Giant Frontoethmoid Mucocoeles—What is the Surgical Choice

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INTRODUCTION

Mucocoeles are chronic expansile cyst like lesions of the paranasal sinuses. They contain sterile mucoid secretions and are limited by the mucosa of the affected cavity. Schaefer et al. (1981) have described mucocoele as "an accumulation of the products of secretion, desquamation and inflammation within a paranasal sinus with distension of the walls of the sinus". Prolonged obstruction of the sinus ostium frequently incites the formation of a mucocoele. The length and tortuosity of the nasofrontal duct as opposed to the shorter ostia of the other sinuses makes frontal sinus more susceptible to obstruction by trauma, inflammation and neoplasm, thus leading to mucocoele formation. (Schenck et al. 1974, Schaefer et al. 1988, Stiernberg et al. 1986). Complications arise as a result of infection or expansion of mucocoeles. Untreated mucocoeles can get infected (mucopyocoele), can spread to surrounding bone and soft tissue and can cause septicaemia. Mucocoeles that have invaded orbit or anterior cranial fossa cause complications by their mass effect. Surgery offers the only effective treatment. However the type of procedure and approach differs amongst various surgeons. We present two cases of giant mucocoeles with intracranial extension with an emphasis on various surgical options available to treat giant mucocoeles.

CASE REPORTS

Case 1

N.K. a 11 years old male child with Down's syndrome presented to Otolaryngology outpatients department with progressive proptosis

Fig. 1a

C.T. showing a large Fronto ethmoidal mucocoele expanding into anterior cranial fossa (Axial)

Fig. 1b

Computerised tomography showing a large frontoethmoid mucocoele expanding into anterior cranial fossa. (coronal)

of left eye of a 1 year duration without ocular pain or visual dysfunction. There was history of recurrent headache in the forehead. Examination revealed mechanical restriction of medial movement of the left eye. There was egg shell crackling over the left medial canthus. CT showed

C.T. showing a large mucocoele with destruction of posterior table of frontal sinus (Axial)

Fig.2b

Computerised tomography showing a large mucocoele with destruction of posterior table of frontal sinus. (coronal)

a large expansile mass predominantly involving the ethmoids and frontal sinus with marked expansion posteriorly into the anterior cranial fossa (Fig 1a and 1b). Exploration through an extended Lynch Howarth incision showed a large mucocoele that involved the ethmoids and frontal sinus with destruction of its posterior wall. The underlying dura was exposed but healthy. A complete removal of mucocoele filled with thick tenacious debris was accomplished along with mucosa. The involved cavity was packed with antibiotic impregnated gauze that maintained a wide opening into the nose. The pack was removed 3 days after surgery. The patient has been followed up for one and half years postoperatively and has been asymptomatic.

Case 2

D.S. a 54 year old male patient presented to the Otolaryngology outpatients with progressive proptosis and diplopia in the right eye of 9 months duration. This was associated with severe headache which used to subside with intermittent foul smelling discharge from the right side of the nose. Examination revealed a diffuse swelling over the supraorbital region on the right side. The swelling was non tender. The eye ball movements were restricted in the upward and medial direction with no visual dysfunction. Anterior rhinoscopy revealed presence of purulent discharge in the middle meatus. The middle turbinate was pushed medially. CT showed a large expansile mass in frontoethmoid region destroying the posterior table of the frontal sinus and extending to anterior cranial fossa. It appeared to compressed the right frontal lobe (Fig 2a and 2b). Patient was operated upon by extended Lynch Howarth approach. A large mucocoele with mucopus filling it was removed along with the diseased mucosa. The posterior table of frontal sinus was destroyed. However the underlying dura was normal. A wide communication was made between the cavity and nose to establish adequate drainage. Patient is asymptomatic without any proptosis or diplopia two years after surgery.

DISCUSSION

Rollet in 1896 first introduced the term mucocoele and defined it as : la retention dans cette cavite—a parois osseus des produits de secretion de la membrane muqueuse” (the retention within a bony cavity wall of the secretory products of the mucous membrane). There are two theories to explain the gradual enlargement of mucocoele with erosion of adjacent bone. The pressure necrosis theory states that accumulation of mucus in a closed space exerts pressure on adjacent bone, leading to necrosis of bone thus permitting mucocoele expansion. Lund (1991) proposed that mucosal inflammation results in released of PGE2 and collagenase from the lining of the mucocoele resulting in bone resorption. In the light of these observations, it becomes imperative to completely excise the mucosal walls to prevent recurrence.

Most often these patients present to the ophthalmologist for their proptosis. Headache is another prominent symptom in large mucocoeles with epidural extension. Both of our patients had headache. Headache was the most common symptom in 71% patients reviewed by Nugent et al. (1970). Bony dehiscence and exposed dura would probably explain headache in these cases. CT evaluation therefore is mandatory in such cases.

Mucocoeles of the paranasal sinuses extending into the epidural space are both uncommon and difficult to manage surgically. These so called “epidural mucocoeles” are more likely to originate from the frontal and ethmoid sinuses than sphenoid. Treatment of such cases is not easy because of possible compromise of neurologic structures and likelihood of recurrent disease due to irreversible adherence of mucous membrane to the dura. Various surgical approaches have been in vogue for treating epidural mucocoeles. They are, the excision of mucocoele with Lynch Howarth frontoethmoidectomy, a craniofacial approach and thirdly creating drainage pathway with nasal endoscopes. Kennedy (1989) has reported successful excision of frontal, ethmoidal

and sphenoidal mucocoeles with no recurrences. Endoscopic removal of mucocoeles have been described of late for large frontal mucocoeles with intracranial extension (Har-El G 1995). Benninger et al. in a report of 15 cases of frontoethmoid mucocoeles treated with endoscopic decompression encountered recurrence in mucocoeles with intracranial extension requiring another session of endoscopic treatment.

A craniofacial approach has also been used and advocated by some (Selvapandian et al. 1994, Stiernberg et al. 1986). Schaefer et. al. advocated marsupialisation into the nose for large frontoethmoid mucocoeles that extend into the epidural space.

We treated our cases with an extended Lynch Howarth frontoethmoidectomy approach. The classical incision in this case is extended more superiorly and laterally upto the floor of frontal sinus. We feel that this approach is better suited for large mucocoeles as it entails thorough removal of mucosa and obviates the risk of CSF leak. Endoscopic approach for large mucocoeles with intracranial extension may not suffice for complete removal of the diseased mucosa. A craniofacial resection has the disadvantage of significant morbidity to the patient.

The two cases of giant mucocoeles with intracranial extension emphasize the point that even large mucocoeles can be completely excised with an extended Lynch Howarth approach. A combined otolaryngologic neurosurgical approach may be reserved for recurrent cases in which excision of the disease dura may have to be done. Schaefer et al. (1988) have advocated resection of involved dura and isolation of epidural space from nasal cavity in certain selected cases in which the diseased mucosa can not be easily dissected from the dura. Postoperative complications like meningitis and CSF rhinorrhea are likely following surgery in epidural mucocoeles. Patients therefore should be carefully monitored in the postoperative period. Prolonged follow up is also necessary since recurrences may appear after few years of initial treatment.

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