and ensures secondary intention. This threshold may also be influenced by various other factors, including the location of

the perforation. Therefore, further research is warranted to investigate this matter.

Considering the favorable outcomes and absence of complications observed, the introduced procedure may prove valuable in aiding surgeons during septorhinoplasty procedures, ensuring the successful removal of rhinoliths without the concern of synechia.

## AUTHOR CONTRIBUTIONS

**Mehdi Heidarizadeh:** Conceptualization; supervision. **Arash Sarrafzadeh:** Investigation; validation; writing – review and editing. **Maryam Mohebiniya:** Project administration; validation; writing – review and editing. **Soheila Jadidi:** Data curation; writing – original draft.

## DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

## CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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