

**Case Report**

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**A behemoth rhinolith: Case report and review of literature**

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**Abstract**

**Introduction:** Rhinolith which translates to stone formation within the nasal cavity is a rare and under-diagnosed condition. The available literature is scanty and tends to be in the form of isolated case reports and very few case series. It is, therefore, important to report each case to facilitate its valid statistical analysis. Its etiopathogenesis is vaguely recognized. They are the result of deposition of nasal, lacrimal and inflammatory mineral salts by accretion around an endogenous or exogenous nidus, usually neglected foreign bodies.

**Case report:** 33 years old female, reported with complaint of left sided nasal obstruction with history of recurrent epistaxis and foul-smelling mucopurulent discharge from left nasal cavity. Left nasal cavity showed blackish brown, stony hard mass filling the entire nasal cavity. Contrast-enhanced computed tomogram of nose and paranasal sinuses revealed a well-defined geographical calcific (HU~1789) density in the left nasal cavity between nasal septum and in inferior meatus measuring ~2.1×1.1×2.3 cm. Intra-operatively, the extent of rhinolith was confirmed after decongestion. Rhinolith was freed from all points of contact viz. septum, middle turbinate and inferior turbinate. It was removed piecemeal (Figure 1d). Post-operative period was uneventful. Histopathological Report (HPR) revealed dystrophic calcification with granulation tissue surrounded with adherent actinomyces colonies

**Conclusion:** Literature appraisal brings out that despite being sporadic in incidence, its susceptible population includes children and young adults as they insert foreign bodies in nose. We present a case of 35 years old female with a giant rhinolith in left nasal cavity which was removed with endonasal endoscopic approach.

**Keywords:** Foreign body; Nasal obstruction; Rhinolithiasis; Calcification; Epistaxis; Nasal septum; Foul smelling; Granulations; Coblator; Exogenous.

## Introduction

Rhinoliths (Greek, rhino~ nose and lithos ~ stone) are hard and dense stone like calcifications within nasal cavity formed by build-up of nasal, lacrimal and inflammatory mineral salts by accrual around an endogenous (i.e. ectopic tooth, bone chip, blood clot, mucus, bacteria, necrosed mucosa) or exogenous (i.e. fruits seeds, gauze, pebbles, plant material, cotton wool, plastic, insects, beads, dental imprinting material, remnants of nasal tampons etc.) nidus [1]. Despite foreign body nose being common in Otorhinolaryngology (ORL) clinics, rhinoliths are extremely rare and are seen in 0.01% of these patients [2]. The principal account of Rhinolithiasis is credited to Bartholin in 1654 [5]. The first radiological description came from Maclintype in 1900 [6]. Owing to its rarity and under-diagnosis till date approximately 700 such cases have been reported [7]. They are calcareous concretions formed from precipitation of mineral salts on intranasal foreign body which may be of endogenous or exogenous origin. These nidi are absent in about 50 percent of cases indicating an organic origin which degrades over time [7].

The incidence quoted in the literature is approximately 1 in 10,000 ORL patients [7]. But, its actual value is probably higher owing to its incidental diagnosis in asymptomatic patients and obscured symptomatology due to co-existent nasal pathologies [7]. They are mostly unilateral and reported in third decade of life, rarely in children and mostly in female patients [8]. Bilateral rhinoliths are extremely rare [9]. In our reported case, the patient is a female but in fourth decade of her life.

They are mostly asymptomatic and are incidentally picked upon panoramic imaging [3]. However, patients may present with unilateral nasal symptoms like obstruction, fetid rhinorrhea, anosmia, epistaxis, taste and smell disturbances, and headache along with signs of sinusitis [4]. A high index of suspicion is required to diagnose a forgotten entity like this.

## Case report

33 years old female, a known case of Carcinoma Breast (Right) post modified radical mastectomy (pT2N3M0) post adjuvant chemoradiotherapy (completed 2 years prior to the date of presentation) presently on Tamoxifen, reported with complaint of left sided nasal obstruction of 2 months duration. It was insidious, continuous and gradually progressive. Patient also gave history of recurrent epistaxis and foul-smelling mucopurulent discharge from left nasal cavity. However, spouse gave history of experiencing bad smell in close proximity with her. Patient denied any foreign body insertion in nose or previous nasal surgery. Clinical examination revealed Grade II deviation of nasal septum towards right. Left nasal cavity showed blackish brown, stony hard mass filling the entire nasal cavity extending between the lateral nasal wall and septum; polypoidal middle turbinate (Figure 1a). No growth or mucopus was seen. Rest of ORL examination was essentially normal. With the presumptive diagnosis of Rhinolith/neglected foreign body left nasal cavity, a contrast-enhanced computed tomogram of nose and paranasal sinuses (CECT nose and PNSs) was done which revealed a well-defined geographical calcific (HU~1789) density in the left nasal cavity between nasal septum and in inferior meatus measuring ~2.1×1.1×2.3 cm with surrounding soft tissue content (Figure 1b). The calcific lesion was abutting and displacing the nasal septum to the right with mild erosion; laterally, it was

flush with medial wall of left maxillary sinus; posteriorly extent was just proximal to choana and inferiorly, it was abutting the nasal floor (Figure 1c). Patient was taken up for examination under General Anesthesia (GA). Intra-operatively, the extent of rhinolith was confirmed after decongestion. Rhinolith was freed from all points of contact viz. septum, middle turbinate and inferior turbinate. It was removed piecemeal (Figure 1d). All pieces were oriented as per the intraoperative findings (Figure 1d). Granulation tissue and soft tissues of nasal cavity was removed using coblator. Post-operative period was uneventful. Histopathological Report (HPR) revealed dystrophic calcification with granulation tissue (Figure 2b) surrounded with adherent actinomyces colonies (Figure 2b). Patient has been on regular follow up with check nasal endoscopies which reveal a well mucosalised nasal cavity (Figure 2c).

## Discussion

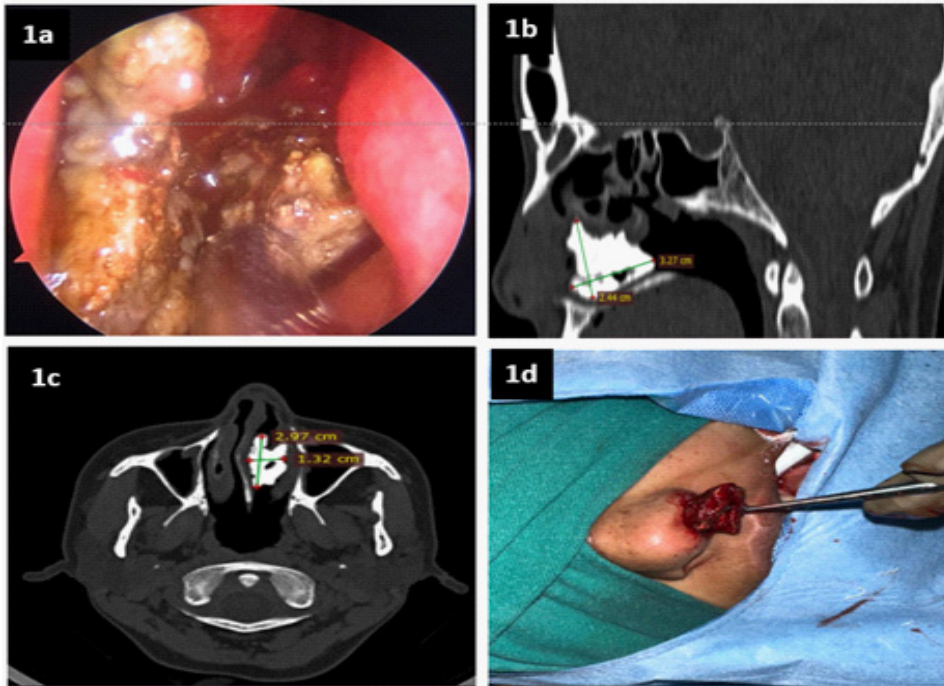
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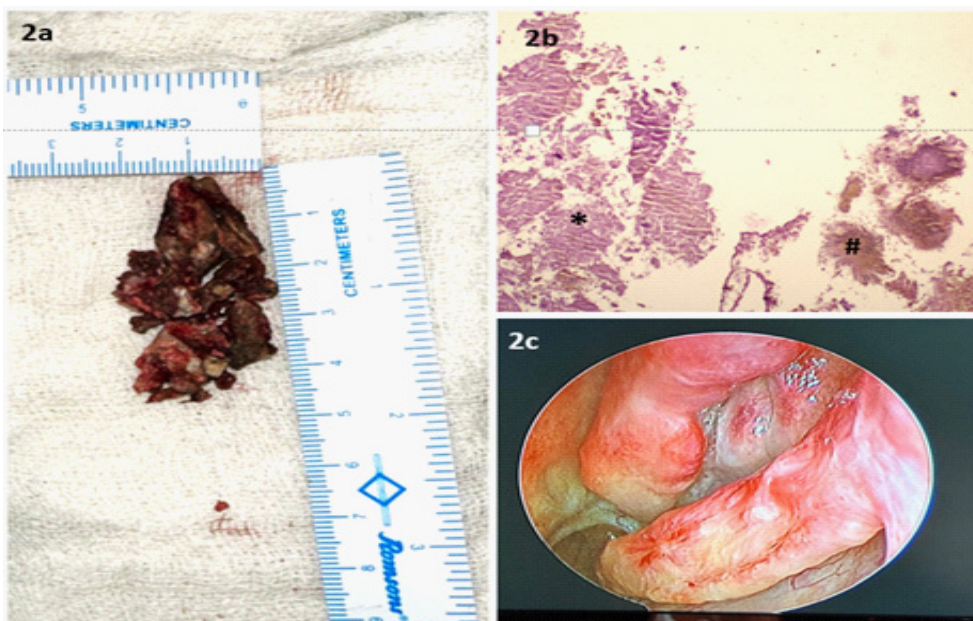
The pathogenesis of this entity remains cryptic. Nevertheless, various factors have been postulated as its contributors. Entry and impaction of foreign body into the nasal cavity causes obstruction leading to downturn of nasal secretions. This incites local inflammatory response with deposition of salts of calcium, aluminium, magnesium, iron and organic substances like glycine and glutamic acid leading to slow and gradual increase in its size. The route of entry to nose is mostly anterior but, in few cases, a foreign body may get lodged into nasal cavity following posterior path through choana during sneezing, coughing or emesis [9].

Rhinoliths cause non-specific symptoms like chronic unilateral nasal obstruction, maxillo-facial region pain (direct stimulation, referred pain, mucosal contact), purulent rhinorrhea, nasal bleed, epiphora, and taste and smell disturbances [7,8].

They are usually formed in inferior meatus. Clinically, patients may have nasal septal deviation to opposite side, erosion and/or septal perforation, variable extent of erosion of lateral nasal wall finally culminating into an oro-antral or oro-nasal fistula [7]. Examination with probe reveals irregular, grayish-black to brownish bony hard mass. A nasal polyp may be seen surrounding a rhinolith which is due to long standing mucosal irritation [8].



**Figure 1:** (A) Endoscopic view of left nasal cavity showing blackish brown, stony hard mass filling the entire nasal cavity extending between the left lateral nasal wall and septum. (B) CECT Nose & PNS (Sagittal view) revealing a well-defined geographical calcific (HU~1789) density in the left nasal cavity between nasal septum and in inferior meatus measuring ~2.1×1.1×2.3 cm with surrounding soft tissue content. (C) CECT Nose & PNS (Axial view) showing a calcific lesion abutting and displacing the nasal septum to the right with mild erosion; laterally, it was flush with medial wall of left maxillary sinus; posteriorly extent was just proximal to choana and inferiorly, it was abutting the nasal floor. (D) Piecemeal removal of the huge rhinolith from left nasal cavity.



**Figure 2:** (A) All removed pieces in orientation as per the intraoperative findings. (B) HPR showing dystrophic calcification with granulation tissue (\*) surrounded with adherent actinomyces colonies (#). (C) Post-operative endoscopic view showing a well mucosalised, healthy nasal cavity (after 3 months).

Co-existent sinusitis has also been reported in about 20 per cent cases [7]. Few complicated cases reported also mention intra-cranial extension, middle otitis and dacryocystitis [8].

Its differential diagnoses include calcified sinonasal masses encompassing osteoma, odontoma, calcified polyps, nasal glioma, encondroma, hemangioma, ossifying fibromas, calcifying angiofibromas, septal desmoid tumours, malignant tumours, syphilis and calcified tuberculomas [8]. Radiological and histo-

pathological examination clinches the diagnosis.

An office nasal endoscopy is essential to locate the rhinolith. Computed Tomography (CT)/ Cone beam CT is the investigation of choice. It enables exact localization, measurement of dimensions, visualization of internal features like central radiolucency of organic nidus surrounded by opacity, local tissue reactions and also offers differential diagnosis of other radio-opaque masses inside nasal cavity. CT is superior to both plain radio-

graphs that get adversely affected by superimposition and magnetic resonance imaging which lacks the sensitivity to pick up bony erosions and calcifications. Rhinoliths on CT characteristically appear radio-opaque masses with irregular contours and hypodense or radiolucent core [10].

Primary modality of treatment is removal of the mass. The acceptable approach shall depend upon its location, size and the need to perform secondary procedures. The tools in the armamentarium of an ORL surgeon to tackle this tricky situation include endoscopic endonasal approach, Le Fort I osteotomy, piriform aperture osteotomy, piecemeal removal and lithotripsy [8].

### Conclusion

While rhinoliths are an extremely unaccustomed entity, clinicians must be wary of it. The slow growth and subtle or nil symptoms demand a high index of suspicion to facilitate an expeditious diagnosis. History of foreign body introduction may be present only in few cases. It must be a part of differential diagnoses in all cases of unexplained persistent unilateral nasal symptoms like progressive obstruction, fetid rhinorrhea, epistaxis etc. A rigid office nasal-endoscopy complemented with CT facilitates its exact location, disease status of sinuses with the need of secondary surgical procedures. CT can also reveal hidden rhinoliths and is absolutely necessary in planning surgical approach.

### Declarations

**Authors contributions:** ZZ- Data curation, Writing original draft; TM- Writing original draft; VS- Data curation, Formal Analysis, Methodology, Project administration, Supervision, Writing original draft; SG- Radiological images; MGK- Histopathology images; SH- Data curation; VBK- Data curation.

**Ethics approval and consent to participate:** Approved by the Institutional Ethics Committee, Command Hospital- Kolkata, Alipore Road, Kolkata-700027.

**Consent to participate:** Informed written consent to participate in the study was taken from the patient.

**Consent for publication:** Written consent obtained from the patient.

**Availability of data and materials:** The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

**Competing interests:** The authors declare that they have no competing interests.

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