International Journal of Otorhinolaryngology
2025, Vol. 11, No. 1, pp. 5-8
https://doi.org/10.11648/j.ijo.20251101.12

Case Report

The Place of Ct Scan in the Diagnosis of Frontal Mucoceles: A Report on Two Clinical Cases

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Abstract

Introduction: Paranasal sinus mucoceles are benign and expansive lesions, related to the accumulation of mucus in an obstructed sinus cavity. The frontal mucocele is the most common, representing 60 to 89% of cases. Despite their benign nature, these lesions can lead to serious complications by extension to orbital or intracranial structures. Clinically, they can manifest as frontal swelling, orbital pain, exophthalmos or visual disturbances, making diagnosis difficult in the early stages. Computed tomography (CT) plays a central role in visualizing the lesion, assessing its extension and guiding management. In a resource-limited setting like Mali, its access remains crucial. This work illustrates the importance of CT through two clinical cases managed at Nianankoro Hospital Fomba of Segou. *Methodology*: This is a retrospective study of two patients treated between January 2023 and January 2025. Clinical, radiological (CT) and surgical data were analyzed. The diagnosis was based on the identification of expansive hypodense lesions of the frontal sinus with bone erosion. Both patients underwent endonasal surgery. *Clinical observations*: The first patient, 45 years old, presented with a left frontal swelling that had been evolving for 10 years. CT scan

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Received: 4 June 2025; **Accepted:** 16 June 2025; **Published:** 7 July 2025

revealed a frontal mucocele with bone lysis and early intracranial extension. Endonasal surgery resulted in a favorable outcome without recurrence. The second patient, 35 years old, followed for chronic frontal sinusitis, presented with right exophthalmos. CT scan showed a mucocele compressive fronto -ethmoidal without bone rupture. The surgical intervention resulted in regression of the signs. *Conclusion*: These cases illustrate the clinical diversity of frontal mucoceles and confirm the diagnostic value of CT, essential for early and effective management.

Keywords

Mucocele, Chronic Sinusitis, CT

1. Introduction

Paranasal sinus mucoceles are benign, slowly progressive, expansive lesions characterized by the accumulation of mucus within an obstructed sinus cavity, most often secondary to ostial obstruction. Among them, the frontal mucocele is the most common, representing approximately 60 to 89% of cases [1]. Although benign, these lesions can be responsible for serious complications due to their potential for extension to orbital and intracranial structures [2].

Clinically, frontal mucocele can present with frontal swelling, orbital pain, exophthalmos, or visual disturbances, making purely clinical diagnosis difficult, especially in the early stages. Computed tomography (CT) plays a central role in the diagnosis, allowing the lesion to be objectified, its extent to be determined, the condition of the bone walls to be assessed, and therapeutic management to be guided [3, 4]. In resource-limited areas such as Mali, access to imaging can be a challenge, which justifies the presentation of these two clinical cases illustrating the importance of CT in the diagnosis of frontal mucoceles.

The objective of this work is to highlight the decisive contribution of computed tomography in the diagnosis of frontal mucoceles through two clinical cases treated at Nianankoro hospital. Fomba of Segou.

2. Methodology

This is a retrospective and descriptive study of two cases of frontal mucoceles diagnosed and treated at the otolaryngology department of Nianankoro hospital. Fomba de S égou between January 2023 and January 2025. Data were collected from patients' medical records, including age, sex, medical history, clinical signs, imaging data (CT), treatment initiated, and outcome.

Computed tomographic examinations were performed with a multi-slice scanner, in axial, coronal and sagittal sections, with bone reconstructions and in parenchymal window. The images were interpreted by an experienced radiologist. The diagnosis of frontal mucocele was made on the basis of images showing an expansive isodense or hypodense lesion, with erosion of the bony walls and extension towards the orbit or the base of the skull. The surgical treatment was documented as well as the postoperative follow-up.

Both cases were anonymized, and the study was conducted in accordance with ethical principles.

3. Result

3.1. Clinical Observations

1. Observation 1

This is a 45-year-old patient, with no particular medical history, who consulted for left frontal swelling that had been developing for more than 10 years, associated with intermittent frontal headaches and a feeling of heaviness in the frontal sinus, intermittent bilateral nasal obstruction. Mucopurulent rhinorrhea; anosmia. These symptoms prompted treatment leading to a slight improvement.

Clinical examination revealed a non-inflammatory, painless, firm frontal swelling, fixed in relation to the deep planes, without local or general signs of infection. Hypertrophy of the nasal turbinates and the mucosa is inflamed, anteroposterior mucopurulent rhinorrhea.

A computed tomography (CT) scan of the facial mass was performed (Figures 1, 2), revealing a well-defined expansive lesion of the left frontal sinus, with homogeneous hypodense content, resulting in lysis of the posterior wall of the frontal sinus with incipient intracranial extension, without signs of empyema. Ipsilateral maxillary sinusitis with a chronic appearance. Bone involvement and deformation of the orbit were also observed. The diagnosis of uncomplicated frontal mucocele was retained.

The patient was surgically managed by endonasal approach with drainage and marsupialization of the mucocele. The postoperative evolution was favorable, without recurrence after 6 months of follow-up.

2. Observation 2

This is a 35-year-old female patient, followed for chronic frontal sinusitis, who presented with non-pulsatile exophthalmos of the right eye, accompanied by orbital pain and moderate visual disturbances.

The clinical examination revealed moderately painful right axillary exophthalmos with slight upward gaze limitation. There was no fever or associated neurological signs. The ENT examination was unremarkable.

The CT scan of the sinuses, performed subsequently (figures 3, 4), revealed grade II exophthalmos of the right eye secondary to a large hypodense process of the right frontal sinus and some adjacent ethmoidal cells. It is not enhanced by iodine contraceptive. It causes swelling without rupture of the sinus walls. There is a slight filling of the homolateral maxillary sinus. This aspect concludes to a mucocele right frontoethmoidal, with right exophthalmos.

Endonasal surgery was performed with complete drainage. The outcome was satisfactory, with regression of exophthalmos and improvement of visual disturbances.

Figure 1. *An axial slice showing a well-circumscribed expansive lesion of the left frontal sinus.*

Figure 2. *A coronal slice showing the lesion with homogeneous hyperdense content.*

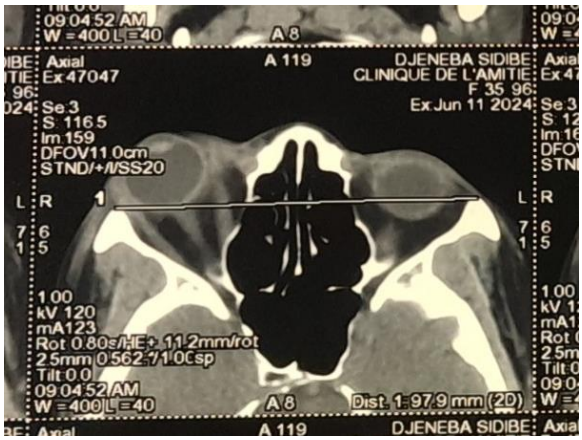

Figure 3. *Grade II proptosis of the right eye secondary to a large hypodense process of the right frontal sinus.*

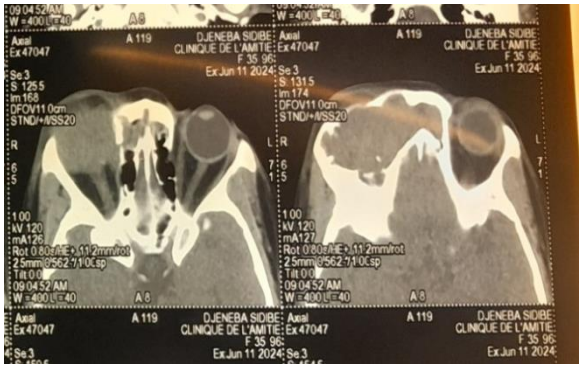

Figure 4. *An axial section showing adjacent ethmoidal cell filling with axial exophthalmos.*

3.2. Discussion and Comments

Mucoceles are benign expansive lesions of the paranasal sinuses, characterized by the progressive accumulation of mucus due to obstruction of the sinus drainage orifices. They are most often located in the frontal sinuses, followed by the ethmoid sinuses [5, 6]. The two reported observations illustrate clinical forms suggestive of frontal mucocele, with different clinical pictures depending on the anatomical extension of the lesion [6].

In the first observation, the patient presented with a decade-long frontal swelling, accompanied by signs of chronic sinusitis: headache, frontal heaviness, mucopurulent rhinorrhea, and anosmia. This clinical presentation is typical of an evolving frontal mucocele with slow progression [7]. The absence of general infectious signs or pain suggests an uncomplicated form. However, the visible frontal deformity and nasal disturbances are indicative of advanced disease. Computed tomography, which is not explicitly described in this case, would probably have revealed an expansive lesion eroding the sinus walls, as is often observed in long-standing mucoceles [8].

In the second observation, the symptomatology was dominated by right exophthalmos, orbital pain and moderate

visual disturbances. These signs reflect an orbital extension of the mucocele, which is more frequent in fronto -ethmoidal locations [9]. CT imaging confirmed the expansive nature of the lesion, without contrast uptake, and without signs of infectious complication (empyema or abscess). The absence of bone rupture but presence of a swelling of the walls shows early bone involvement, often reported in the literature [10].

The diagnosis of mucocele is based mainly on imaging, particularly CT scans, which allow visualization of the lesion, assessment of its extent and the condition of the sinus walls [11]. MRI can be complementary, particularly to assess the relationships with intraorbital and intracranial structures [12]. In both reported cases, CT was decisive for diagnosis and treatment planning.

The treatment of mucoceles is surgical. The endoscopic approach is currently the technique of choice, allowing effective marsupialization and restoration of sinus drainage with a low recurrence rate [13]. However, in forms with significant extension, an external approach can be considered [14]. The two cases described justify surgical management to avoid serious complications such as meningitis, cerebral empyema or visual loss [15].

4. Conclusion

These observations highlight the variability of clinical presentations of frontal mucoceles and highlight the importance of imaging, particularly computed tomography, in the diagnosis and assessment of lesion extension. Early surgical management can prevent severe complications.

Abbreviations

ENT	Ear, Nose, and Throat (Otorhinolaryngology)
CT	Computed Tomography

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Konne S, Banabila N, Menye P, et al. Mucoceles of the paranasal sinuses: a report of 12 cases. *Health Sci Dis.* 2020; 21(9): 45-49.

[2] Courvoisier DS, Borruat FX, Lovblad K, et al. Mucocele Fronto - ethmoidal: diagnosis and treatment. *Rev Med Suisse.* 2012; 8(337): 1626-1629.

[3] Zouaoui A, Belyamani L, El Bouhmadi K, et al. Sinus mucoceles: role of computed tomography. *J Radiol.* 2005; 86(6): 635-640.

[4] Schaefer SD. The treatment of frontal sinus mucoceles: minimally invasive procedures. *Oper Tech Otolaryngol Head Neck Surg.* 2006; 17(1): 28-31.

[5] Hauser R, Wende W, Pirsig W. Pathogenesis of frontoethmoidal mucoceles. *Laryngolith Rhinol Otol (Stuttg).* 1987; 66(4): 195-198.

[6] Lund VJ, Milroy CM, Beale T. Frontoethmoidal mucoceles: has histopathological analysis. J Laryngol Otol. 1991; 105(5): 342-345. https://doi.org/10.1017 /S0022215100115901

[7] Kantarci M, Karasen RM, Alper F, et al. Primary paranasal sinus mucoceles: CT and MRI findings. Diagn Interv Radiol. 2005; 11(3): 145-150.

[8] Natvig K, Larsen TE. Mucocele of the paranasal sinuses: A retrospective clinical and histological study. J Laryngol Otol. 1978; 92(12): 1075-1082.

[9] Kennedy DW. Prognosis factors, outcomes and staging in ethmoid sinus surgery. Laryngoscope. 1992; 102 (Suppl 57): 1-18.

[10] Lee TJ, Huang SF, Chang PH, et al. Transnasal endoscopic marsupialization of frontoethmoidal mucoceles: analysis of patient satisfaction. Otolaryngol Head Neck Surg. 2006; 134(4): 657-660.

[11] Yadav SP, Gulia JS, Chauhan A, Goel HC. Primary frontal sinus mucocele: a case report. Ear Nose Throat J. 2006; 85 (8): 514-516.

[12] Courvoisier DS, Turgeon C, Theriault E. Imaging of paranasal sinus mucocele and mucopyocele: Comparison of CT and MRI. J Otolaryngol Head Neck Surg. 2018; 47(1): 63.

[13] Castelnuovo P, Valentini V, Giovannetti F, et al. Endoscopic management of paranasal sinus mucoceles: A 12-year experience. Am J Rhinol. 2000; 14(6): 377-381.

[14] Har -El G. Endoscopic management of 108 sinus mucoceles. Laryngoscope. 2001; 111(12): 2131-2134.

[15] Weber R, Draf W, Keerl R, et al. Osteoplastic frontal sinus surgery with fat obliteration: technique and long- term results using magnetic resonance imaging in 82 patients. Laryngoscope. 2000; 110(6): 1037-1044.