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Giant frontal mucocele presenting with displacement of the eye globe

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ABSTRACT

In this case, a 70-year-old female patient presented with large forehead swelling that occurred 2 years prior, with slow progressive enlargement that mimicked the behavior of a neoplasm. There was severe inferior displacement of the right orbital globe to the level of the nares. Brain computed tomography showed a large expansive lesion in the right frontal sinus with bony wall thinning without destruction or erosion. Brain magnetic resonance imaging showed high signal intensity of the contents in T1- and T2-weighted images with only peripheral enhancement after contrast administration. These features were consistent with a typical right frontal mucocele.

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Introduction

A frontal mucocele consists of distension of the frontal sinus due to accumulation of mucoid secretion and epithelial cells with thinning of its bony wall due to obstruction of the sinus drainage [1]. A frontal mucocele presents with various clinical manifestations such as periorbital swelling, ptosis, proptosis, and inferior displacement of the orbital globe with diplopia [2]. Frontal and ethmoid paranasal sinuses are the most commonly affected sinuses (70%-90%), and young adults (aged 20-40 years) are the most commonly affected age group, with a slight predilection to male patients but no significant difference according to gender.

Radiologic investigation is essential to diagnose the mucocele. Computed tomography (CT) shows an expansive

homogeneous sinus mass with thinning and remodeling of the bony wall of the sinus, but bone destruction is uncommon. Magnetic resonance imaging (MRI) is superior to CT in differentiating a mucocele from soft tissue neoplasms and identifying its relationship with adjacent soft tissues as the brain and orbit.

Chronic mucoceles show high signal intensity (SI) contents on T1-weighted images (T1WIs) with peripheral enhancement after administration of gadolinium and show intermediate SI contents on T2-weighted images (T2WIs) [3].

Mucocele shows continuous expansion with increasing pressure due to continuous secretion and accumulation of mucus that may lead to erosion and extension into the adjacent orbit, nose, skin, or intracranial extension [4].

This case study was aimed at documenting typical radiological features of giant frontal mucoceles presented as a rare

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Fig. 1 – CT of the brain shows an approximately 10 × 9-cm well-circumscribed expansive mass in the region of the right frontal sinus that has contents of similar attenuation to that of brain tissue. CT, computed tomography.

massive right frontal swelling causing a strange displacement of the orbital globe that reached the level of the nares.

Case report

A 70-year-old woman was referred to the medical imaging department with large swelling in the right frontal region of the head that started as a small swelling above the right eye 2 years prior. The mass slowly and gradually increased in size, causing progressive proptosis with loss of vision. Severe inferior displacement of the right eye was observed reaching the level of the nares, giving the appearance of a giant neoplasm.

The patient was evaluated by CT of the brain. CT revealed a mass in the right frontal sinus of about 10 × 9 cm in the maximal transverse dimensions with homogeneous contents and expansion and thinning of its bony wall without cortical destruction or extension into the adjacent brain tissue. The contents inside the lesion were homogeneous with intermediate attenuation on CT (Fig. 1). After contrast administration, peripheral enhancement of the lesion was noted with no enhancement of the contents and no evidence of vascularity (Fig. 2). The appearance is typically consistent with fluid contents.

T1-weighted MRI showed high SI contents filling the swelling that revealed peripheral enhancement after gadolinium administration (Figs. 3-5). The contents appeared as high SI on T2WI (Fig. 6). The lesion was observed to have no connection with the brain tissues, and there was thinning of the bony wall of the sinus without bone destruction. The findings were consistent with a typical case of right frontal mucocele. Informed consent was given by the patient provided that the identity and photograph would not be revealed.

The patient underwent endoscopic sinus surgery by the otorhinolaryngologist with the presence of the ophthalmologist



Fig. 2 – Contrast-enhanced CT of the brain shows a well-circumscribed expansive mass in the region of the right frontal sinus whose content showed no enhancement and no vascularity. CT, computed tomography.

and neurosurgeon. After surgery, the patient was stable with no improvement in vision.

Discussion

Frontal mucocele is a benign pseudocystic lesion that occurs as a result of obstruction of the sinus ostium, causing progressive accumulation of mucus secretion inside the sinus cavity. Frontal sinus mucocele is the most common site of



Fig. 3 – Sagittal T1WI shows a large expansive lesion in the region of the right frontal sinus with high SI content with a significant mass effect, significant displacement of the right orbital globe, and severe compression of the brain and surrounding tissue. SI, signal intensity; T1WI, T1-weighted image.

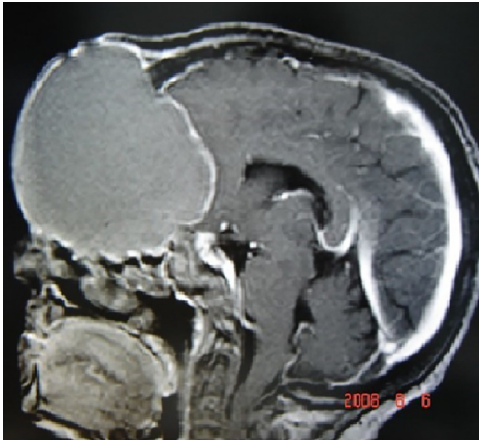


Fig. 4 – Sagittal T1WI after gadolinium administration reveals a large expansive lesion in the region of the right frontal sinus with intermediate SI content showing only peripheral enhancement with no vascularity inside it. SI, signal intensity; T1WI, T1-weighted image.

mucocoeles; Lee et al. [5] reported that the frontal and ethmoid sinuses are the most common sinuses affected by mucocoeles.

No previous case report has described the size of mucocoeles as giant. However, the giant is variant, and most cases have considered a mucocoele as giant when it causes intraorbital and intracranial extension [6]. Thus, this case was considered a giant mucocoele. Similar to this case, Weidmayer reported a large right frontal sinus mucocoele that protruded in the right orbit and

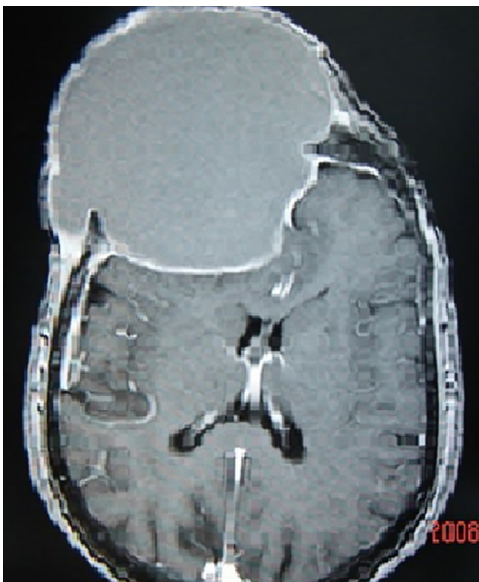


Fig. 5 – Axial T1WI after gadolinium administration reveals a large expansive lesion in the region of the right frontal sinus with intermediate SI content showing only peripheral enhancement with no vascularity inside it, causing a significant mass effect mainly on the right cerebral hemisphere. SI, signal intensity; T1WI, T1-weighted image.

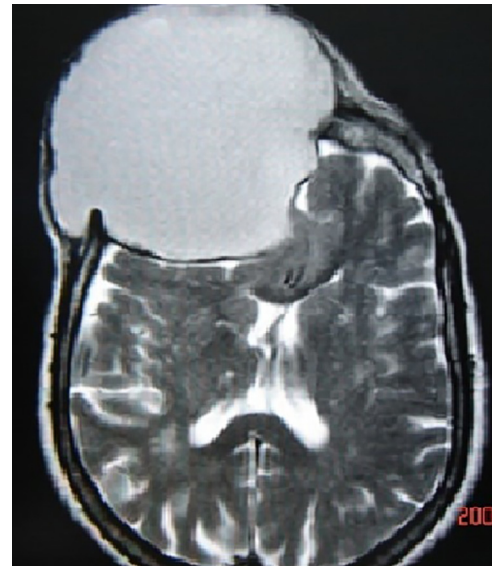


Fig. 6 – Axial T2WI of the brain shows a large well-circumscribed expansive mass in the right frontal sinus with a high SI content and a significant mass effect on the brain tissue without an obvious connection to the cerebral tissue. SI, signal intensity; T2WI, T2-weighted image.

frontal lobe of the brain, causing mass effect that resulted in frontal lobe syndrome [7].

Giant frontal mucocoeles (GFMs) are uncommon paranasal sinus lesions that usually affect middle-aged individuals [8]. The age of the female patient in this study was 70 years.

The presentation of the case in this study was obvious swelling and proptosis with a severe inferior displacement of the right orbital globe. The complications of GFM were the loss of vision and severe compression of the brain tissue. This is similar to previous cases, which were presented as decreased visual acuity, proptosis, diplopia, and periorbital swelling [8,9].

CT is essential for demonstrating the anatomic details of the mucocoele and delineating its extension to the surrounding organs. The most critical function of CT is determining bony erosions or destruction [10,11]. In the current case, CT demonstrated expansion and thinning of the bony wall of the frontal sinus without any erosion or damage.

MRI is superior in demonstrating the relationship of the mucocoele to neighboring soft tissue and in the differentiation from other soft-tissue neoplasms. In the present case, the contents of the lesion appeared as intermediate to high SI on T1WI with peripheral enhancement after contrast administration. The intermediate SI on T1WI is attributed to the high contents of protein. The lesion appeared on T2WI as high SI, which is attributed to a decrease in the amount of fluid. These findings were, to some extent, consistent with previous reports that studied the paranasal sinus mucocoele [12,13].

In the current case, the contents of the swelling were of intermediate SI in T1WI with peripheral enhancement after gadolinium administration and of high SI on T2WI. These findings are similar to those of Tsitouridis et al. [14] who reported that mucocoeles have low to intermediate SI in T1WI with linear peripheral enhancement after contrast administration and high SI in T2WI.

Conclusion

Frontal and ethmoidal paranasal sinus pathologies are important causes of orbital problems. Frontal mucoceles usually present with visual problems such as diplopia, decreased visual acuity and proptosis. In this case, the mucocele presented with severe inferior displacement of the eye. The case highlighted the important role of CT and MRI to confirm the clinical diagnosis.

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