Serial Cases

Mucocele Frontal Sinus : How I Do It

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ABSTRACT

Background: Paranasal sinus mucoceles are gradually expanding lesion. They usually cause obstruction to the normal drainage channels of paranasal sinuses that leads to accumulation of secretions within the sinus cavity. These patients classically do not presenting nose and sinuses symptoms and 60% of paranasal sinus mucoceles are found in the frontoethmoidal region. Purpose: Sharing experience of the management of frontal sinus mucoceles. Cases: Three cases of frontal sinus mucoceles at Wahidin Sudirohusodo General Hospital, Makassar which treated by endoscopic and external approach were presented. Management: Endoscopic marsupialization with combination of internal and external approaches. Conclusion: Endonasal endoscopically management of frontal sinus mucocele with or without external approach is a grave surgical challenge.

Keywords: Frontal sinus mucocele, transnasal, endonasal, endocopy.

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PENDAHULUAN

Mucocele is an expansive benign lesions with slow growth in the paranasal sinuses. Histopathologic features of mucocele is a cyst wall that has a structure similar to the respiratory epithelium containing mucus. Mucocele also a destructive lesion that can damage the surrounding bone, including the orbit.

Mucocele occurs due to sinus ostium obstruction. Mucocele is growing slowly and fill the affected sinus cavities, extend and erode the adjacent bone. Secondary infections can cause rapid expansion and increase complications, especially in the periorbital region.
Mucocele can occur at any age, but majority of patients are diagnosed at the age of 40 to 60 years. The incidence of bone destruction and extension into the intracranial reported at 10-55%.\textsuperscript{1,2}

One of the mucocele formation mechanism is cystic degeneration of seromucinous gland causing retention cyst. Common etiological factors which related to fronto-ethmoid mucocele are sinusitis history, history of sinus surgery, maxillofacial trauma history, allergies, tumors, and idiopathic.\textsuperscript{1,2}

The exact cause is not yet clear. There is a theory that sinus ostium obstruction is the main cause. Mucocele may arise as a result of adhesion (post inflammatory, post-traumatic or post-operation), which causes obstruction of sinus drainage. Large masses such as tumors or polyps can also cause obstruction and obliteration of the drainage channels so that causing mucocele formation. Continuous mucus production of mucocele increase the size and causing pressure on the sinus wall. In a further process, mucocele can cause sinus wall bones thinning and involves surrounding structure such as the orbital.\textsuperscript{2,5}

Some theories that align bone erosion in mucocele because of the involvement of cytokines (IL-1). Bone resorption occurs because the antigen stimulates the release of IL-1, while the mononuclear cells contained in the periosteum secrete cytokines which produce prostaglandin E2 (PGE2), while the fibroblasts produce collagenase. PGE2 and fibroblasts leads to bone resorption. PGE2 and collagenase levels produced by the fibroblasts in mucocele is two times more than the normal mucosa.\textsuperscript{1,6}

Histopathology studies show that obstruction of the frontal recess accompanied by frontal sinus cavity infection, stimulates the lymphocytes and monocytes to cytokines production by fibroblasts layers. These cytokines trigger bone resorption causing mucocele expansion. Fibroblasts culture derived from mucocele showed an increase of prostaglandin E2 and collagenase compared with fibroblasts from normal frontal sinus. Research has also been found that the prostaglandin E2 has a major role in the osteolitic process in mucocele.

Frontal sinus mucocele may have various size and configuration.\textsuperscript{5} This classification is a standard for evaluating frontal sinus mucocele and management, type I: mucocele confined to the frontal sinus (with or without expansion into orbit), type II: fronto-ethmoid mucocele (with or without expansion into orbit), type III: the erosion of the posterior wall of the sinus with minimal expansion or no expansion to intracranial or extended expansion of intracranial, type IV: the erosion of the anterior wall, type V: erosion wall of posterior and anterior with minimal expansion or no intracranial expansion or intracranial extended expansion.\textsuperscript{5}

Clinical symptoms consist of orbital symptoms such as proptosis, diplopia, reduced vision, epiphora, nasal symptoms such as nasal obstruction, mucopurulent rhinorrhea, headache, and lump in the frontal or face.

Mucocele diagnosis is based on anamnesis, physical examination, and radiologic imaging. Additionally, it is often obtained a palpable mass in the frontal areas or in medial canthus accompanied by proptosis. Nasoendoskopy also be used to see abnormalities such as intranasal polyposis, septal deviation, and others.
Case Report

Case I

53 years old female, come to the ENT Outpatient Unit of Wahidin Sudirohusodo Hospital, Makassar with a chief complaint of cephalgia experienced since the last 1 year and then become worse when it appears a lump above his left eye that is getting bigger, and post nasal drips. No complaints on ear and throat.

On physical examination, there were mass in the left frontal area of 2x3x3 cm size on palpation, solid consistency and fixed, no tenderness. On examination of the anterior rhinoscopy, otoscopy, pharyngoscopy is within normal limit.

Laboratory tests and chest X-ray are normal. On head / paranasal sinuses CT scan coronal plane, there is a mass at frontal region.

Supra-orbital incision of Lynch-Howarth modification was made, then freed the mucocele, mucocele was broken containing mucopurulent liquid, after the entire mucocele was extirpated, later endoscopic sinus surgery procedure was performed.

From the history, physical examination and investigation, it diagnosed as frontal sinus mucocele.

The Management is internal and external approach (endonasal) on August 28, 2013.
Case II

20 years old male came to ENT Outpatient Unit Wahidin Sudirohusodo Hospital with major congestion on the right nasal side since one year ago and felt worsening in two months. No rhinorrhea, there was post nasal drips, cephalgia, particularly in the left frontal area, no blood stained rhinorrhea or epistaxis, smell function declines. No complaints in ear and throat.

From the examination of the right anterior rhinoscopy, there was nasal cavity tumor mass, pale, slippery surfaces, accompanied by secretions, not easy to bleed, no deviation of the nasal septum, nasal cavity of the left within normal limit. Otoscopy examination and pharyngoscopy were normal.

From anamnesis, physical examintaions, and investigations, it was diagnosed by left frontal mucocele and sinonasal polyp.

Management was performed by endoscopic sinus surgery. Initially performed polypectomy procedure, then uncinectionty procedure, and dissection of the left frontal resessus that opened cells in the frontal recess region, agger nasi cells for easy access to the frontal sinus; then mucocele was seen. Then the mucocele capsule

Pemeriksaan laboratorium dan foto to-raks dalam batas normal. Pada pemeriksaan CT Scan didapatkan:

Figure 3. 6 months post operation: there is no mucocele in the frontal sinus

Figure 4. Head CT Scan coronal plane: Sircumscripted Mass, regular on medial nasal meatus region and left frontal sinus
extirpated using forceps.

**Case III**

26 years old male, came to the ENT outpatient unit of Wahidin Sudirohusodo Hospital, with a chief complaint of headache over the left eye with post nasal drips. No rhinorrhea, nasal congestion, blood stained rhinorrhea, as well as disorders of smell, no complaints on the ears and throat.

From the examination of the anterior rhinoscopy, there was secretions found in the medial meatus and the base of the nasal cavity, there is no deviation of the nasal septum, mucosal within normal limits, slippery surfaces, nasal concha within normal limits. Otoscopy examination and pharyngoscopy within normal limits. Laboratory tests and chest x-ray examination are within normal limits. On CT scan, there is round lesions, well demarcated, regular edges on the side of the superior frontal sinus.

**Figure 5: CT Scan coronal plane, left frontal mucocele**

From anamnesis, physical examination, and investigation, it is diagnosed as frontal sinus mucocele

Management of external and internal approach with the help of endoscopy on April 30, 2014. During the operation was performed endoscopic sinus surgery procedures such as left uncinectomy, frontoethmoidectomy, then conducted external approach with an incision above the left eyebrow, started with an incision of 1.5 cm the landmark performed on the left supraorbital then deepened sharply and bluntly until frontal bone exposed and then made a hole with a drill until it reaches the frontal sinus, then widened so the endoscope can pass through without resistance. Furthermore, with the help of endoscope exploration, the mucocele was removed with forceps until the entire mucocele was extirpated.

From histopathology study, the specimen is consistent to a mucocele.

**Figure 6. Lynch-Howarth operation combined with endoscopic sinus surgery**
DISCUSSION

Clinically, mucocele most often found on the frontal sinus. There are few theories on the etiology of mucocele. Some argue that mucocele caused by obstruction of the sinus ostium and there is also an explanation that mucocele is caused by obstruction of the minor salivary glands located in the paranasal sinus lining. Diagnosis is made based on history, physical examination, and the radiology studies in the form of CT Scan and MRI.

Mucocele clinical symptoms can range from no symptoms to severe symptoms. In the first patient there was only cephalgia followed by lump above the eye, there are no other nasal symptoms. In the second patient tends to have worse symptoms because of nasal polyps in the nasal cavity. Meanwhile, the third had symptoms of dominantly frontal area pain. Intracranial extension through the erosion of the posterior wall of the frontal sinus may cause meningitis or CSF fistula. Posterior sinus wall is very susceptible to erosion because of thin. There are three criteria of CT scans for diagnosis of mucocele, that isodens homogeneous mass, clear margins, and osteolysis around massa.

Mucocele management is surgical. The goal is to drainage and ventilation of the sinus as well as eradication of mucocele with minimal morbidity and prevent recurrence. Surgical approach is based on the size, location and extent of the mucocele. If there are signs of infection, it is recommended provision of antibiotic. In the era prior to endoscopic, surgical management for fronto-ethmoidal mucocele was using external approach (modification of Lynch-Howarth) or by osteoplastic frontal sinus surgery. Currently endoscopic sinus surgery is recommended as an option for the management of frontal mucocele for maintaining sinus mucosa and get better results. With the advent and development of endoscopic sinus surgery, allowing minimally invasive functional interventions and maintain sinus structure and especially not scarring the face. Applications of the drain aims to maintain the patency of the drainage of the frontal sinus.

In the first case, to see a relative contradiction to transnasal approach which mucocele located in region of the most external and sinus posterosuperior where transnasal approach would have difficulty, then we did a combination that is external approach and then proceed with the endoscopy. In the second case, we did transnasal endoscopic sinus surgery approach. While in the third case, we did a combination of internal and external procedures as in the first case.

The fact that the frontal sinus mucocele can have a varied presentation depend on the level and complexity of the lesion, making the surgical approach may also vary. The main objective in the operation of mucocele is to ensure drainage must remain patent and prevent postoperative recurrence. Recurrence of mucocele may be increased in cases involving invasive mucocele, which is far in the lateral and posterior of frontal recess, in patients who have undergone transfacial frontal sinus surgery (using procedures of Killian or Lynch-Howarth) and in patients who require a repeated surgery for example in patients with intolerance of anesthesia. Recurrence or complication of frontal sinus mucocele can develop many years after surgery, especially in the frontal sinus invasive mucocele. Recurrence should be treated as early as possible because of the danger of complications, it is advisable to do routine control.
CT scan at 1, 2, and 5 years after surgery or immediately when symptoms recur. In all three cases above, have not undergo a control CT scan because of the absence of complaints or-no clinical symptoms showing signs of recurrence or complication after 8 months post operatively.³

The conclusion of the serial cases is endoscopic sinus surgery is the selection of appropriate management to a simple frontal mucocele without symptoms. However, external and transnasal approach / endonasal combination still needed in some certain mucocele cases.

REFERENCES