



**Case series**

**Frontal mucocele with orbital extension: a series of 4 cases and review of the literature**

Mucocèle frontale avec extension orbitaire : série de 4 cas et revue de la littérature

DJM Okamon\*<sup>1</sup>, WI Meuga<sup>1</sup>, J Brou<sup>1</sup>, L Konan<sup>1</sup>, S Dongo<sup>2</sup>, DO N'dri<sup>1</sup>

**Résumé**

Introduction : Les mucocèles sont des tumeurs bénignes se développant à partir de la muqueuse des sinus faciaux. Elles peuvent potentiellement compromettre la vie et la fonction visuelle. L'objectif de cette étude est de présenter la prise en charge, ainsi que les aspects cliniques et radiologiques de quatre cas de mucocèles.

Cas cliniques : Ces quatre patients sont des hommes âgés de 46 à 54 ans. Trois d'entre eux présentaient une exophtalmie sans troubles oculomoteurs. Chez deux patients, une tomodensitométrie (TDM) a révélé une masse du sinus frontal associée à une lyse osseuse. Cette masse a également été visualisée par imagerie par résonance magnétique (IRM) chez deux autres patients. L'exérèse de la mucocèle a été réalisée. Le contenu était stérile chez tous les patients. Les suites opératoires ont été simples.

Conclusion : Bien que bénignes et à croissance lente, les mucocèles peuvent compromettre le pronostic vital et visuel en raison de leur extension. La prise

en charge nécessite une intervention ORL et/ou neurochirurgicale.

Mots-clés : mucocèle frontale, exophtalmie, mucosectomie, extension orbitaire.

**Abstract**

Introduction: Mucoceles are benign tumors developed at the expense of the mucosa of the facial sinuses. They can potentially compromise life and visual function. The aim of this study is to present management, clinical and radiological aspects of 4 cases of mucoceles.

Clinical cases: These 4 cases are all male with ages ranging from 46 to 54 years old. 3 of them presented exophthalmos without oculomotor disorders. 2 patients performed a computed tomography (CT) showed a frontal sinus mass associated with bone lysis. The mass was revealed on magnetic resonance imaging (MRI) in 2 cases. Excision of the mucocele was performed. Contents were sterile in all patients. Postoperative follow-up was uneventful.

Conclusion: Although benign and slow growing, mucoceles can compromise vital and visual prognosis due to their extensions. Management involves otolaryngology and/or neurosurgical interventions.

Keywords: frontal mucocele, exophthalmos, mucosectomy, orbital extension.

---

## Introduction

Mucoceles are benign, slow-growing tumors with osteolytic potential, developed at the expense of the mucosa of the facial sinuses. They are pseudocystic formations with mucoid content rich in epithelial desquamation (1). They commonly develop in the frontal sinuses and are primarily unilateral (2). Although benign, mucoceles can cause complications related to their intracranial and orbital dissemination (3). They can potentially compromise life and visual function (4, 5). The etiologies of mucoceles are multifactorial but can be separated into obstructive, inflammatory, and allergic causes (1). We present the management, clinical and radiological aspects of 4 cases of mucoceles.

## Clinical cases

### Case n°1

A 46-year-old male consulting for a painless frontal mass that had been progressively growing for 3 years. The patient had a history of chronic frontal sinusitis for about twenty years. Physical examination revealed a soft frontal-orbito-latero-nasal right mass fixed to the deep plane with healthy overlying skin (Fig. 1A). There was a right unilateral non-axial exophthalmos without visual disturbances, oculomotor disorders, or fever. A cerebral CT scan revealed an isodense mass filling the frontal sinuses associated with frontal osteolysis of the lamina papyracea and the roofs of the orbits, with an extension of the mass into the right orbit. A drainage of the mucocele, sinus mucosectomy, and cranioplasty were performed (Figs. 1B-E).

Mycological and bacteriological examination of the mucocele content was sterile. Postoperative follow-up was uneventful.

### Case n°2

A 46-year-old man had progressive right exophthalmos, with no visual disturbances. The patient had a history of surgery for resection of a left frontal bone tumor with cranioplasty. Physical examination found non-axial exophthalmos without oculomotor disturbance. Orbital MRI revealed a right frontal-orbital ovoid mass hyperintense on T2 weighted imaging (Fig. 2). Excision of the mucocele and mucosectomy of the frontal sinuses were performed. Culture of mucocele contents was sterile.

### Case n°3

A 54-year-old patient who was consulted for progressive downward and outward displacement of the left eyeball, associated with decreased visual acuity. The patient had no medical history. Physical examination revealed unilateral non-axial left exophthalmos without oculomotor impairment. MRI revealed a left frontal mucocele (Fig. 3). Excision of the mucocele was performed. Postoperative follow-up was uneventful.

### Case n°4

A 54-year-old patient consulted for progressive appearing fluctuating frontal mass with intercanthal extension (Fig. 4A). The overlying skin was healthy, and the mass was fixed to the deep plane. The patient had no medical history or atopic background. The CT scan revealed a right frontal mass associated with frontal bone lysis with breach of the bilateral frontal sinuses. Excision of the tumor with mucosectomy and cranioplasty was performed (Fig. 4B-C). The content sent for anatomical and bacteriological examination was sterile.

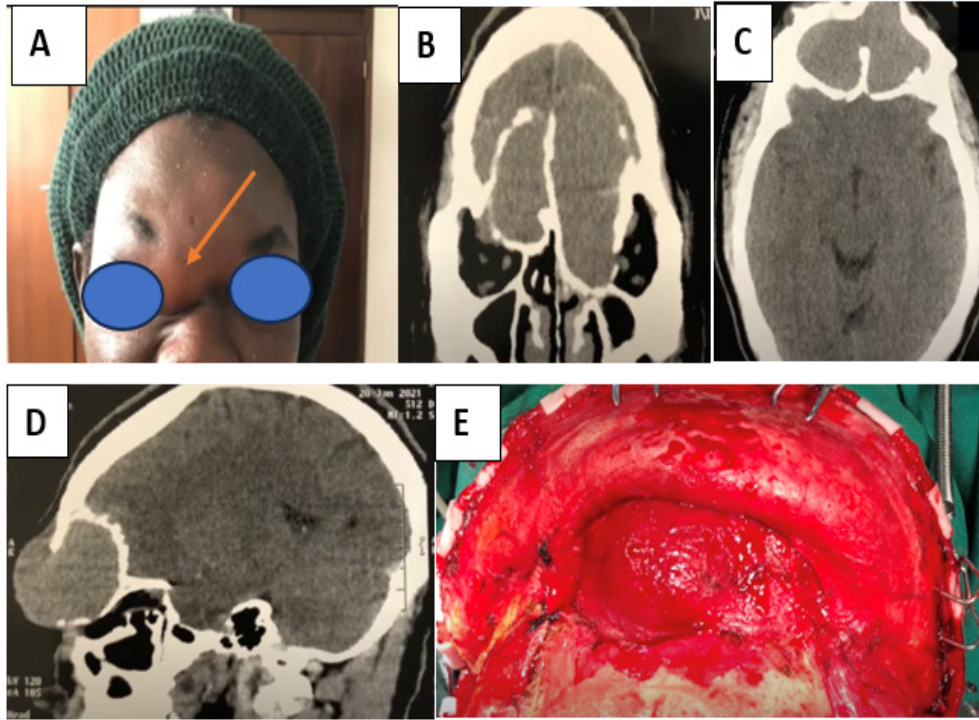


Fig. 1: Fronto-orbito-nasal mass (A); CT scan showing bilateral frontal mucoceles (B-D); Intraoperative presentation (E).

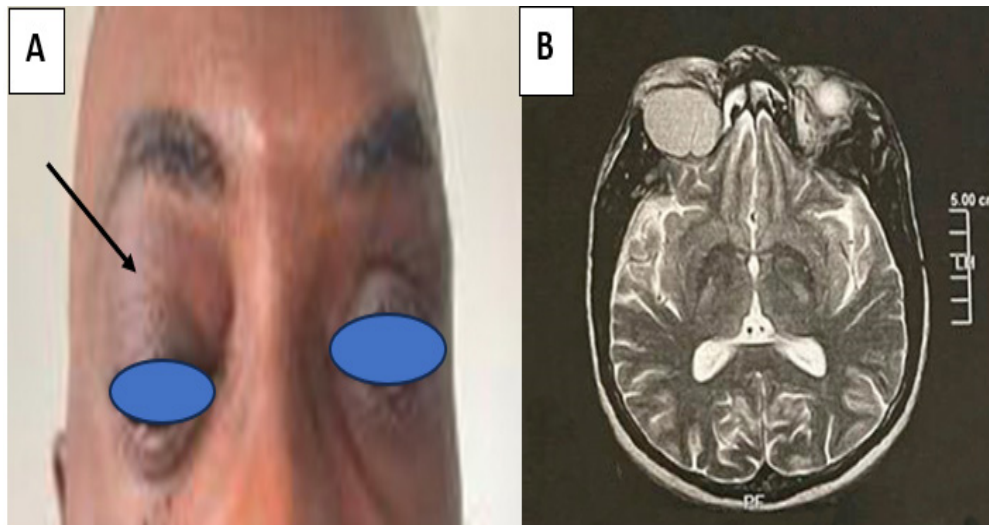


Fig. 2: preoperative exophthalmos (A); MRI appearance of an orbital mucocele on T2 weighted imaging (B).

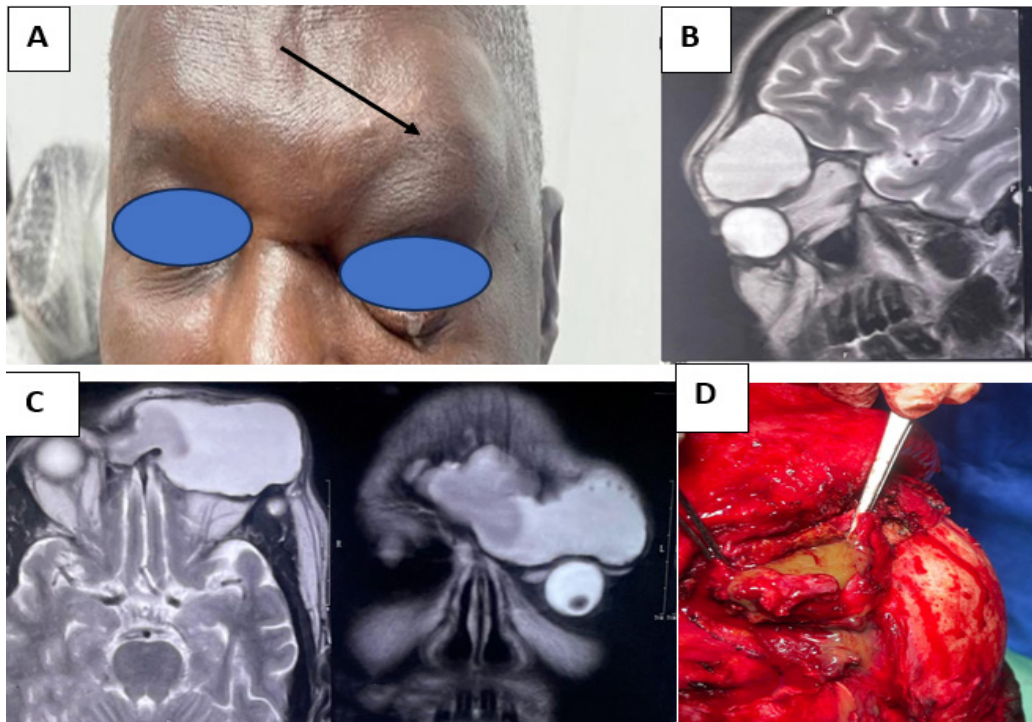


Fig. 3: Left preoperative exophthalmos (A); MRI T2-weighted images showing orbital mucocele (B, C); Intraoperative presentation of the mucocele content (D).

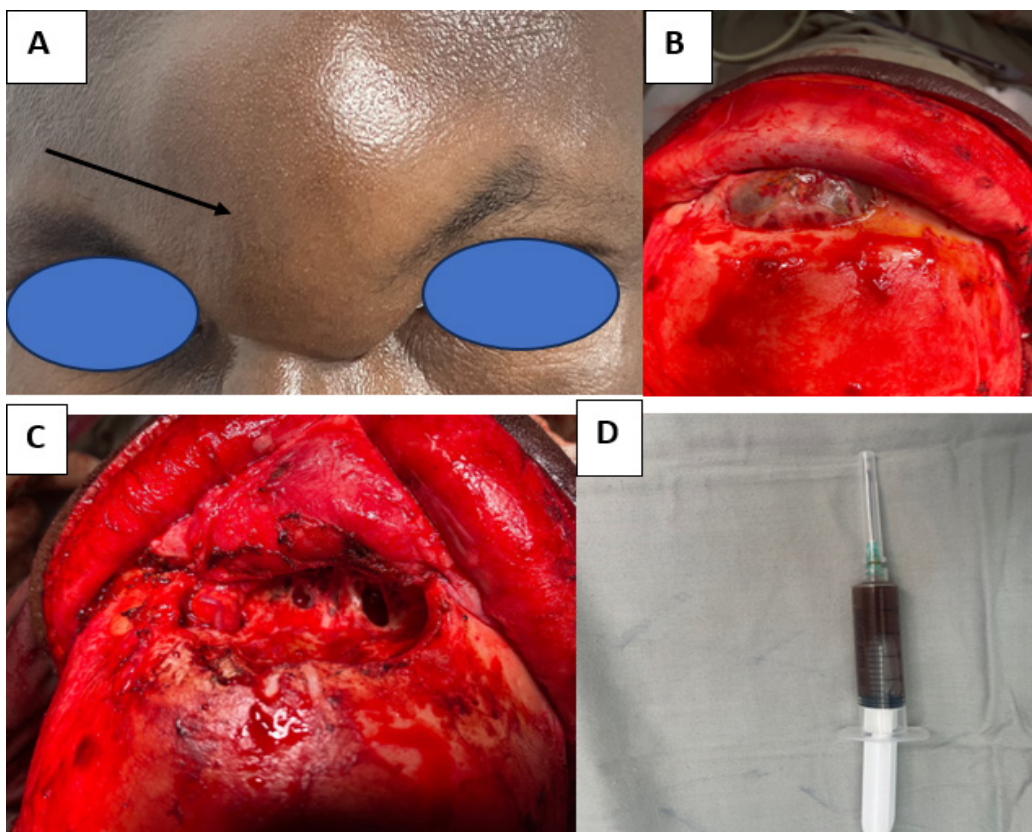


Fig. 4: Intercanthal frontal mass (A); Intraoperative presentation of the mucocele (B); Demonstration of the mucocele's osteolytic potential (C); Sampling of the mucocele content (D).

## Discussion

Mucoceles are rare benign tumors that develop within the mucosae of sinus cavities. They correspond to pseudo cystic formations with a mucoid content that is rich in epithelial cells (1, 6). Bacteriological analysis of the mucocele content frequently reveals certain pathogens such as *Staphylococcus aureus*, which is the most common, as well as alpha-hemolytic streptococcus and gram-negative bacilli, which form pyoceles (7). Mucoceles most often occur between the ages of 40 and 80 years (2, 8). All the patients in our series were aged over 40 years, with an average age of 50 years. There seem not to exist a gender predominance although all our reported cases were males (1, 2, 8). Although rare, pediatric forms of mucoceles are described in the literature (9, 10). The most frequent location of mucoceles is the frontal sinus (in 60-89% of cases), followed by the ethmoidal sinuses (in 8-30% of cases), and less than 5% in the maxillary sinuses (8). Sphenoidal forms are extremely rare (11). The osteolytic power of mucoceles is responsible for their ability to spread. They can extend intracranially by eroding the posterior wall of the frontal sinus, leading to intracranial suppuration or meningitis, or towards the oculo-orbital region by destroying the anterior cortical wall of the sinus and the orbital roof (12). The occurrence of mucoceles is related to the obstruction of a sinus ostium. This obstruction is most often due to chronic sinusitis, trauma, tumor, or congenital obstruction, or frontal-sinus surgery. In 20% of cases, no relevant past medical history is found (8, 13). In our series, two patients presented with a past medical history of chronic sinusitis and of frontal craniotomy with cranialization of the sinus for a frontal tumor resection procedure. The iatrogenic factor is present in 45% of cases in Serrano's series (8), highlighting the importance of mucosectomy in exclusion sinus procedures. Clinical manifestations depend on the localisation, size, and extensions of the mucocele (2, 8). Symptoms can include headaches, orbital signs like peri-orbital pain, diplopia, decreased visual acuity, exophthalmos, rhinological signs like

nasal obstruction, or neurological signs like signs of meningeal irritation, seizures, or frontal syndrome (14). Exophthalmos is the most frequent sign of fronto-ethmoidal localizations (8, 15), presenting as non-axial, slightly reducible, and non-pulsatile exophthalmos. Three of the patients in our series presented exophthalmos accompanied by fronto-orbital resistant masses.

CT scan is the first-line imaging test for diagnosing mucocele (16). Lesions are rounded, hypodense, and do not enhance after contrast injection (6, 16). Bone erosion was observed in all our patients. Brain MRI helps assess intracranial and orbital extension and allows differential diagnosis with other tumors or inflammatory causes (16). Mucocele appears hypointense on T1 and hyperintense on T2 weighted imaging. Two patients in our series underwent complementary MRI to better visualize the tumor extension and discuss other orbital tumors.

The natural evolution of mucoceles can lead to complications, the most frequent are abscesses and the invasion of neighboring structures. It is very important to remember that frontal mucoceles can cause intracranial invasion when there is an erosion of the internal osseous table (3). The treatment of mucoceles is surgical (8, 17). The aim is to drain the mucocele and prevent recurrences. There are internal transnasal endoscopic and external transcranial approaches. The choice of technique is guided by the size, location, and extension of the mucocele (1). The endoscopic approach is currently the first choice of treatment (18), allowing marsupialization of the mucocele content, reintegrating the mucocele into the naso-sinus tract (6). Its advantages are low morbidity without leaving scars or causing destruction of the naso-sinus pathways and a very low recurrence rate (19). However, it is limited in cases of significant bone destruction (2). The transcranial approach involves excising the mucocele, sinus wall, and mucosa, and cranializing or excluding the sinus cavity from the respiratory system (2, 8). In some cases, a combined approach may be necessary (18, 19). The histopathological examination of the specimens

obtained from all our patients confirmed mucocele. It showed non-specific inflammatory connective tissue without signs of malignancy. Bacteriological examination of the mucocele content was sterile in all our samples. Postoperative morbidity of mucoceles is generally low. The small sample size and lack of long-term follow-up are the limitations of our study. The most frequently encountered complications according to Dos Santos and al (18) are infectious pansinusitis and recurrences. Recurrences occur because of inadequate marsupialization or insufficient mucosectomy (1, 18).

### Conclusion

Mucoceles are rare benign tumors forming pseudocystic structures with mucoid content rich in epithelial cells. Although benign and slow growing, they can compromise vital and visual prognosis due to their extensions. Management involves otolaryngology and/or neurosurgical interventions. The gold standard is endoscopic transnasal marsupialization, but the transcranial route remains important.

### List of Abbreviations

CT: computed tomography

MRI: magnetic resonance imaging

---

### \*Correspondence :

Djiby Jean Marcel Okamon

[marcelokamon@gmail.com](mailto:marcelokamon@gmail.com)

Available online : January 31, 2026

1 : Department of Neurosurgery, Université Félix Houphouët Boigny, Abidjan, Ivory Coast

2 : Department of Neurosurgery, Université Alassane Ouattara, Bouaké, Ivory Coast

© Journal of african clinical cases and reviews 2026

**Conflict of interest :** None

### References

- [1] Aggarwal SK, Bhavana K, Keshri A, Kumar R, Srivastava A. Frontal sinus mucocele with orbital complications: management by varied surgical approaches. *Asian J Neurosurg.* 2012;7(3):135-140.
- [2] Alami F, Benchekroun N, El Berdaoui N, Oumelal J, Berraho A. Mucocèle sphénoïdale bilatérale révélée par une paralysie du nerf abducens: à propos d'un cas. *J Fr Ophtalmol.* 2013;36(5):e87-e91.
- [3] AlShakhs A, AlMomen A, Alharbi M, Almolani F, Alawadh A, Alameer M. The endonasal endoscopic management of pediatric lateral frontal mucocele. *Int J Surg Case Rep.* 2021;78:405-409.
- [4] Ba MC, Tall A, Hossini A, Ly Ba A, Ndoye N, Sakho Y, et al. Les mucocèles du sinus frontal en milieu neurochirurgical: à propos de six cas dakarois. *Afr J Neurol Sci.* 2005;24(2).
- [5] Bouatay R, Aouf L, Hmida B, El Korbi A, Kolsi N, Harrathi K, et al. The role of imaging in the management of sinonasal mucoceles. *Pan Afr Med J.* 2019;34:3.
- [6] Brook I, Frazier EH. The microbiology of mucopyocele. *Laryngoscope.* 2001;111(10):1771-1773.
- [7] Har-El G. Transnasal endoscopic management of frontal mucoceles. *Otolaryngol Clin North Am.* 2001;34(1):243-251.
- [8] Lund VJ. Anatomical considerations in the aetiology of fronto-ethmoidal mucoceles. *Rhinology.* 1987;25(2):83-88.
- [9] Magboul NA, Alzubaidi AA, Abumsmar LA, Alzarei A, Al-Ahmari M, Alshehri MA. Mucocele of the paranasal sinuses: retrospective analysis of a series of eight cases. *Cureus.* 2023;15(7):e41986.

- [10] Makihara S, Kariya S, Okano M, Naito T, Tsumura M, Nishizaki K. Orbital complications of infected mucocele in the paranasal sinuses. *Auris Nasus Larynx*. 2020;47(6):990-995.
- [11] Mat CMHC, Mustapha F, Noor RM, Ramli R, Mohamad I. A rare intraorbital mass: an isolated mucocele. *Medeni Med J*. 2020;35(4):344-348.
- [12] Randriamora JTM, Andrianilana H, Rarivomanana M, Rahezaka N, Rakotovao F, Rasoavelonoro VA. Volumineuse mucocèle frontale à extension orbito-palpébrale. *J Fr Ophthalmol*. 2005;28(1):55-58.
- [13] Santos PLD, Chihara LL, Alcalde LFA, Masalskas BF, Sant'Ana E, Faria PEP. Outcomes in surgical treatment of mucocele in frontal sinus. *J Craniofac Surg*. 2017;28(7):1702-1708.
- [14] Serrano E, Klossek J, Percodani J, Yardeni E, Dufour X. Surgical management of paranasal sinus mucoceles: a long-term study of 60 cases. *Otolaryngol Head Neck Surg*. 2004;131(1):133-140.
- [15] Severino R, Severino P. Fronto-orbital mucocele with intracranial extension: a case report. *J Surg Case Rep*. 2017;2017(6):rjx107.
- [16] Siegel MJ, Shackelford GD, McAlister WH. Paranasal sinus mucoceles in children. *Radiology*. 1979;133(3):623-626.
- [17] Sigüenza González R, Pérez Fernández S, Jiménez Cuenca I, Castañeda Cruz C. Facial mucocele and brain complications: diagnostic priorities. *BJR Case Rep*. 2019;5(4):20190006.
- [18] Taouri N, Ed-Darraz I, Amazouzi A, Boutimzine N, Cherkaoui O. Mucocèle du sinus frontal: à propos d'un cas. *PAMJ Clin Med*. 2020;4:70.
- [19] Weidmayer S. Frontal mucocele with intracranial extension causing frontal lobe syndrome. *Optom Vis Sci*. 2015;92(6):e138-e142.

## To cite this article

Y Sow, I Diallo, MS Bangoura, K Kamano, AA Bah, AT Sow et al. Frontal mucocele with orbital extension: a series of 4 cases and review of the literature. *Jaccr Surgery* 2026; 2(1): 27-33

<https://doi.org/10.70065/2621.jaccrSurg.005L013101>