

## CASE SERIES

## Clinical Outcomes of Surgical Management of Paranasal Sinus Mucocoeles in South-East Nigeria

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## DISCLOSURE

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**ABSTRACT**

Paranasal sinus mucocoeles are uncommon, benign clinical entities. They result from obstruction of the sinus drainage ostium with accumulation of secretions within the cavity and slow progressive expansion, resulting in adjacent tissue displacement. The clinical features demonstrated are therefore dependent on the prominent direction of its expansion. Treatment is by surgical intervention to drain the mucocoele with or without extirpation of the sinus mucosa to prevent re-accumulation. Complications result from tissue damage following delay in surgical intervention.

We present four cases with sinonasal mucocoeles who underwent surgical drainage and mucosal extirpation in two tertiary eye centres in South-East Nigeria. The first had lost vision prior to surgery from exposure keratopathy and globe perforation. Two had no impairment of vision. Proptosis, diplopia, chronic discharging sinus and cosmetic blemish were the prominent presenting complaints. All complaints were fully resolved following surgery. There has been no report of recurrence of symptoms during the limited follow-up period.

**Keywords:** Mucocoele, Proptosis, Vision loss, Orbital mass

## INTRODUCTION

A mucocoele is a mucus-filled sac lined by secretory epithelium and capable of progressive expansion. It is usually caused by obstruction of the sinus ostium. The most

commonly obstructed paranasal sinus (PNS) is that of the frontal sinus (60-89%) followed by the ethmoid sinus (8-20%).<sup>1</sup> Obstruction of the sphenoid sinus is rare, and maxillary obstruction is the least common(1%), and may

result from trauma, instrumentation, inflammation, infections, tumors, irradiation or may be idiopathic.<sup>2</sup> PNS mucocoeles are an uncommon pathology, often causing globe displacement in the form of proptosis or dystopia and other ophthalmic signs and as such, frequently presenting first to the ophthalmologist. Less commonly, they present as otorhinolaryngological or neurosurgical cases.<sup>3</sup> A large series from the United States presented with headache and maxillofacial pressure as the most common presenting symptoms.<sup>4</sup> Mucocoeles are surprisingly benign, with a propensity for progressive expansion and bony destruction which is responsible for the presenting signs. Prostaglandins and collagenases play a significant role in progressive osteolysis and expansion of the bony cavity.<sup>1,5,6</sup> The diagnosis is often missed with resultant delayed intervention and disease progression.<sup>2,4,7</sup>

#### CASE 1

A 68-year-old female first presented to us three years earlier with a firm, painless, progressively enlarging forehead mass, proptosis, inferolateral dystopia and restriction of extraocular motility in the right eye of two years' duration. There was a previous history of vision loss in childhood in the same eye. Patient was otherwise healthy.

A diagnosis of a superior orbital mass (Figure 1) was made, and a computed tomography (CT) scan of the orbits and paranasal sinuses was ordered but patient was lost to follow up, during which time, no orthodox intervention occurred. She returned a year later, by which time the mass had enlarged with the brow mass being fluctuant, with worsening of the

proptosis, unsightly globe displacement, exposure keratopathy with corneal perforation and globe collapse (Figure 1).

CT done (Figure 2) demonstrated homogenous opacification and massive enlargement of the right frontal sinus with erosion of the floor, anterior and posterior tables of the sinus walls as well as the left frontal sinus.

Drainage of the mucocoele and sinus epitheliectomy were performed via a sub-brow incision by two oculoplastic surgeons and a neurosurgeon (Figure 3). The dura was found to be exposed in some areas of complete bony erosion but not perforated. The sinus epithelium was gently peeled off the dura as well as the residual bony wall of both frontal sinuses. The sinus mucosa was also peeled off the periorbita as the roof of the orbit was completely eroded. Subsequently, the perforated eye was eviscerated and a 22mm polymethyl methacrylate implant was placed, the globe was repositioned and the excess skin, subcutaneous tissue trimmed and the wound sutured. A prosthesis was placed after two months. The patient has remained clinically stable and asymptomatic for 18 months.

#### CASE 2

A 54-year-old lady presented with complaints of lateral displacement of her left eye for four months. There was no associated pain, but she had double vision. Proptosis was mild with horizontal dystopia, but no other significant ocular findings. CT orbits and paranasal sinuses demonstrated an oval homogenous mass on the medial orbit displacing the globe laterally and suggestive of a left ethmoidal sinus mucocoele. The mass was exposed via a medial lid crease approach, mucocoele incised

and drained and the sinus epithelium completely extirpated. Post-operative recovery was uneventful with visual acuity of 6/6. The globe position was restored to normal and double vision resolved with full ocular motility. She has remained asymptomatic for 13 months of follow up.

### CASE 3

A 58-year-old male diabetic presented with a chronic discharging sinus above the left globe. A previous history of a painless swelling above the left eyeball was elicited, which had ruptured prior to presentation. He was unable to shut the eyelid due to cicatrix formation and developed a corneal ulcer from exposure. The ulcer was treated until it stopped staining. CT of the orbits and paranasal sinuses showed aeration of both frontal sinuses, a seemingly misleading finding.

A diagnosis of corneal ulcer secondary to exposure from upper lid cicatricial ectropion from a cutaneous fistula in a diabetic was made. The diabetes was controlled, and the patient scheduled for orbital exploration and fistula repair.

On the table, it was discovered that the fistula was arising from the frontal sinus which contained inspissated debris. The sinus mucosa was cleared along with its contents and the fistula repaired using a cutaneous flap. Lagophthalmos from persistent upper lid cicatricial ectropion necessitated correction using a full thickness skin graft about 4 months later with resultant full correction. Patient has remained asymptomatic with full eyelid closure for 12 months.

### CASE 4

A 39-year-old male chronic cigarette smoker presented with a 4-month history of "an abnormal appearance" of the face though there was no obvious facial deformity. His wife reported that the right eye remained open during sleep. He sought medical attention at another tertiary eye-care centre but the diagnosis was not made. A family member then advised that a second opinion be sought, hence his presentation to us. Examination revealed a mild proptosis and inferior dystopia. CT of the orbits and paranasal sinuses showed a large frontal sinus mucocoele displacing the globe downwards, forward, and laterally (Figures 4&5).

He underwent complete extirpation of the right frontal sinus via a lid-crease incision. The entire sinus mucosa was removed. Post-operatively, visual acuity remained 6/6 with mild down-gaze restriction. The patient had a single episode of large volume of brownish content escaping from the nose two weeks later which resolved spontaneously. Healing was uneventful. He however developed lid lag on down-gaze due to cicatrix formation in the surgical plane. A scar release and full thickness skin graft is planned.

**Figure 1.** Facial appearance of Case 1 at first presentation and a year after



**Table 1.** Patient demographics

Case no.	Age (yrs)	Gender	Location	Predisposing factors	Duration of symptoms prior to presentation	Clinical features	Surgical Approaches	Recurrence	Post-operative complications
1	68	Female	Frontal	Nil	2 years	Disfiguring proptosis Massive globe displacement and corneal perforation	Sub-brow incision	Nil	Nil
2	54	Female	Ethmoidal	Nil		Mild Proptosis and lateral dystopia	Medial Lid crease incision	Nil	Nil
3	58	Male	Frontal	?diabetes mellitus	5 months	Discharging cutaneous fistula and corneal exposure	Access via cutaneous fistula	Nil	Cicatricial ectriopion
4	39	Male	Frontal	?Smoking	4 months	Moderate Proptosis and dystopia	Lid crease incision	Nil	Cicatricial ectriopion

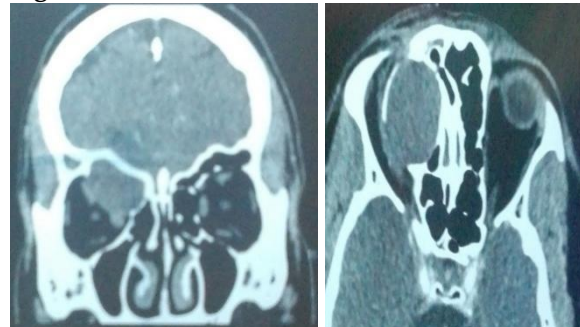
**Figure 2.** CT image of Case 1



**Figure 3.** Immediate post-operative appearance of Case 1



**Figure 4.** Coronal and axial CT scan of Case 4



**Figure 5.** Subtle proptosis in Case 4



The age range in this series was 39-68 years with no gender predilection. The frontal sinus was involved in most of the cases. One was

purely ethmoidal (case 2). Two patients (Cases 1 and 3) developed significant complications from corneal exposure prior to surgery which led to poor visual outcome. The other two (Cases 2 and 4) without prior signs of exposure retained preoperative visual acuity following surgery. Cicatricial ectropion was a delayed complication in two cases, one following the cutaneous fistula repair and the other from scarring of the lid crease incision (Cases 3 and 4). Complete meticulous extirpation of the sinus mucosa resulted in resolution of symptoms in all patients.

#### DISCUSSION

Mucocoeles of the paranasal sinuses result from obstruction of the sinus drainage. Initially, they are innocuous, asymptomatic lesions but as they progressively increase in size, they become symptomatic due to direct mass effect. Chronic inflammation, reactive bone formation and osteolysis resulting from prostaglandin and collagenase release are responsible for the signs and symptoms of the disease. However, they are uncommon. Our small series of 4 patients were operated within 18 months. Fasina and Okoh in 2018 reported 10 cases operated over a period of 10 years while Martel-Martín *et al.* reported 58 patients over a period of 23 years approximating 2.5 patients per annum, indicating the uncommon nature of this pathology.<sup>5,23</sup> Seventy percent of this large series from an otorhinolaryngology unit presented with ophthalmic signs and symptoms.<sup>5</sup>

Proptosis, tearing and orbital swelling were the most common presentations with an equal male to female ratio in Fasina's report.<sup>23</sup> Ocular presentations include proptosis as the commonest followed by periocular swelling and diplopia.<sup>5,12,23,24,25</sup> Other ocular

presentations include ptosis, ocular motor palsies, cranial nerve palsies or frank vision loss.<sup>10,12,18,19,24,25,26</sup> Lid crease incisions offer cosmetically acceptable cutaneous access as the scar is well hidden and non-disfiguring. Their use however may be limited by already existing complications like a cutaneous fistula or massive disfigurement as in two of our cases. Endoscopic approach is currently recommended as the modality of choice for small or medium-sized mucocoeles. Those extending beyond the medial globe or extensive intracranial involvement may benefit more from a non-endoscopic approach. Available instrumentation and surgeon's competence are also determinants of the surgical approach selected.<sup>15,27</sup> Reports from Nigeria show no gender predilection while a male preponderance is reported from other places.<sup>6,23,24</sup>

Vision loss may result from exposure keratopathy following proptosis or glaucoma from globe compression. Compressive optic neuropathy is uncommon and occurs in sphenoid and posterior ethmoidal sinus mucocoeles because of their proximity to the optic nerve.<sup>4,14,28,29</sup> It may rarely be noted with frontal or maxillary sinus mucocoeles.<sup>30</sup> A relative afferent pupillary defect precedes vision loss in these cases.

#### CONCLUSION

The ophthalmologist is often the first port of call for patients with paranasal mucocoeles because of the ocular signs and symptoms that result from progressive displacement of the orbital content. Globe destruction could result if appropriate intervention is delayed as with our first case. Surgical outcomes are gratifying, and recurrence rates are low when managed appropriately.

## REFERENCES

1. Schlewet M. Frontal Sinus Mucocoele after Osteoplastic Flap Surgery: Case Report. *Annals of Clinical Case Reports* 2017;2(1453):1-4.
2. Sathoo A, Tuli IP, Sharma N. Idiopathic mucocoele of maxillary sinus: A rare and frequently misdiagnosed entity. *Journal of Oral and Maxillofacial Radiology* 2016;4(3):87-89.
3. Capra GG, Carbone PN, Mullin DP. Paranasal sinus mucocoele. *Head Neck Pathol* 2012;6(3):369-372.
4. Scangas GA, Gudis DA, Kennedy DW. The natural history and clinical characteristics of paranasal sinus mucocoeles: a clinical review. *Int Forum Allergy Rhinol* 2013;3(9):712-717.
5. Martel-Martin M, Gras-Cabrerizo JR, Bothe-Gonzalez C, Montserrat-Gili JR, De Juan-Delago M, Masegur-Solench H. Clinical analysis and surgical results of 58 paranasal sinus mucocoeles. *Acta Otorrinolaringol Esp* 2015;66(2):92-97.
6. Obeso S, Llorente JL, Pablo Rodrigo J, Sanchez R, Mancebo G, Suarez C. Paranasal sinuses mucocoeles. Our experience in 72 patients. *Acta Otorrinolaringol Esp* 2009;60(5):332-339.
7. Tailor R, Obi E, Burns J, Sampath R, Durrani OM, Ford R. Fronto-orbital mucocoele and orbital involvement in occult obstructive frontal sinus disease. *Br J Ophthalmol* 2016;100(4):525-530.
8. Cappello ZJ, Dublin AB. Anatomy, Head and Neck, Nose Paranasal Sinuses. StatPearls. Treasure Island (FL)2019.
9. Whyte A, Boeddinghaus R. The maxillary sinus: physiology, development and imaging anatomy. *Dentomaxillofac Radiol* 2019;48(8):20190205.
10. Sundar U, Sharma AL, Yeolekar ME, Pahuja V. Sphenoidal sinus mucocoele presenting as mono-ocular painless loss of vision. *Postgrad Med J* 2004;80(939):40.
11. Naik MN, Tourani KL, Sekhar GC, Honavar SG. Interpretation of computed tomography imaging of the eye and orbit. A systematic approach. *Indian J Ophthalmol* 2002;50(4):339-353.
12. Lee TJ, Li SP, Fu CH, Huang CC, Chang PH, Chen YW, et al. Extensive paranasal sinus mucocoeles: a 15-year review of 82 cases. *Am J Otolaryngol* 2009;30(4):234-238.
13. Yu M, Takashi M, Takuya Y, Ken I. Paranasal sinus mucocoele with visual disturbances whose causative lesion was hardly identified on computed tomography imaging: A case report. *Acta Oto-Laryngologica Case Reports* 2019;4(1):10-12.
14. Ting MYL, Shan M, Gantz O, Zhang-Nunes S, Wrobel B. Optic Neuropathy due to an Ethmoid Mucocoele: A Case Report and Literature Review. *Case Rep Ophthalmol* 2019;10(2):227-234.
15. Lee JT, Brunworth J, Garg R, Shibuya T, Keschner DB, Vanefsky M, et al. Intracranial mucocoele formation in the context of longstanding chronic rhinosinusitis: A clinicopathologic series and literature review. *Allergy Rhinol (Providence)* 2013;4(3): e166-75.
16. Aggarwal SK, Bhavana K, Keshri A, Kumar R, Srivastava A. Frontal sinus mucocoele with orbital complications: Management by varied surgical approaches. *Asian J Neurosurg* 2012;7(3):135-140.
17. Weidmayer S. Frontal mucocoele with intracranial extension causing frontal lobe syndrome. *Optom Vis Sci* 2015;92(6): e138-42.
18. Kennedy A, Chowdhury H, Athwal S, Baddeley P. Frontal sinus mucocoele: a rare cause of ptosis. *BMJ Case Rep* 2015;2015.
19. Lin JY, Lin SL, Chang YL, Lo SH, Chuang FS, Lin SY. Sphenoid sinus mucocoele presenting with optic neuropathy and abducens palsy: a late complication of radiotherapy to the head and neck. *Eye (Lond)* 2005;19(6):697-699.
20. Sethi DS, Lau DP, Chan C. Sphenoid sinus mucocoele presenting with isolated

- oculomotor nerve palsy. *J Laryngol Otol* 1997;111(5):471-473.
21. Roufail E, Briggs R, Tress B, Kaye AH. Sphenoid sinus mucocoele presenting as complete ophthalmoplegia. *J Clin Neurosci* 2001;8(4):372-374.
  22. Peric A, Baletic N, Vukomanovic-Durdevic B, Jovic M, Kozomara R. [Mucocoele of the maxillary sinus]. *Vojnosanit Pregl* 2007;64(5):361-364.
  23. Fasina O, Okoh S. Paranasal sinus mucocoeles in a tertiary center, Southwestern Nigeria: A 10-year review of ophthalmic features, management, and outcome. *Journal of Clinical Sciences* 2018;15(4):183-185.
  24. Ajaiyeoba A, Kokong D, Onakoya A. Clinicopathologic, ophthalmic, visual profiles and management of mucocoeles in blacks. *J Natl Med Assoc* 2006;98(1):63-66.
  25. Sheth HG, Goel R. Diplopia due to maxillary sinus mucocoele. *Int Ophthalmol* 2007;27(6):365-367.
  26. Wong CS, Luk SH, Leung TW, Yuen KK, Sze WK, Tung SY. Sphenoid sinus mucocoele and cranial nerve palsies in a patient with a history of nasopharyngeal carcinoma: may mimic local recurrence. *Clin Oncol (R Coll Radiol)* 2001;13(5):353-355.
  27. Trimarchi M, Bertazzoni G, Bussi M. Endoscopic treatment of frontal sinus mucocoeles with lateral extension. *Indian J Otolaryngol Head Neck Surg* 2013;65(2):151-156.
  28. Mowatt L, Foster T. Sphenoidal sinus mucocoele presenting with acute visual loss in a scuba diver. *BMJ Case Rep* 2013;2013.
  29. Yasuda Y, Morita T, Akiguchi I, Kimura J, Kameyama M. Sphenoid sinus mucocoele with recurrent visual disturbance. *Eur Neurol* 1992;32(4):225-227.
  30. Simoes JC, Nogueira-Neto FB, Gregorio LL, Caparroz Fde A, Kosugi EM. Visual loss: a rare complication of maxillary sinus mucocoele. *Braz J Otorhinolaryngol* 2015;81(4):451-345.