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Case Study

An unusually large right frontoethmoidal mucocele

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Mucocele as a space occupying lesion is disturbing, especially, when expanding within the potential space in the nose with attendant pressure necrosis and consequent respiratory embarrassment. Bilaterality makes it worse. Good imaging evaluation goes a long way to assist the clinician in management in order to achieve a better outcome. This was a case of a huge right sided frontoethmoidal mucocele with associated ipsilateral visual loss in a 70-year old woman. The lesion had been growing gradually for about four years. The diagnosis was initially made using plain radiographs and Magnetic Resonance Imaging (MRI) of the paranasal sinuses and this was latter confirmed intraoperatively during radical frontoethmoidectomy and enucleation of the right eye. Though, mucocele has a number of imaging features of which none is particularly unique, imaging features when taken together with clinical findings will help in better clinical evaluation.

Key words: Frontoethmoidal mucocele, imaging, challenges.

INTRODUCTION

Mucocele is an epithelial lined mucus-containing sac completely filling paranasal sinus. It occurs when there is obstruction to the outflow of a sinus. This obstruction may be due to congenital anomaly, infection, trauma, allergy, neoplasm or surgical procedures in the nose (Lund and Milroy, 1991). With continued secretion and accumulation of mucus, the increasing pressure causes pressure necrosis of the bone of the sinus, allowing the mucocele to expand in the path of least resistance. This expansion may occur inside the orbit, adjacent sinuses, nasal cavity or through the skin (Benninger and Marks, 1995). Frontal sinus mucocele may be so large as to extend into the ipsilateral ethmoidal sinus (Lund and Milroy, 1991; Benninger and Marks, 1995).

This report is a case of a 70-year-old woman with unusually large mucocele involving the right frontoethmoidal sinuses and the ipsilateral orbit.

CASE REPORT

This is a report of a case of a 70-year-old woman who presented at the Ophthalmology Clinic of University of Maiduguri Teaching Hospital (UMTH), Maiduguri, with swelling of the right side of the face for a period of four years. The swelling was insidious on the onset and progressively increased from the right aspect of the forehead. There was no known aggravating factor. There was a positive associated history of visual loss, eye discharge and hearing loss on the right side. There was a past history of recurrent nasal discharge which was always treated by self medication. History of facial pain could not be ascertained and no anteceding facial trauma, headaches, fever, chills, nausea, vomiting and neck stiffness. Past surgical, family and social histories were non-contributory.

Physical examination of the patient revealed an elderly woman, not in obvious distress, not pale, anicteric, no finger clubbing and no peripheral lymphadenopathy. Essential findings on examination were on the face: a huge disfiguring mass involving the frontal, temporal and nasal aspect of the right side of the face displacing the eye downwards and outwards (Figure 1). The mass was firm in consistency. Her visual acuity showed no light perception in the right eye and hand motion in the left eye. Ocular movements were normal. The patient had an afferent pupillary defect in the right eye. Fundoscopy

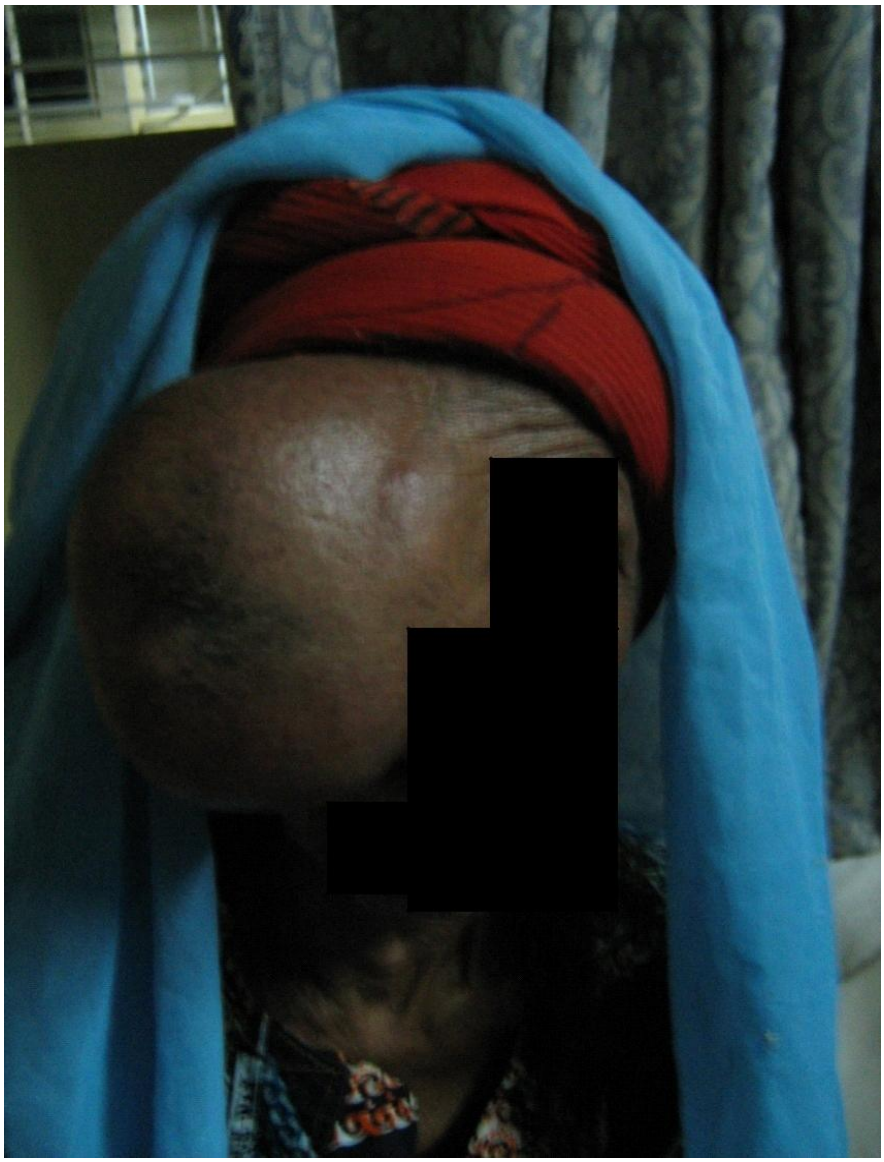

Figure 1. Picture of a 70-year-old woman with a huge mass involving the right half of the face.

revealed optic atrophy in the right eye.

The central nervous systems, cardiovascular, chest, abdominal and musculoskeletal examinations were essentially normal. Packed cell volume (PCV), white blood cells, platelets, electrolytes and urinalysis values were within normal limits. A provisional diagnosis of a right frontoethmoidal mucocele to rule out haemangioma was made.

Plain skull radiographs: occipitomental, occipitofrontal and lateral views (Figures 2 and 3), showed a large expansile soft tissue mass involving the right anterior lateral half of the face. There was associated erosion and sclerosis of the medial wall of the ipsilateral orbit and the frontoethmoidal sinus along with sclerosis of the floor of the anterior cranial fossa. No calcification was seen within the mass. However, linear fragments of bones were seen within the mass. The right maxilla was also sclerosed. The margins of the right antrum were intact, though opaque and size reduced as compared to the contralateral antrum. There was a near obliteration of the right nasal cavity. The nasal turbinates on the contralateral side were engorged. Computed Tomography (CT) and ultrasound were not done for some logistic reasons. Magnetic Resonance Imaging (MRI): axial, coronal and sagittal images of the brain and sinuses showed a hyperintense huge oval soft tissue mass with associated destruction of medial walls of the right frontal and ethmoidal sinuses. Extension of the

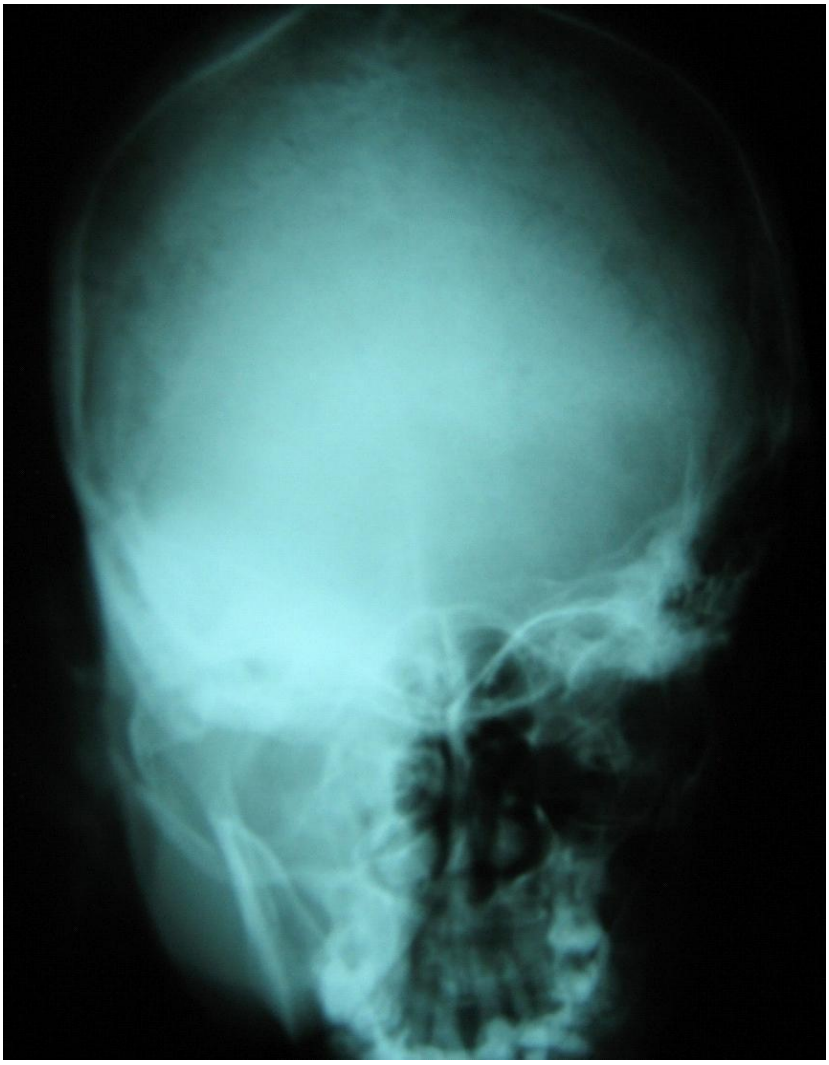

Figure 2. Frontal plain skull radiograph of the patient showing an expansile soft tissue mass involving the right anterior half of the face (black arrow).

mass into the nasopharynx was noted along with protrusion of the right eye. The walls of the ipsilateral antrum were thickened and appeared hyperintense on T2-weighted images. The sinuses on the contralateral side were normal. The brain parenchymal and the ventricular systems were also normal (Figures 4 and 5). A diagnosis of the right frontoethmoidal mucocele was made. The patient was referred to the Department of Otorhinolaryngology for surgical intervention.

Extended radical frontoethmoidectomy with enucleation of the right eye was done and an osteoplastic flap was raised to cover the potential cavity left behind. The sac and the content were sent for histopathological analysis, microscopy, culture and sensitivity. The culture of the content yielded no bacterial growth. The histopathology of the sac revealed findings consistent with mucocele. The patient made an uneventful recovery and was discharged two weeks post-operative. She was asked to come back for a follow-up visit to the Otorhinolaryngology clinic after a fourth night. Unfortunately, due to financial reasons, she declined to have postoperative imaging for check-up in order to assess the success of the surgery.

DISCUSSION

Mucocele can develop in any of the paranasal sinuses with 65% frontal, 25% ethmoidal and 10% maxillary antrum, though mucocele of the sphenoid sinus is rare (Chavda and Olliff, 2007). Besides, frontal sinus involvement can occur with ethmoidal but bilateral involvement is not common (Arrue et al., 1998). This case report was that of unilateral frontoethmoidal mucocele.

The true incidence of mucocele in the general population is not known. This may not be unrelated to its relatively uncommon nature. It is, however, generally

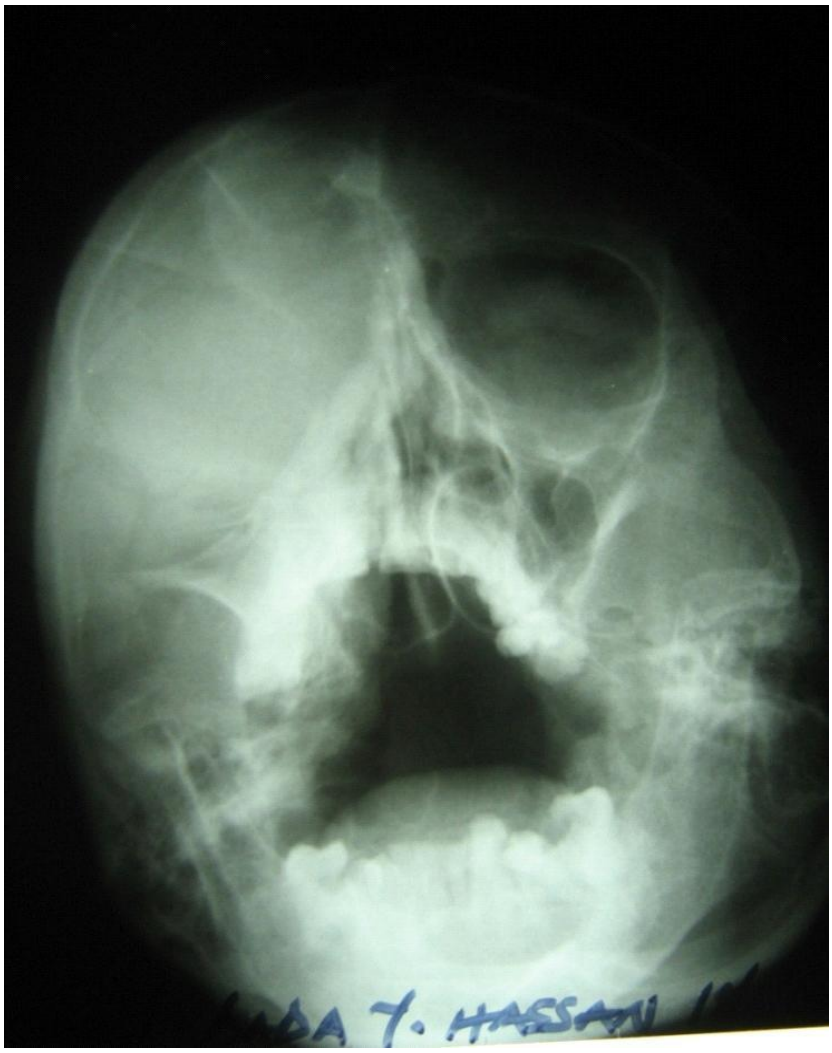

Figure 3. Occipitomental view of the plain radiograph of the skull (occipitomental view) of the patient showing the soft tissue mass with associated erosion and sclerosis of the medial wall of the right orbit and the frontoethmoidal sinuses (black arrow).

documented that mucocele occurs slightly more in males than in females and in patients whose age ranged between 40 and 70 years (Lund, 1997). Although there are reports of mucocele in a 5 months old child and also in an elderly patient of 87 years (Lund, 1997; Cicco et al., 2005), the patient being reported was a 70-year-old female.

Mucocele is the most common expansile lesions of the paranasal sinuses. The expansion, as in this case, may take place over many years or occur rapidly when secondary bacterial infection produces a pyocele (Chavda and Olliff, 2007; Jaswal et al., 2008). It encroaches on the orbit from all sinus sites, though ethmoidal mucocele is more commonly associated with proptosis and, in some patients, epiphora. This occurs when the expansion impinges on the lacrimal sac (Benninger and Marks, 1995; Chavda and Olliff, 2007). Other varieties of symptoms and signs which the patients may present with as a result of the expansion and compression include: enophthalmia, diplopia, loss of vision, facial pain, headache or nasal obstruction (Benninger and Marks, 1995). This patient presented with complaints of right visual loss, eye discharge and hearing loss. The hearing loss may be due to presbycusis.

Apart from encroaching on the orbit, intracranial extension may occur in some severe cases with resultant meningitis and raised intracranial pressure (Lund, 1997; Molteni et al., 2003; Odebode et al., 2005). These features were, however, not seen in this patient.

Certain expansile lesions of paranasal sinuses like nasal polyposis, neoplasia and mucus retention cyst may share similar features with mucocele. Imaging findings

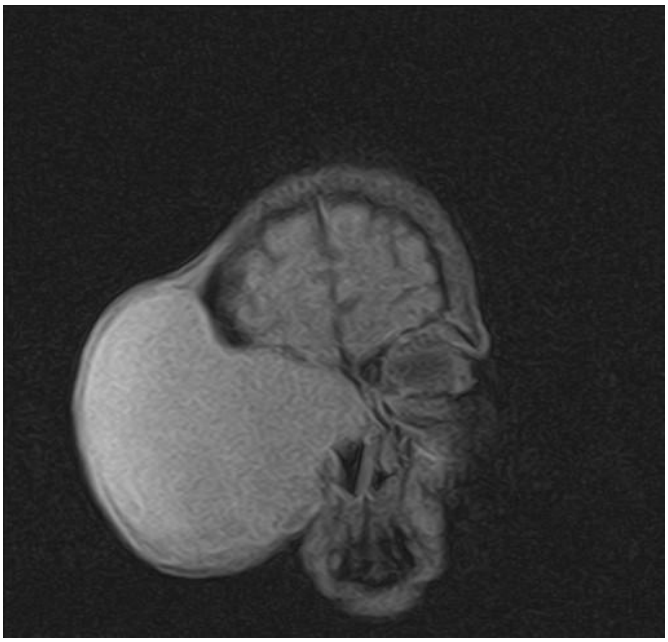

Figure 4. T1-weighted image of the coronal view showing the mass (black arrow) to be homogenously hyperintense with involvement of the right orbit and frontoethmoidal sinus. There is associated compression of the nasal septum to the contralateral side.

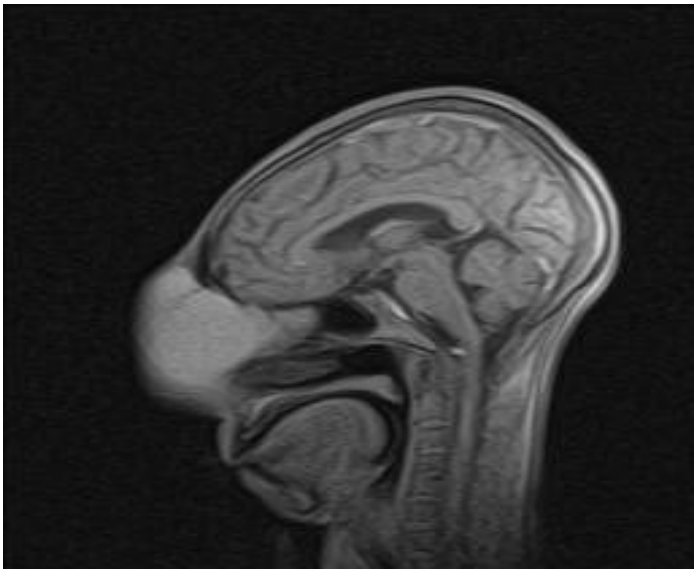

Figure 5. T1-weighted image of the sagittal view showing the mass extending into the nasopharynx (black arrow). The brain parenchyma and ventricular system are normal.

along with clinical history and laboratory findings are necessary in differentiating these lesions. On plain films, the mucocele may appear as a clouding of the involved sinus. The normal thin mucoperiosteal white line becomes attenuated. Dense reactive bone may surround an involved sinus. The sinus may be expanded, and the normal scalloping of the larger sinus may be effaced (Lund, 1997). Although this present case was a large frontoethmoidal mucocele, some of these features were evident in the plain radiograph of this patient. In addition, there was erosion and sclerosis of the medial wall of the right orbit and the right frontoethmoidal sinuses. Other imaging modalities of diagnostic value in the management of mucoceles include Ultrasound Scan (USS), Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) (Dahnert, 1999). However, USS and CT were not used in this case under study. This is because at the time the patient presented in our hospital, these modalities were not in order. USS may demonstrate the mucocele as a homogenous hypoechoic mass, while CT will not only demonstrate the mass but will also confirm those features as seen on plain radiographs. Furthermore, a post contrast CT will demonstrate a pyocele as a ring enhancing lesion (Chavda and Olliff, 2007).

In the radiological evaluation of mucocele, MRI is the optimum imaging modality as any intracranial and intraorbital extension can be assessed before surgery. On MRI, mucocele will show varying signal intensities on T_1- and T_2-weighted images according to the protein content (Chavda and Olliff, 2007; Dahnert, 1999). A high signal on T_1- and an iso-signal intensities on T_2-weighted images was seen in the MRI.

In conclusion, mucocele has a number of imaging features of which none is particularly unique. This is more so if the mucocele is huge in size. However, these imaging features when taken together with clinical findings may help the clinician in arriving at the appropriate diagnosis and implementing good definitive treatment.

SUMMARY

A case of a 70-year-old woman with a huge right frontoethmoidal mucocele was presented. The role of imaging in the management of this condition was discussed. The patient had surgery and was discharged home . She is presently on follow-up in the out-patient department.

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