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Nasal Septal Abscess : Clinical Analysis of 6 Cases

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－ ABSTRACT －

Objectives：To evaluate the clinical characteristics and management of nasal septal abscess (NSA) of various etiologies among all age groups. **Materials and Methods**：Between 2010 and 2014, six patients diagnosed with NSA were included. Demographic data, clinical characteristics, culture results, Duration of antibiotics treatment, and complications were reviewed. **Results**：Of the 6 patients (mean age, 45.33±24.60 years; 4 male and 2 female), 4 were adults (66.7%) and 2 (33.3%) were adolescents. The most common symptom was nasal pain (83.3%), followed by nasal obstruction (66.7%). The etiologies were varied (iatrogenic : 3, idiopathic : 2, trauma : 1). The isolated bacterial organisms included *Staphylococcus aureus* (2 isolates), *Pseudomonas aeruginosa* (1 isolate), *Staphylococcus epidermidis* (1 isolate), and α- hemolytic streptococcus (1 isolate). The therapeutic duration was between 3 and 4 weeks. A saddle nose complication was observed in 3 subjects (50%). **Conclusion**：Early diagnosis and treatment within one week might prevent the saddle nose complications in NSA. **(J Clinical Otolaryngol 2015;26:213-218)**

KEY WORDS：Nasal septum · Abscess.

Introduction

Nasal septal abscess (NSA) is defined as a collection of pus between the cartilaginous and the mucoperichondrium or bony septum and the mucoperiosteum. NSA is a rare disease that occurs predominantly among children.[1-9] An early diagnosis of NSA is difficult to make without sufficient knowledge about it. This situation may lead to development of various complications. NSA is a rhinologic emergency that requires early diagnosis and treatment to prevent life-threatening complications such as meningitis and cavernous sinus thrombosis.[1]

NSA is usually associated with untreated nasal septal hematoma that develops after trauma or could result from infections within the nasal cavity and sinuses, or may have iatrogenic or spontaneous causes.[1] Most recent studies pertaining to NSA have been case reports;[3-5,10-15,18] a few original research articles have been found in the literature.[2,6-8,16] Most of these NSA articles have focused on trauma and children.

The purpose of this study was to examine the clinical characteristics and management of NSA of different etiologies, among all age groups.

Materials and Methods

Six patients whose NSAs were diagnosed between 2010 and 2014 were included in this study. We reviewed medical records, including clinical manifestation, management, culture results, and complication.

Among cases where there was a suspicion of NSA,

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needle aspiration was performed. If purulent discharge was observed, NSA was confirmed. The aspirated contents were sent for culture. All patients underwent a computed tomography (CT) scan; incision and drainage was performed under local anesthesia. A Penrose drain (Sewoon, Korea) was then inserted into incision sites of some patients, and both nasal cavities were packed with non-absorbent materials. Nasal packing was removed on the second or third postoperative day. The following day, the Penrose drain was removed. All patients were prescribed antibiotics for 3−4 weeks. All patients received intravenous amoxicillin-clavulanic acid until the results of culture and sensitivity were reported, then culture-based antibiotics were administrated. The study was approved by the Institutional Review Board of Daegu Fatima Hospital (DFH15ORIOe008).

Statistical anaylsis was performed using the PASW, ver. 18.0 (SPSS Inc., Chicago, IL, USA). The Mann-Whitney U-test was used to compare the mean symptom duration before initiation of treatment between saddle nose deformity and non-saddle nose deformity groups in the previous studies[3-5,10,12-16] that mean symptom duration was provided. Statistical significance was defined as $p < 0.05$.

Results

The clinical characteristics of NSA were presented in Table 1. Two subjects (33.3%) were adolescents and four (66.7%) were adults. Mean age of participants was 45.33±24.60 years (range : 14−76 years). Four subjects (66.7%) were male and two subjects (33.3%) were female. Underlying diseases, such as immunodeficiency, were not observed.

The most common symptom was nasal pain (5/6, 83.3%) followed by nasal obstruction (4/6, 66.7%). Mean symptom duration was 9.17±4.83 days. The etiologies were varied (iatrogenic : 3, idiopathic : 2, trauma : 1). In iatrogenic NSA cases, electrocauterization, stitch out after septal surgery, and acupuncture on the septum were some of the causative factors.

Five of 6 cultures were positive for bacteria. The iso-

Table1. Summary of cases

Patient	Age/sex	Presenting complaint	Symptom duration	Cause	Complication	Culture	Penrose	Fluid recollection after drainage
1	14/M	Nasal pain, Headache	4 days	Acupuncture	no	Staphylococcus aureus	Yes	No
2	15/M	Nasal pain, Fever	9 days	Trauma	Saddle nose	a-hemolytic streptococcus	No	No
3	41/M	Nasal obstruction, Nasal pain	5 days	Septal stitch out	no	Pseudomonas aeruginosa	Yes	No
4	63/F	Nasal obstruction, Nasal pain	7 days	Idiopathic	no	Staphylococcus aureus	Yes	Yes
5	63/F	Nasal obstruction	15 days	Idiopathic	Saddle nose	negative	No	No
6	76/M	Nasal obstruction, Nasal pain	15 days	Electrocauterization	Saddle nose	Staphylococcus epidermidis	No	Yes

lated bacterial organisms were *Staphylococcus aureus* (2 isolates), *Pseudomonas aeruginosa* (1 isolate), *Staphylococcus epidermidis* (1 isolate), and α- hemolytic streptococcus (1 isolate). CT scans were performed preoperatively in all patients. The location of all NSAs was the cartilaginous portion of septum (Fig. 1).

Duration of antibiotics, including both parenteral and oral preparations, depended on how soon after symptom occurrence the treatment was initiated. If treatment started within one week of symptom onset, the treatment duration lasted three weeks ; if treatment started after one week of symptom onset, then the treatment duration was four weeks. Penrose drain was inserted in 3/6 subjects. The proportion (33%) of fluid re-collection was equal among groups with and without the Penrose drain.

Mean follow-up period of the subjects was 6.00±5.06 months (range : 2−14 months). Three of 6 subjects developed saddle nose deformity. All these 3 subjects were prescribed antibiotic therapy one week after symptom onset. No other complications were observed. The mean duration of saddle nose development after initial treatment was 2.33 weeks (range : 1−3 weeks).

Discussion

The incidence of NSA is not well known. Although the incidence of nasal septal hematoma and NSA resulting from nasal trauma has been variable among studies, it has been reported between 0.8 and 1.6%.[1,2,7] NSA occurs predominately in children and male subjects.[1,2,6,7] The reason for this predominance could be explained that the mucoperichondrium and mucoperiosteum are loosely adhered to the septum in children, and the activity of male children is more aggressive.[1,2,7] On the other hand, Jalaludin[16] reported that NSA was more commonly encountered in adults. In our cases, NSA was more common among adults (66.7%).

NSA is caused by various factors. Beck[17] divided etiology of NSA into three groups : primary, in which the causative factor is nasal trauma ; secondary, in which NSA develops secondary to dental or sinonasal infections ; and spontaneous, when no underlying cause could be detected. Alshaikh and Lo[1] classified NSA into 4 groups, including iatrogenic causes. Trauma is the most common cause of NSA.[3,12,14,16] Other causes

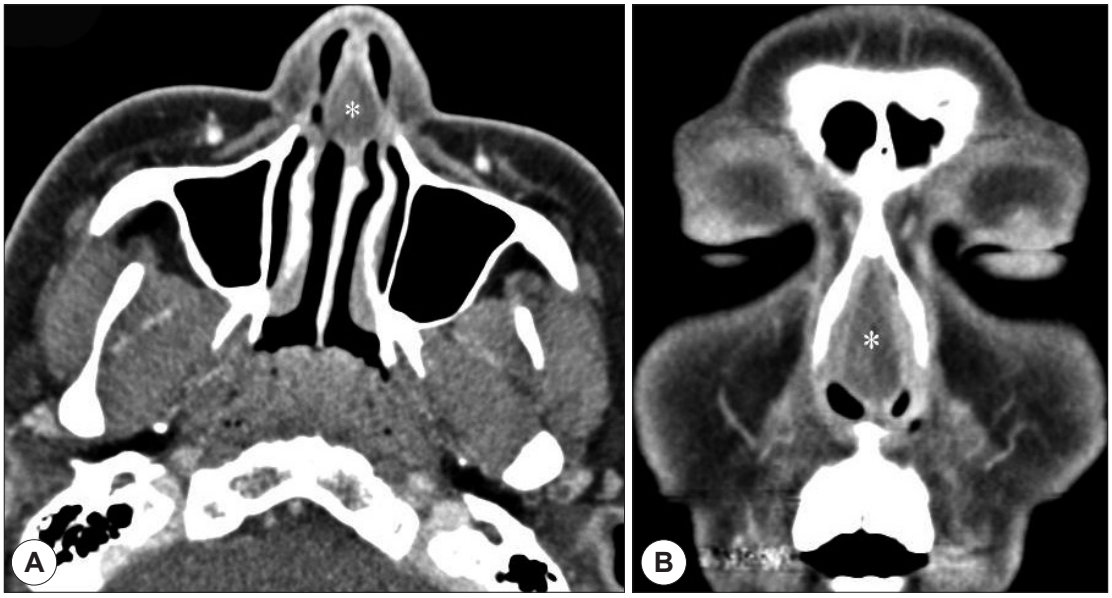

Fig. 1. Computed tomography scans show the swelling of the soft tissue and the thin-walled collection of fluid (*) with peripheral enhancement (A : axial, B : coronal).

are relatively uncommon. Our results differed from other studies, wherein the most common causes were iatrogenic and idiopathic (50 and 33.3%). One possible reason is that health service accessibility is good in Korea compared to other countries. Moreover, this study included various age groups, and had a small sample size.

The most common initial symptom of NSA is the bilateral nasal obstruction, as well as other symptoms such as nasal pain, headache, and fever.[2,6,7,16] The symptoms that our patients complained of were similar to those reported in previous studies.

Intranasal examinations such as anterior rhinoscopy and nasal endoscopy are the most important steps in diagnosing NSA. The most common findings of intranasal examinations are swelling and hyperemia of the septal mucosa. It is easy to overlook these signs without sufficient knowledge about NSA. Therefore, we think that the use of pledgets moistened with epinephrine packed within both nasal cavities is helpful in making a differential diagnosis in cases where nasal cavity is inflamed. If NSA is suspected or diagnosis is still uncertain, preoperative needle aspiration can be helpful to confirm the diagnosis. Alvarez et al[7] suggested that preoperative needle aspiration is neither practical nor cost-effective, but it can be helpful to diagnose NSA and reduce the pressure within the abscess, as well as provide pus for culture and sensitivity tests before antibiotic administration.[2,3,5,6,9,10,13] We think that preoperative needle aspiration is an essential aspect of treatment.

CT scan with contrast is not necessarily required to diagnose NSA, but it is helpful to find any predisposing factors, such as rhinosinusitis, or to ascertain the extent of NSA. NSA appears as a thin-walled collection of fluid with peripheral enhancement, similar to the appearance of abscesses that occur in other areas of the body. We suggest that CT scan with contrast is routinely performed in order to obtain more information, such as the factors predisposing to the formation of NSA rather than the purpose of diagnosing NSA.

The most common bacterial organism of NSA is *S. aureus*, but other organisms were also present, including *Haemophilus influenzae*, group A β-hemolytic streptococcus, and *Streptococcus pneumonia*.[1,3-7,9-12,14,16] Recently, methicillin-resistant *S. aureus* has been reported.[3,13,15] In our study, five of six cultures revealed growth of bacteria (Table 1). Interestingly, p. *aeruginosa,* had not been reported until recently. Most of the time, p. *aeruginosa* is a nosocomial infection, which was the case with our patient. The patient had a septal surgery and NSA developed after removal of remnant absorbable thread (Vicryl®) at three months postoperatively. In hindsight, patients may benefit from closer postoperative follow up.

If diagnosis and treatment of NSA are not performed immediately, various complications, ranging from cosmetic deformity to life-threatening events, can develop. The complications may be divided into 4 groups as follows : 1. local complications, i.e., deviated nasal septum, saddle nose deformity, nasal valve collapse, sinusitis, facial cellulitis/abscess, nasal vestibulitis, 2. systemic, i.e., bacteremia, sepsis, 3. orbital, i.e., orbital cellulitis, subperiosteal abscess, orbital abscess, 4. cranial, i.e., cavernous sinus thrombosis, epidural abscess, meningitis, intracranial abscess.[1] The only complication we observed was saddle nose deformity, and this developed among three patients. Interestingly, the 3 patients with the saddle nose deformity visited our clinics beyond 1 week after symptom onset. Canty and Berkowitz[6] have reported that among patients with cartilage destruction, the average time to management is 6.9 days. We analyzed the correlation of saddle nose deformity and symptom duration, based on previous studies.[3-5,10,12-16] The symptom duration of group that occurred the saddle nose deformity was 7.5 days. The symptom duration was statistically significant between saddle nose deformity and non-saddle nose deformity groups (Table 2). Therefore, we think that the probability of saddle nose-deformity occurrence

Table 2. Mean symptom duration between saddle nose and non-saddle nose group

	Saddle nose	Non-saddle nose	p
Mean symptom duration, days*	7.50±4.04	3.33±2.07	0.04

* : Mann-Whitney U test

could be predicted, on the basis of time to treatment.

The standard management of NSA involves a combination of surgical drainage and antibiotic administration. After surgical drainage, nasal packing and Penrose drain are widely used to prevent re-accumulation of fluid or pus. Nasal packing is removed 48 or 72 hours postoperatively. However, the optimal time for removal of the Penrose drain is uncertain.[2,4,6,7,10,12] Canty and Berkowitz[6] reported that the insertion of a Penrose drain is not beneficial for prevention of re-accumulation of fluid. We observed that insertion of a Penrose drain had no effect because the proportion (33%) of patients among whom fluid re-collection occurred was equal among groups with and without the Penrose drain. The systemic administration of broad-spectrum antibiotics is initially recommended to cover the most common pathogens, followed by culture-based antibiotic therapy. In our study, all subjects were commenced on intravenous amoxicillin-clavulanic acid. Various oral antibiotics such as amoxicillin-clavulanic acid, cefixime, cefpodxime, and ciprofloxacin were administrated according to the results of cultures and sensitivity studies.

Many studies have reported that the optimal duration of antibiotic administration is two weeks.[1,3,5,10,12,14,15] In our study, the optimal duration of antibiotic administration was 3 or 4 weeks. Similar to occurrence of the saddle nose deformity, the antibiotic administration duration was varied according to timing of treatment. Therefore, we think that timing of treatment may depend on the occurrence of local complications, such as saddle nose deformity, as well as the duration of antibiotic administration.

Limitations of this study include the fact that it is a retrospective study with a small sample size. As a result, it can be difficult to generalize the conclusions. However, this study is worthwhile in that it examines the clinical characteristics of NSA with diverse causes, among various age groups.

Conclusion

As NSA is a rare disease, it may go undiagnosed, and the appropriate timing of treatment can be missed. In our study, time of treatment is important because correct timing can decrease the occurrence of saddle nose deformity, and affect the duration of antibiotic administration, depending on whether treatment is started within 1 week of symptom onset or not. We think that the best results are yielded when treatment is begun within 1 week of symptom onset. Future studies with a large sample size will be required to provide more information of NSA.

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