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ENDOSCOPIC MANAGEMENT OF FRONTO-ETHMOIDAL SINUS MUCOCELE

Aims & Objective:

The aim of this study was to present the efficacy of endoscopic sinus surgery for management of fronto-ethmoidal sinus mucocele.

Material and Methods:

A prospective, longitudinal, observational study of seven patients with clinical and radiological evidence of mucocele of fronto-ethmoidal area from June 2008 to June 2009 and who underwent endoscopic wide marsupialization of mucocele cavity with or without fronto-ethmoidectomy were included in the study.

Results:

Duration of symptoms ranged from 25 days to 1 year. Most common symptoms were swelling in supero-nasal, medial canthal region, infero-lateral eye displacement. Majority of patients had soft to hard swelling in periorbital region and non axial proptosis. One patient had lid ptosis and two patients still complained of diplopia after surgery. Postoperative endoscopy revealed widely opened sinus cavity with epithelisation of mucosa without sign of recurrence in all the cases.

Conclusion:

Endoscopic marsupialization with drainage through nasosinusal approach proved to be safe and efficient procedure in therapeutic approach of frontoethmoidal mucocele.

Key words: Mucocele, Endoscopic, Marsupialization, Frontoethmoidal

INTRODUCTION:

Mucocele first described by Langenbeck in 1818, is an epithelial lined, mucous containing sac completely filling the sinus and capable of expansion.¹ A clinically significant mucocele most commonly originates in the frontoethmoidal sinus.² Frontoethmoidal areas are most susceptible to mucocele formation due to complexity of its drainage as compared to sphenoid and maxillary sinuses. Mucocele are usually unilateral but in five percent cases they are bilateral and/or multiloculated. In at least a third of cases they occur without an obvious predisposing factor but in remaining cases predisposing factors are infection, polyps, trauma and allergic rhinitis.³ There are conflicts among authors concerning the etiology of mucocele.^{2,4} Some suggest they develop from obstruction of sinus ostium whereas others believe that mucocele formation occurs when there is obstruction of duct of minor salivary glands located within the lining of paranasal sinus.⁴ Either mechanism they result as a consequence of obstruction plus inflammation.

The diagnosis of mucocele is based on the history, physical examination and radiological findings. Fronto-ethmoidal mucocele usually present with orbital symptoms of infero-lateral eye displacement, lid edema, swelling in supero-nasal and medial canthal region, diplopia, proptosis, ptosis, palpable mass, reduced vision, orbital pain and headache.¹ Computed tomography (CT) scan and magnetic resonance imaging (MRI) are effective in detecting the lesion and in demonstrating any intracranial extension.⁵ Several treatment options are available and choice depends on the degree of extension⁶ and may range from functional endoscopic sinus surgery to external approach, craniotomy and craniofacial exposure with or without obliteration of the sinus.⁷ The current tendency is to conduct functional, minimal invasive and low morbidity procedure with nasosinusal endoscopic surgery with marsupialization and abundant drainage of the lesion, preserving the epithelium.⁹ The aim of this study was to present the efficacy of endoscopic sinus surgery for management of fronto-ethmoidal sinus mucocele.

MATERIAL AND METHODS:

A prospective, longitudinal, observational study was conducted at Department of ENT- Head and Neck surgery of Ganesh Man Singh Memorial Academy of ENT- Head and Neck Studies, Tribhuvan University Teaching Hospital, Institute of Medicine, Kathmandu, Nepal from June 2008 to June 2009. We included patient with clinical and radiological evidence of mucocele of fronto-ethmoidal area. Patient

with involvement of paranasal sinus other than fronto-ethmoidal region, coexisting other pathology like polyp and with history of previous surgery for mucocele were excluded from study. All patient underwent endoscopic wide marsupialization of mucocele cavity with or without fronto-ethmoidectomy by single surgeon. No stent were kept in all the cases. The aspirated fluid was sent for culture and lining mucosa for histopathological examination. Postoperatively all patients were given oral cefexime according to body weight and were advised to douche the nasal cavity with normal saline twice daily both for two weeks. Patients were evaluated at 2 weeks, 2 months and 6 months following surgery. Study variables noted were age, sex, sinus/side involved, duration of symptoms, past history, physical finding, proptosis, intracranial extension, postoperative complication and follow-up endoscopic finding.

RESULTS:

Total of seven patients were included in the study. There were five male and two female. Age of patient ranged from 24 years to 70 years. Out of seven patients with mucocele, four were frontoethmoidal, two were ethmoidal and one was frontal sinus mucocele. In five patients right side and in two patients left side sinus were involved. Duration of symptoms ranged from 25 days to 1 year (Table 1). Most common symptoms were swelling in supero-nasal, medial canthal region, infero-lateral eye displacement, increased lacrimation, headache, blurring of vision in decreasing frequency respectively. No nasal symptoms were noted in any of the patients. Majority of patients had soft to hard swelling in periorbital region. Similarly five patients had non axial proptosis and two had no orbital displacement. CT scan showed radiological finding compatible with mucocele in all cases. Culture of aspirated fluid showed no microorganism or fungi. Histopathological examination was suggestive of mucocele in all patients. Mean follow-up time was 4.5 months. Table 2 shows that one patient had history of trauma two years prior to symptoms. One patient still had lid ptosis four months post surgery. Two patients still complained of diplopia six months after surgery. Postoperative endoscopy revealed widely opened sinus cavity with epithelisation of mucosa without sign of recurrence in all the cases. (Table 2)

DISCUSSION:

A mucocele is an epithelial lined mucous containing sac completely filling the sinus and is capable of expansion. They tend to expand, remodel and reabsorb bone wall of affected paranasal sinus, changing their integrity and occasionally affecting the neighbouring structure

Tab. 1: Showing age, sex, site and sinus involved, duration of symptoms, finding, proptosis, and IC extension

SN	Age/Sex	Sinus/Site	Duration of symptoms	Finding	Proptosis	IC Extension
1	41/M	Right Frontal	1 year	3x3 cm Swelling over Rt upper lid	Non axial	Absent
2	70/F	Right Fronto-ethmoid	6 months	1x1 cm swelling over Rt supraorbital region	None	Absent
3	24/M	Right Ethmoid	3 months	None	None	Absent
4	60/M	left Fronto-ethmoid	1 year	5x4 cm swelling over Lt supraorbital region	Non axial	Present
5	30/M	Right Fronto-ethmoid	25 days	5x.5 cm swelling over Rt medial canthal region	Non axial	Absent
6	37/M	Left Ethmoid	2 months	None	Non axial	Absent
7	30/M	Right Fronto-ethmoid	9 months	2x2 cm swelling above and medial to Lt medial canthus extending to frontal sinus	Non axial	Absent

NB. IC= intracranial

such as the orbit and intracranial cavity.¹⁰ Mucocele expands in the direction of least resistance, frontal and ethmoidal mucocele tends to erode the thin bone of superior and medial orbital wall extending into orbit displacing the globe infero-laterally.¹¹ Vicente et al,¹² found that disease has equivalent incidence in men and women but in our study we had more male patients which may be due to small sample size. In our study we found age of patients ranged from 24-70 years with mean age being 41.71 years. Vicente et al,¹² found mucocele normally affects people on their 3rd and 4th decade but James et al,¹¹ found highest incidences in 4th to 7th decade of life. Patients with mucocele in frontoethmoidal region present with orbital symptoms¹³ similar to our study. Considerable time lag between the initiating factor and the clinical presentation of mucocele occur, in the case of surgery or trauma this is an average of 23 years³. In one of our case it occurred 2 years after trauma.

Treatment of mucocele is surgical. There are two modes of operative treatment; external and endonasal. External approach is made through Lynch-Howarth external fronto-ethmoidectomy with or without placement of stent or by osteoplastic flap with or without frontal sinus obliteration and total excision of mucosa. These procedures have significant surgical morbidities including scarring, cosmetic deformities and paresthesia.¹⁴ Furthermore, oblitative procedure may make follow up difficult because of the inability to visualize the cavity endoscopically and difficultly in imaging recurrent disease¹⁴. Second approach is endonasal approach with marsupialization and abundant drainage by creation of new drainage pathway and preserving the

Tab. 2: Showing past history, operative finding, post operative complication and follow up endoscopy

S.N.	Past history	Operative finding	Postoperative complication	Follow up endoscopic finding
1.	None	Edematous ethmoidal air cell mucosa. Thick dark fluid in frontal sinus.	Lid ptosis	Widely opened sinus cavity with epithelization
2.	None	Thick straw colored fluid in frontal and ethmoid sinus. Kuhn's type I frontal cell present	None	Widely opened sinus cavity with epithelization
3.	None	Thick amber colored fluid in ethmoid sinus. Middle turbinate and uncinata absent	None	Widely opened sinus cavity with epithelization
4.	Trauma 2 years back	Thick tenacious green-yellowish fluid in ethmoid and frontal sinus. Posterior wall of frontal sinus dehiscent, dura intact	Diplopia	Widely opened sinus cavity with epithelization
5.	None	Thick grayish fluid in frontal and ethmoid sinus	Diplopia	Widely opened sinus cavity with epithelization
6.	None	Dark Greenish tenacious fluid in ethmoid sinus	None	Widely opened sinus cavity with epithelization
7.	None	Thick grayish fluid in frontal and ethmoid sinus	None	Widely opened sinus cavity with epithelization

epithelium. Intranasal marsupialization of mucocele was reported as early as 1921 by Howarth, who stated that by removing the floor of mucocele, one practically makes the mucocele a part of roof of nose.¹⁵ Endoscopic marsupialization of frontal sinus mucocele was first reported by Kennedy et al. in 1989.¹⁴ In our study also we found no sign of recurrence of mucocele during our follow up period. Kennedy et al. in a series of 18 mucocele found endoscopic surgical technique successful with no recurrence. Similarly Har-El G¹⁷ in their study of 103 with 108 paranasal sinus mucocele treated with wide endoscopic marsupialization found a very low recurrence rate of 0.9% after mean follow up of 4.6 years. Khong et al.¹⁸ in their study of 41 patients with mucocele found that long term results of modified endoscopic Lothrop procedure and endoscopic marsupialization were similar. Lund⁸ in a series of 48 patients found the recurrence rate to be 0% in the endoscopic group and 11% in the combined endoscopic and external group during mean follow up of 39 months. Kennedy et al.¹⁴ in a series of 15 case treated by endoscopic frontoethmoidectomy found 0% recurrence during follow up period of 3-42 months. Complications of endoscopic surgery for mucocele are minimal. Though there is potential risk of haemorrhage, CSF leak, and/or orbital damage but in practice this has not been reported. In our study we found one case of lid edema and two cases of persistence of diplopia postoperatively. As these were persistence of symptoms they were not taken as complication of surgery. The advantage of endoscopic procedure is the preservation of bony framework of sinus involved, decrease operative time, no external incisions, decrease hospitalization and thus the surgical cost. With this approach the mucosal lining and function of the sinus are preserved and following surgery direct endoscopic visualization of the area enables accurate follow up. Patients with mucocele require long term follow up since recurrence of mucocele may occur even years after surgery.

CONCLUSION:

Functional endoscopic surgery affords the potential for dramatically reducing operative morbidity of surgery for paranasal sinus mucocele by offering a minimal invasive approach and also direct endoscopic visualization of the area enables accurate follow up. There is increasing evidence in the literature that endoscopic management of sinus

mucocele is successful, with low morbidity rates and recurrence. Endoscopic marsupialization with drainage through nasosinusal approach proved to be safe and efficient procedure in therapeutic approach of frontoethmoidal mucocele. Otorhinolaryngologist should consider the endoscopic approach as the surgical procedure of choice for management of frontoethmoid mucocele. .

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