



MAXILLARY SINUS MUCOCELE – A RARE CASE REPORT

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ABSTRACT

Cystic lesions of the paranasal sinuses are commonly seen and they range from mucous retention cysts to true mucocoeles. Although both entities are characterized by mucus accumulation within the sinus cavity, they differ significantly in their pathogenesis, clinical behaviour, radiological features, and management. Accurate differentiation between these lesions is essential for appropriate clinical decision-making and prevention of complications. In this article we are presenting a case report of 16-year-old male who presented with right side nasal obstruction. Provisional diagnosis of mucocoele was made on a computed tomography scan, which was later confirmed on histopathology. The lesion was managed surgically with uneventful episode.

INTRODUCTION

Paranasal sinus mucocoeles are benign yet potentially aggressive lesions, characterized by progressive mucus accumulation within an epithelial-lined sinus cavity leading to expansion, bony erosion, and displacement of adjacent structures.^[1] The frontal and ethmoid sinuses are most commonly involved about 70% to 90%; however, maxillary sinus mucocoeles are relatively rare, accounting for less than 10% of cases.^[2] Clinically, maxillary mucocoeles typically present with painless cheek swelling, facial asymmetry, nasal obstruction, or dental symptoms, while orbital involvement is uncommon but may result in significant morbidity.^[3]

Maxillary sinus mucoceles are etiologically classified as primary or secondary. Primary mucoceles arise due to obstruction of the natural sinus ostium, commonly following chronic inflammation, whereas secondary mucoceles are usually postoperative, resulting from entrapment of residual mucosa and prolonged retention of secretions.^[2,4] Progressive expansion of the lesion leads to thinning, remodelling, and erosion of the surrounding bony walls, a key feature distinguishing mucoceles from other cystic maxillary sinus lesions.^[5]

In contrast, mucous retention cysts of the maxillary sinus are frequently detected incidental findings on radiological imaging, with a reported prevalence of 1.4%–9.6% in the general population^[6]. These lesions are non-expansile, do not cause bony destruction, and are often asymptomatic. When symptomatic, retention cysts may present with headache, facial pain, nasal obstruction, or recurrent sinusitis, and generally require conservative management, with surgical intervention reserved for selected cases.^[7]

CASE REPORT

A patient 17-year-old male had come to ENT OPD with complaint of nasal obstruction of right side for 2-3 years, with history of chronic nasal discharge for childhood. No history of trauma, or previous history of surgical treatment was present. Patient had no other known co morbidities.

On examination in Anterior rhinoscopy, a S shaped deviated nasal septum is present, and bilateral inferior turbinate hypertrophy is seen. Ophthalmological examination was found to be normal.

PNS scan showed complete filling of the right maxillary sinus, thinning and bulging of the internal wall of the maxillary sinus suggestive of benign expansive lesion.

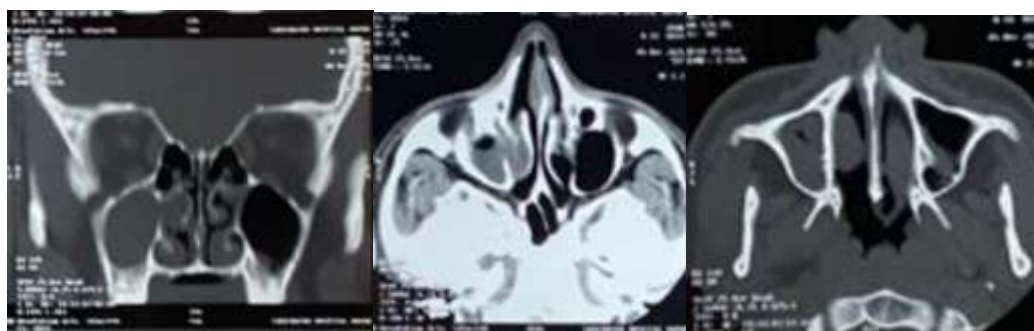


FIGURE 1 – NCCT PNS showing complete opacification of right maxillary sinus.

Patient was planned for Functional Endoscopic sinus surgery. Under GA induction and intubation was done. Bilateral nasal packing done for 10 minutes to achieve decongestion. S- shaped deviated nasal septum corrected. Right side uncinectomy was done and maxillary sinus ostium identified followed by Middle meatal antrostomy. Intra operatively in right maxillary sinus a polypoidal tissue was present and it was filled with pus like discharge for which pus swab was sent for culture and sensitivity, gram stain and AFB stain. Pus suctioned out and multiple washes were given in maxillary sinus. Polypoidal mucosa debrided out and sent for histopathological examination.

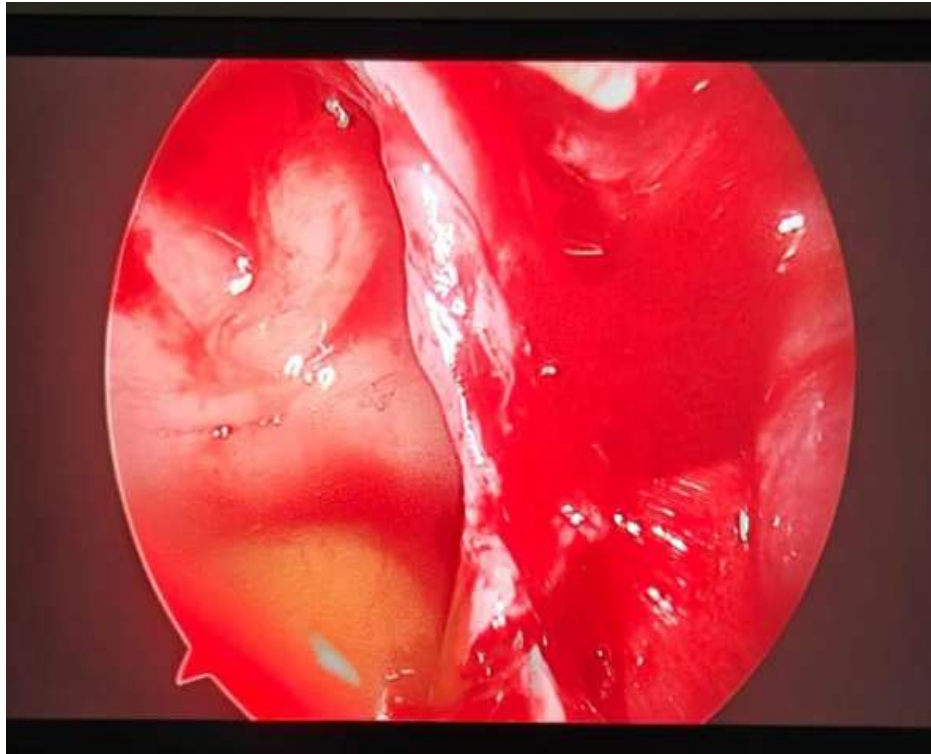


FIGURE 2 – Intraoperative picture showing mucocele in right maxillary sinus.

Patient underwent endoscopic ethmoidectomy, middle meatal antrostomy and marsupialization with drainage of the mucocele. The contents of the mucocele are evacuated with a curved maxillary sinus suction without the need to totally remove the mucocele lining. Nasal Packing was done using merocel and pack was removed after 2 days.

Pus from gram stain showed positivity for *Staphylococcus* species which was sensitive to Clindamycin, Linezolid, Vancomycin, Rifampicin. AFB stain was not positive. Patient was discharged on oral antibiotics based on culture and sensitivity report and saline douching advised for a week. Histopathological reports revealed as mucocele lined with pseudostratified columnar epithelium.

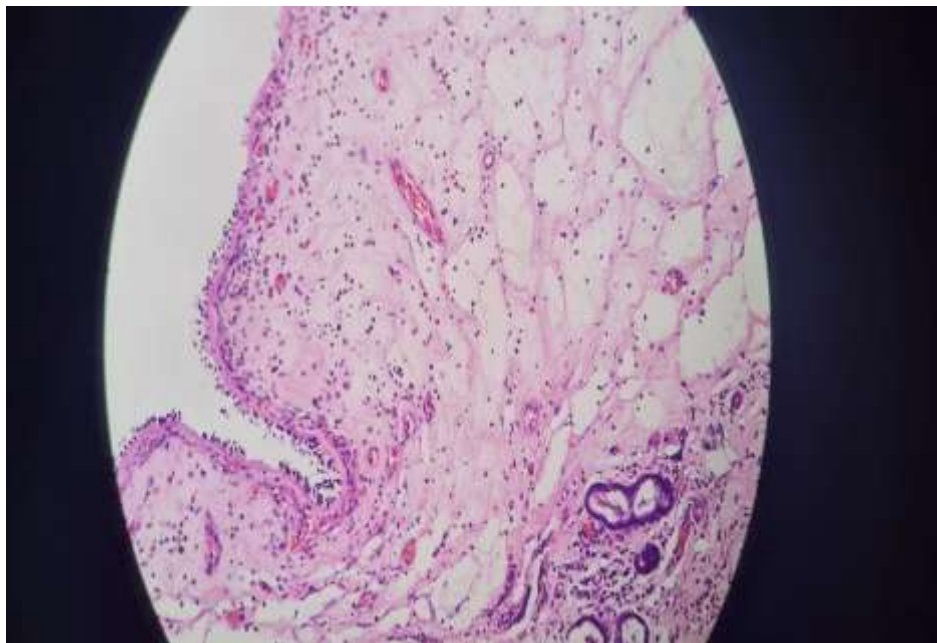


FIGURE 3 – MICROPHOTOGRAPH of excised mucocele showing a cystic cavity lined by pseudostratified columnar epithelium.

On follow up, repeated diagnostic nasal endoscopy revealed patent maxillary ostium with no discharge or symptoms.

DISCUSSION

The maxillary sinus is the largest paranasal sinus, pyramidal in shape, and situated within the maxillary bone, draining via its ostium into the middle meatus of the nasal cavity. It lies in close anatomical relation to the orbit superiorly, the palate and maxillary dentition inferiorly, and the nasal cavity medially.^[8] This intimate relationship with surrounding structures explains why expansile lesions such as mucoceles may produce pressure-related bony remodelling and, when secondarily infected, progress to a pyocele due to bacterial superinfection.^[1]

Among paranasal sinus mucoceles, fronto-ethmoidal involvement is most common, while maxillary and sphenoid sinus mucoceles are relatively rare. The paranasal sinuses are air-filled cavities lined by a thin mucosa that is firmly adherent to the underlying periosteum, a feature that contributes to the characteristic expansile behavior of mucoceles.^[8,1] The most important differential diagnosis of a sinus mucocele is a mucous retention cyst. Cystic lesions of the maxillary sinus include antral pseudocysts, mucous retention cysts, and true mucoceles, each exhibiting distinct etiopathogenesis and clinical behavior.^[9]

Feature	Retention Cysts & Pseudocysts	Maxillary Sinus Mucocele
Nature	Retention cysts are epithelial-lined; pseudocysts lack epithelial lining	True cyst lined by respiratory epithelium
Etiology	Obstruction of seromucous gland ducts	Obstruction of natural sinus ostium
Symptoms	Usually asymptomatic; incidental finding	Symptomatic: pain, swelling, nasal obstruction
Growth Pattern	Non-expansile, self-limiting	Progressive expansile growth
Radiology	Dome-shaped, well-defined opacity; no expansion	Homogeneous expansile lesion
Bone Involvement	Bone preserved; no erosion	Bone remodeling and erosion present
Complications	Rare	Orbital/intracranial extension; mucopyocele
Management	Conservative; surgery if symptomatic	Surgical—endoscopic marsupialization

Retention cysts result from obstruction of seromucous gland ducts and are generally non-expansile and self-limiting. In contrast, mucoceles exhibit progressive expansile growth and possess the potential for local bone erosion and sinus wall perforation if left untreated, underscoring the importance of accurate diagnosis.^[11] Management of maxillary sinus retention cysts is largely conservative, as many lesions regress spontaneously. Surgical intervention is reserved for symptomatic cases where a clear causal relationship is established. While older approaches such as inferior meatal puncture or the Caldwell–Luc procedure were previously employed, endoscopic management has become the standard of care. Middle meatal antrostomy, with or without ostiomeatal complex widening, is currently preferred; however, limited access to certain areas of the maxillary sinus may occasionally result in incomplete clearance and potential recurrence.^[12]

Paranasal sinus mucocoeles are benign, mucus-filled, expansile lesions lined by pseudostratified respiratory epithelium that develop following obstruction of normal sinus drainage. Their frequent occurrence in the frontal sinus supports the role of anatomical variations and impaired ostial ventilation in their pathogenesis.^[2] Although uncommon, accounting for a small proportion of paranasal sinus lesions, their clinical significance lies in their ability to cause progressive mucus accumulation, gradual sinus expansion, structures and secondary infection inducing inflammatory cytokine release, which stimulates fibroblast-mediated production of prostaglandins and collagenases, leading to progressive bone resorption and lesion expansion.¹³ Symptomatology varies with lesion size and extent and may include facial pain, headache, and nasal obstruction. Natvig and Larsen, in their classic clinicopathological series, described mucocoeles as slowly expanding but locally aggressive lesions with the potential to involve adjacent structures. Mucocoeles most commonly involve the frontal sinus, followed by the ethmoid sinuses, while maxillary sinus involvement is relatively uncommon. Sphenoid sinus mucocoeles are rare but clinically significant due to their proximity to critical neurovascular structures. The secretions in mucocoele is commonly sterile, but due to superadded infection may become pyocoele.

Clinically, mucocoeles often present with progressive symptoms related to pressure effects, including facial deformity, proptosis, diplopia, visual impairment, or neurological deficits. Orbital and intracranial complications have been well documented, particularly in frontal, ethmoid, and sphenoid sinus mucocoeles. Computed tomography is the imaging modality of choice for evaluation, as emphasized by Kennedy et al., allowing differentiation between non-expansile retention cysts and expansile mucocoeles with bony erosion. Magnetic resonance imaging is useful in cases with suspected orbital or intracranial extension or when differentiation from neoplastic lesions is required.

The diagnosis of maxillary sinus mucocoele is based on clinical features supported by radiological evaluation, surgical findings, and histopathological confirmation. Computed tomography remains the imaging modality of choice, typically demonstrating a well-defined, homogeneous, non-enhancing lesion with smooth pressure-induced bony erosion and sinus expansion, unless secondary infection is present. In contrast, mucous retention cysts appear as well-circumscribed, dome-shaped soft tissue opacities, most commonly arising from the floor of the maxillary sinus, without associated bony erosion or sinus expansion.

Management strategies differ substantially between these two entities. Asymptomatic mucous retention cysts are generally managed conservatively, with observation recommended in most cases. Surgical intervention is reserved for symptomatic lesions or when cysts interfere with sinus ventilation or planned surgical procedures. In contrast, mucocoeles require surgical management due to their progressive nature and risk of complications. Endoscopic marsupialization, as advocated by Kennedy et al. and Lund, has become the treatment of choice, offering excellent outcomes with minimal morbidity and low recurrence rates. Endoscopic marsupialization has superseded the Caldwell–Luc procedure as the treatment of choice, as it ensures effective drainage and sinus ventilation with significantly reduced morbidity. When wide marsupialization is performed, recurrence rates following endoscopic sinus surgery are exceptionally low, reported to be below 5%.

Early intervention is crucial to prevent orbital and intracranial complications associated with paranasal sinus mucocoeles. Endonasal endoscopic surgery is the recommended treatment modality and is generally preferred because of its minimally invasive nature and low recurrence rate, reported to be approximately 4.8%. The fundamental principle of surgery is to adequately widen the mucocoele ostium to allow complete evacuation of its contents and to establish a wide, permanent communication between the mucocoele cavity and the nasal cavity. Surgical techniques described include lateral marsupialization, medial marsupialization, and transverse excision.

CONCLUSION

Maxillary sinus mucocoele is a rare clinical entity that may remain asymptomatic for a prolonged period. Infection like mucopyocoele formation and orbital compression represent the most significant complications. Endonasal endoscopic marsupialization is the treatment of choice.

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