



## Nasal septal abscess: a 10-year retrospective study

Li-Hsiang Cheng<sup>1</sup> · Pei-Chuan Wu<sup>2</sup> · Cheng-Ping Shih<sup>1</sup> · Hsing-Won Wang<sup>1,3</sup> · Hsin-Chien Chen<sup>1</sup> · Yuan-Yung Lin<sup>1</sup> · Yueng-Hsiang Chu<sup>1</sup> · Jih-Chin Lee<sup>1</sup>

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### Abstract

**Objective** Nasal septal abscess is an uncommon condition but it can cause potentially life-threatening intracranial complications and cosmetic nasal deformity.

**Methods** We analyzed ten years of cases to determine the optimal diagnostic and therapeutic modalities. A retrospective review of case notes from Tri-Service General Hospital archives was performed. Records of six patients diagnosed with nasal septal abscess, who were treated from September 2007 to August 2017 were retrospectively reviewed. Patients' clinical symptoms, etiology, diagnostic methods, bacteriology, antibiotic and surgical treatment were recorded and analyzed.

**Results** Out of six patients diagnosed with nasal septal abscess, three were male and three were female. Ages ranged from 19 to 75 years (mean 51 years). The most common symptoms at presentation were nasal pain and nasal obstruction. Typical etiologies were trauma or acute sinusitis, but uncontrolled diabetes mellitus was also an important etiology. In the series of six patients, four of them had positive findings of abscess and in drainage, had the following bacterial cultures: *Staphylococcus aureus* (two cases), methicillin-resistant *S. aureus* (one case), and *Klebsiella pneumoniae* (one case). In addition to antibiotic treatment, all patients underwent surgical drainage and had complete resolution of disease without intracranial complications during at least 1 year of follow-up. However, two out of the six patients developed saddle nose deformity.

**Conclusions** This study highlights that: 1. In view of the rapidly increasing number of diabetes mellitus cases, uncontrolled diabetes mellitus is an important etiology of nasal septal abscess. 2. Although *S. aureus* is the most common pathogen, we must pay attention to methicillin-resistant *S. aureus* (MRSA) to prevent severe complications and patients who are at increased risk for MRSA colonization should be administered antibiotics against MRSA initially. 3. Nasal septal abscess should be managed with parenteral broad spectrum antibiotics, appropriate drainage and immediate reconstruction of the destructed septal cartilage with autologous cartilage graft, to prevent serious intracranial complications and cosmetic nasal deformity.

**Keywords** Nasal septum · Abscess · Nasal infection

### Introduction

Nasal septal abscess is defined as a collection of pus between the nasal septum and overlying mucoperichondrium or mucoperiosteum. Nasal septal abscess is a rare entity and can result in devastating complications. On examination, the nasal septum is swollen on one or both sides, with a bluish or reddish hue over the mucosa, with symptoms of nasal obstruction and nasal pain. The treatment should be prompt to prevent severe complications. The most common complication is devascularization of the septal mucoperichondrium leading to cartilaginous destruction and subsequent septal perforation and saddle nose deformity. If left untreated, potentially life-threatening complications such as

✉ Jih-Chin Lee  
doc30450@gmail.com

<sup>1</sup> Department of Otolaryngology-Head and Neck Surgery, Tri-Service General Hospital, National Defense Medical Center, No. 325, Cheng-Kung Road Section 2, Taipei 114, Taiwan, ROC

<sup>2</sup> Department of Psychiatry, Far Eastern Memorial Hospital, New Taipei City, Taiwan, ROC

<sup>3</sup> Graduate Institute of Clinical Medicine and Department of Otolaryngology, Taipei Medical University-Shuang Ho Hospital, Taipei, Taiwan, ROC

osteomyelitis, orbital and intracranial abscess, meningitis, and cavernous sinus thrombosis may occur [1–6]. We sought to analyze the clinical presentation and outcomes of nasal septal abscess in our department to determine the optimal treatment methods for such cases.

## Materials and methods

We retrospectively reviewed the records of our inpatients diagnosed with nasal septal abscess who received treatment at the Department of Otolaryngology, Tri-Service General Hospital, Taipei, from September 2007 to August 2017. We collected six patients diagnosed with nasal septal abscess and their charts were reviewed. Characteristics of infection, cellulitis, or abscess were confirmed by CT and surgery. Patient characteristics, disease etiology, diagnostic methods, bacteriology, treatment, duration of hospital stay, complications and outcomes were recorded and analyzed. The study design was approved by the hospital Institutional Review Board.

## Results

Out of six patients in our study, three were male and three were female. Ages ranged from 19 to 75 years with a mean age of 51 years (Table 1). Anterior rhinoscopy findings revealed bilateral bulging of nasal septum, that obstructed both nasal cavities in all the above mentioned cases and it was difficult to perform rhinoscopy. Presenting symptoms and laboratory results are summarized in Table 2. The most common symptoms at presentation were nasal pain and nasal obstruction. Three patients had fever, two patients had facial cellulitis, and one patient complained of headache. Obvious precipitating or predisposing factors are summarized in Table 3. Out of six patients in our study, three patients had preexisting Type II diabetes mellitus with poor

**Table 1** Age and sex distribution of the patients

Age (years)	Sex (no. patients)		Total (no. patients)
	Male	Female	
11–20		1	1
21–30	1		1
31–40			
41–50			
51–60		1	1
61–70	1	1	2
71–80	1		1
81–90	3	3	6

**Table 2** Symptom at presentation and lab. data

Symptom at presentation	No. patients (%)
Nasal obstruction	6 (100)
Nasal pain	6 (100)
Fever	3 (50)
Facial cellulitis	2 (33)
Headache	1 (17)
Lab. Data	
Total white cell count > 10,000/cumm	4 (67)

control, one patient had acute sinusitis, one patient had nasal trauma and one patient had undergone nasal surgery. Total white cell count was raised with relative neutrophilia in four patients (range 4460–19,600/cumm), C-reactive protein was raised (range 2.54–14.82 mg/dL) and blood cultures were negative in all the patients.

Radiological investigations were also performed. Six patients underwent Computed Tomography (CT) scans (three patients with contrasted CT and the other three patients without contrasted CT scans) and CT scans showed bilateral thickened nasal septal mucosa with fluid collection (Fig. 1).

Initially, broad spectrum intravenous antibiotics (Amoxicillin/Clavulanate or Clindamycin) were administered as antibiotic coverage for common pathogens and later adjusted based on the bacterial culture in all patients. All patients also underwent surgical incision and drainage under general anesthesia. An incision was made across the swelling in the septum, a penrose drain was sutured in the incision, and nasal tamponade was inserted after surgery. Four patients had positive findings of abscess and in drainage, had the following bacterial cultures: *Staphylococcus aureus* (two cases), Methicillin-resistant *S. aureus* (one case), and *Klebsiella pneumoniae* (one case). (Table 4). The patients were admitted for an average of 13 days (range 7–18 days). There was complete resolution of disease without intracranial complications in all patients during at least 1 year of follow-up. However, two out of the six patients developed saddle nose deformity. One patient with uncontrolled diabetes mellitus was diagnosed late. The other patient was diagnosed immediately but the pathogen was methicillin-resistant staphylococcus aureus.

**Table 3** Predisposing factor

Predisposing factor	No. patients
Uncontrolled diabetes mellitus	3
Acute sinusitis	1
Nasal trauma	1
Nasal surgery	1



**Fig. 1** Contrasted CT scans showed bilateral thickened nasal septal mucosa with fluid collection

**Table 4** Microbiology results

Micro-organism cultured	No. patients
<i>Staphylococcus aureus</i>	2
Methicillin-resistant	
<i>Staphylococcus aureus</i>	1
<i>Klebsiella pneumoniae</i>	1
No growth	2

## Discussion

Nasal septal abscess is a very uncommon entity. The incidence of nasal septal abscess is unknown and there are limited reports in medical literature. Of six patients in our study, three were male and three were female. Ages ranged from 19 to 75 years with a mean age of 51 years. There is no description of sex predominance and age predisposition in our study.

Trauma is the most common cause of nasal septal abscess and less frequently it is associated with nasal surgery, nasal furuncles, sinusitis, influenza, uncontrolled diabetes mellitus, dental disease, and immune deficiency [1–4]. In our study, half of the patients had preexisting Type II diabetes mellitus with poor control. In view of the rapidly increasing number of diabetes mellitus cases, septal abscess is an important consideration in the differential diagnosis in patients presenting with symptoms of nasal obstruction, nasal pain, and fever; especially in cases of uncontrolled diabetes mellitus.

The most common presentation of nasal septal abscess is nasal obstruction. Other symptoms, such as nasal pain, fever or headache and perinasal tenderness may bother patients.

Anterior rhinoscopy typically reveals unilateral or bilateral cherry-like swelling of the nasal septum that narrows the nasal cavity, and palpation of involved portion of the septum may reveal tenderness and fluctuance. Destruction of septal cartilage may lead to septal perforation or saddle nose deformity caused by loss of cartilaginous support to the distal portion of the nose. Spread of untreated infection from the abscess can lead to a number of dangerous complications, including orbital cellulitis, meningitis, subarachnoid empyema, intracranial abscess, cavernous sinus thrombosis, and sepsis [3–6].

Once nasal septal abscess is suspected, sinus CT is the most informative investigation and it can identify abscess size and location, relative position of the great vessels and airway, and possible underlying malignancy [4]. Moreover, it is better and easier to identify nasal septal abscess with contrasted CT scans, as we noted in our study. Hence, sinus CT with a contrast agent is recommended for diagnostics.

The most common pathogens associated with nasal septal abscess are *S. aureus*. Other pathogens reported in the literature include *Streptococcus pneumoniae*, *Streptococcus milleri*, *Streptococcus viridians*, *Staphylococcus epidermidis*, *Haemophilus influenzae*, *Klebsiella pneumoniae*, *Enterobacteriaceae*, and anaerobic bacteria [1–4, 7]. MRSA was cultured in a 19-year-old female in our study and the patient developed a saddle nose deformity. Antibiotic was used to treat acute sinusitis for 1 week previously. Patients who are susceptible to MRSA infections may also be at higher risk for nasal colonization, and this includes elderly patients, those with recent hospital admission or antibiotic use, healthcare worker, and patients with HIV [8]. Although *S. aureus* is the most common pathogen, we must pay attention to MRSA to prevent severe complications and patients at increased risk for MRSA colonization should be administered antibiotic against MRSA initially.

Choice of antibiotic was based on most likely pathogen. Broad antimicrobial therapy is indicated to cover all possible aerobic and anaerobic pathogens. Penicillinase-resistant penicillin, such as Oxacillin combined with Clindamycin is prescribed before the result of culture. Culture-directed antibiotics are prescribed later as indicated. The presence of penicillinase-resistant or beta-lactamase-producing pathogens may mandate the use of penicillin (i.e., amoxicillin) with a beta-lactamase inhibitor, such as Amoxicillin/Clavulanate [1–4].

Besides maintaining adequate hydration and administering parenteral antimicrobial therapy, incision and drainage of the abscesses are required initially. An incision across the swelling is made as near as possible to the floor of nose to prevent pocketing of the pus. Necrotic tissue and

cartilage, granulations and blood clots are removed. Drainage is provided by Penrose drain sutured at the incision site. The packing serves as a stent for both the nasal skeleton and the septum. It prevents re-accumulation of blood and pus [1–4]. In addition, to achieving a successful long-term functional and esthetic result, immediate reconstruction of the lost cartilage with autologous cartilage graft (concha or rib), which is widely believed to be the implant material of choice because of less risk of infection, resorption and rejection, is recommended [9].

## Conclusion

This study highlights that: (1) in view of the rapidly increasing number of diabetes mellitus, uncontrolled diabetes mellitus is an important etiology of nasal septal abscess. (2) Although *S. aureus* is the most common pathogen, we must pay attention to MRSA, to prevent severe complications and patients at increased risk for MRSA colonization should be administered antibiotic against MRSA initially. (3) Nasal septal abscess should be managed with parenteral broad spectrum antibiotics, appropriate drainage and immediate reconstruction of the destructed septal cartilage with autologous cartilage graft, to prevent serious intracranial complications and cosmetic nasal deformity.

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## References

1. Dinesh R, Avatar S, Haron A, Suhana et al (2011) Nasal septal abscess with uncontrolled diabetes mellitus: case reports. *Med J Malaysia* 66:253–254
2. Tien DA, Krakovitz P, Anne S (2016) Nasal septal abscess in association with pediatric acute rhinosinusitis. *Int J Pediatr Otorhinolaryngol* 91:27–29
3. Cain J, Roy S (2011) Nasal septal abscess. *Ear Nose Throat J* 90:144–147
4. Huang PH, Chiang YC, Yang TH (2006) Nasal septal abscess. *Otolaryngol Head Neck Surg* 135:335–336
5. Lin IH, Huang IS (2007) Nasal septal abscess complicated with acute sinusitis and facial cellulitis in a child. *Auris Nasus Larynx* 34:241–243
6. Pang KP, Sethi DS (2002) Nasal septal abscess: an unusual complication of acute sphenoiditis. *J Laryngol Otol* 116:543–545
7. Dispenza C, Saraniti C, Dispenza F (2004) Management of nasal septal abscess in childhood: our experience. *Int J Pediatr Otorhinolaryngol* 68:1417–1421
8. Angelos PC, Wang TD (2010) Methicillin-resistant *Staphylococcus aureus* infection in septorhinoplasty. *Laryngoscope* 120:1309–1311
9. Nada A, Stephen L (2011) Nasal septal abscess in children: from diagnosis to management and prevention. *Int J Pediatr Otorhinolaryngol* 75:737–744