Abstract:
Frontal sinus mucoceles can present with a multitude of different symptoms including ophthalmic disturbances, even though benign they have a tendency to expand by eroding the surrounding bony walls. They displace and destroy structures by pressure and bony erosion. A 60 year old female with proptosis of the right eye and headache with watering attended the OPD. On investigation, she was found to have isodense extraconal lesion in the right orbit with erosion of roof of orbit. She underwent surgery and found to have infected mucocele presenting as proptosis and skull erosion.

Keyword: Frontal mucocele, Proptosis, Open sinus surgery

Introduction:
Mucocele is a chronic expanding mucus lined lesion of the paranasal sinuses, characterized by mucus retention that can be infected becoming a muco pyocele and on palpation there can be eggshell crackling. They may originate from the obstruction of the sinus ostium by congenital abnormalities, infection, allergy, tumor (either osteoma or a malignant SOL) and trauma including surgery. Though benign they have a tendency to expand by eroding the surrounding walls like a malignant lesion that displace and destroy structures by pressure and bony erosion. The frontal sinus is the most commonly affected site followed by ethmoid sinus. Symptoms and Signs from frontal mucocele include pain, swelling, exophthalmos, diplopia, loss of vision. Erosive mucocele may lead to meningitis, meningoencephalitis, pneumocephalus, brain abscess, seizures and CSF fistula. They are benign lesions that occur with similar frequency in adults of both sexes and they are rare in children less than 10 years. A mucocele appears on imaging as an expansile lesion in airless sinus with thickening and sometimes erosion of bony walls.
CT has proven to be an excellent diagnostic tool and essential in surgical planning. MRI may provide additional information in the examination of the orbit and may be preferred imaging technique, if other soft tissue tumors causing proptosis cannot be excluded.

**Differential Diagnosis:**
Includes PNS carcinoma, aspergilloma, chronic infection, or an inverted papilloma. The most common modality of treatment is excision of the mucocele.

**Case Report:**
60 years old female patient presented with complaints of watering of the right eye 3 months duration, on and off headache – 3 months duration and proptosis for same duration with no features of ICT. There was no constitutional symptoms. On examination patient is conscious, oriented. Vision is normal in both eyes i.e 6/6 in both eyes. Pupils 3mm bilaterally reacting to light equally. Extra Ocular movements are normal in left eye. On right side, there was mild upgaze restriction with proptosis. Proptosis was not increasing during coughing/ sneezing or with URI (proptosis was not measured clinically). Fundus was normal on both sides. Spinomotor system was normal. Cardiovascular and respiratory system were also normal.
The above pictures are the clinical photos of the patient showing Right proptosis. The Xray does not show any significant abnormality. So CT orbit was taken

**CT Orbit:**
There was a isodense lesion of size 4 X 3 cm with enhancement of the wall in the right frontal sinus with extension into the superolateral aspect of the right retroorbital region causing proptosis of right eye.

CT Brain and orbit -- plain and contrast shows isodense lesion of size 4 X 3 cm with enhancement of the wall in the right frontal sinus with extension into the superolateral aspect of the right retroorbital region causing proptosis of right eye.

**Impression:**
· Right frontal sinus mucocele · Orbital metastasis

**Surgery:**
Patient underwent surgery – Frontal sinus exenteration and excision of mucocele through bicoronal cosmetic flap. Peroperatively the mucocele was found to be infected.
Intraoperative pictures showing pus coming out of infected frontal mucocele

**Microbiology:**
Staphylococci aureus grown in culture which was sensitive to Penicillin, Erythromycin, Ciprofloxacin.

**Staphylococci aureus grown in culture**

**Post-operative:**
Proptosis regressed immediately following surgery. Patient was treated with appropriate antibiotics. Postoperative imaging showed no residual or recurrent mucocele. Patient improved and discharged from the hospital. She has been on regular follow up for 6 months without any recurrence or complication till now.
Post operative clinical photo and CT showing complete resolution of mucocele and proptosis
Pathological Diagnosis:

Fig A - shows portions of pseudo stratified ciliated columnar epithelium beneath which there is fibrousseous connective tissue with calcification surrounding a cystic space lined by foamy macrophages, foreign body type of giant cells and focal lymphoid aggregates.

Fig B – shows portions of respiratory epithelium overlying calcified debris

Fig C – shows calcified mucinous material only
All these features are consistent with infected mucocele.

DISCUSSION:
Frontal sinus is the most commonly affected site. Usually frontal mucocele present as proptosis by causing bony erosion. The pathogenesis is that when the frontal recess get obstructed, there will be collection of mucus leading to the formation of mucocele. Subsequently when it is infected, there will be infiltration of inflammatory cells like lymphocytes and monocytes.
The inflammatory cascade stimulates these inflammatory cells resulting in the production of various cytokines by the lining fibroblasts. These cytokines are responsible for the bony resorption and bone remodelling. These fibroblasts also produce prostaglandin E2 and collagenase which is responsible for the osteolytic process. This results in bone erosion of the floor of the frontal sinus causing the mucocele to enter into the orbit presenting as an intraorbital lesion. Various treatment options are available.

1. Open surgery -- excision of mucocele and exenteration of frontal sinus and obliteration of frontal sinus cavity.
2. Open marsupialisation of the mucocele wall.
3. Endoscopic endonasal aspiration of the mucocele.

Endoscopic endonasal marsupialisation of mucocele. Of all the above treatment options, open surgical excision of frontal mucocele and obliteration of the sinus cavity has the least recurrent rate though it gives surgical scar. Endoscopic surgery has better cosmetic results but laterally placed frontal mucocele will be difficult to approach by endoscopy.

CONCLUSION:
Although mucocele of frontal sinus is relatively common, infected mucocele of frontal sinus causing proptosis and erosion of orbital wall is rare. Early recognition and management is necessary to avoid complications like erosion of the skull or orbital walls. This case study is reported because of its rare presentation with rare clinical findings.

References:
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