

# Idiopathic pediatric nasal septal and epidural abscess: A case report and review of the literature

SAGE Open Medical Case Reports  
Volume 12: 1–4  
© The Author(s) 2024  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/2050313X241252745  
journals.sagepub.com/home/sco



James Robert Macaskill<sup>1</sup>  and Nico Moolman<sup>2</sup>

## Abstract

Nasal septal abscess is an uncommon otolaryngologic condition with little reported in the literature. Most commonly arising secondary to hematoma, idiopathic abscess formation is rare. A previously healthy 13-year-old male with no preceding nasal hematoma or trauma presented with rhinorrhea, nasal pain, and obstruction. Initial incision and drainage were not curative; the patient returned to care with complaints of new-onset headache. Neuroimaging revealed abscess recurrence alongside pansinusitis and epidural empyema. The patient was transferred to a tertiary care center for joint otolaryngologic and neurosurgical care. The patient's postoperative course was uncomplicated. Nasal septal abscesses have become increasingly uncommon, but they still occur. Prompt treatment is warranted to mitigate the potential risk of further intracranial spread and facial deformity, as seen in this case.

## Keywords

Septal abscess, epidural abscess, pediatrics, idiopathic

Date received: 17 December 2023; accepted: 18 April 2024

## Introduction

Nasal septal abscess (NSA) is an uncommon otolaryngologic condition characterized by a collection of pus between the septal cartilage and its overlying muco-perichondrium or -periosteum.<sup>1</sup> These abscesses require urgent intervention due to the risk of lethal intracranial complications and facial deformity. In 85% of cases, NSA arise from infected hematoma secondary to nasal trauma, and are therefore more common in adolescent males.<sup>1</sup> While septal abscesses typically arise traumatically, there are some instances of atraumatic NSA without precedent infection reported in the literature.<sup>2,3–9</sup> Notably, most of these spontaneous abscess formations occur in immunocompromized children; idiopathic abscess formation in immunocompetent children is exceedingly rare, with seven cases identified in our search of the literature from 1977 to 2023.<sup>3–9</sup> Here we describe one such case of idiopathic septal abscess formation in an otherwise-healthy 13-year-old patient with no apparent trigger or infection source.

## Case presentation

A previously healthy 13-year-old male presented to a rural emergency department (ED) with subacute complaints of sinusitis. His symptoms included rhinorrhea, nasal pain, and

obstruction. He denied any history of head and neck infection, foreign body aspiration, sinonasal surgery, hematoma, or trauma. A full head and neck examination was performed by a community otolaryngologist at the time of initial consultation, with erythema of the nasal dorsum and tenderness to palpation. Anterior rhinoscopy and sinoscopy revealed fluctuant swelling arising from the septum in both nares and extending toward the sidewalls bilaterally. Needle aspiration of purulent material confirmed the diagnosis of NSA. The patient subsequently underwent uncomplicated urgent incision and drainage. The nares were lightly packed with gauze to the internal nasal valve. This packing was removed by the patient's caregivers that evening. The patient was not provided any antibiotic prescription, and was subsequently discharged from the ED. No follow-up was planned, but both

<sup>1</sup>College of Medicine, University of Saskatchewan, Saskatoon, SK, Canada

<sup>2</sup>Division of Otolaryngology, Head and Neck Surgery, College of Medicine-Department of Surgery, University of Saskatchewan, Saskatoon, SK, Canada

### Corresponding Author:

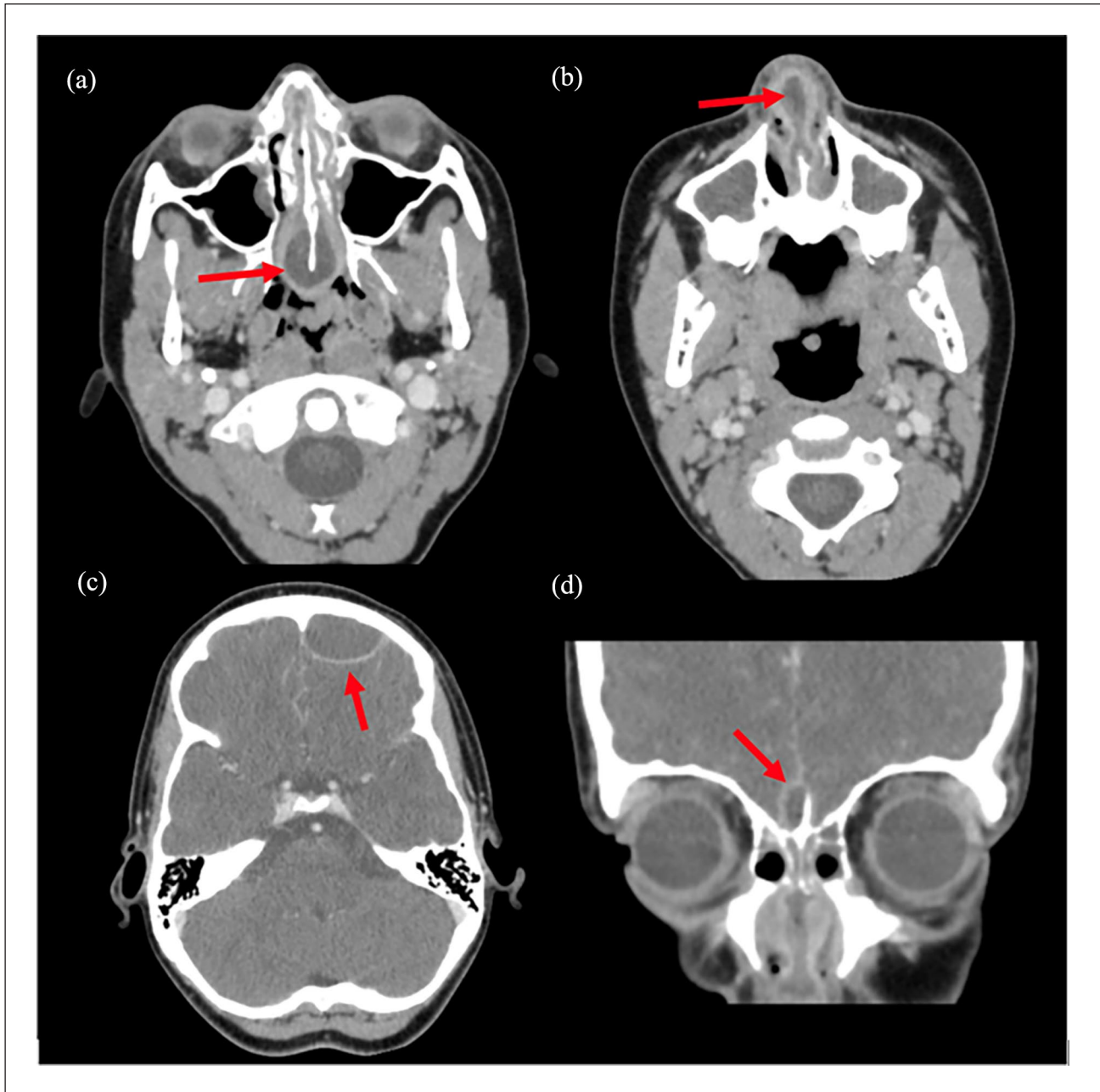
James Robert Macaskill, College of Medicine, University of Saskatchewan, 55-203 Herold Terrace, S7V 1H3 Saskatoon, SK, Canada.  
Email: james.macaskill@usask.ca.



the patient and caregivers were given return-to-care instructions should symptoms persist or worsen.

Recurrent headache following surgery brought the patient back to the ED for re-evaluation. Contrast-enhanced computed tomography (CT) imaging of the head and neck and non-contrast CT of the sinuses, as outlined in Figure 1 below. Neuroimaging revealed septal abscess recurrence, pansinusitis, and left frontal epidural empyema. The patient was referred and transferred to a pediatric tertiary care center for multidisciplinary treatment under otolaryngology and neurosurgery.

Surgery was performed using an endonasal approach under general anesthesia, with cranial fixation and endoscopic image guidance.<sup>10</sup> The nares were prepped with iodopovidone and topical epinephrine for sterility and vasoconstriction. Inferior turbinoplasty allowed for access into the edematous nasal cavity. Hemi-transfixion incision of the left septal muco-perichondrium was performed which revealed underlying purulence and soft tissue necrosis and degeneration of the quadrangular septal cartilage. The necrotic tissue was debrided, samples sent for culture and the cavity flushed with betadine and saline.



**Figure 1.** Pre-treatment axial and coronal CT imaging with contrast. (a) Posterior extent of septal abscess wrapping around the vomer. (b) Anterior septal abscess and dependent maxillary sinus opacification. (c) Frontal epidural abscess collection. (d) Superior septal abscess extension with intracranial abscess tracking along crista galli.

Further exploration revealed significant polypoid edema within the middle meatus. Maxillary antrastomies and anterior ethmoidectomies were performed bilaterally to facilitate sinonasal irrigation and promote outflow of the opacified paranasal sinuses. NasoPore Firm (Stryker Corp., Kalamazoo, MI, USA) was placed bilaterally in the middle meatus to facilitate hemostasis and bolgerization while silastic septal splints were placed on both sides of the septum and secured with prolene suture to prevent recollection within the septal space.

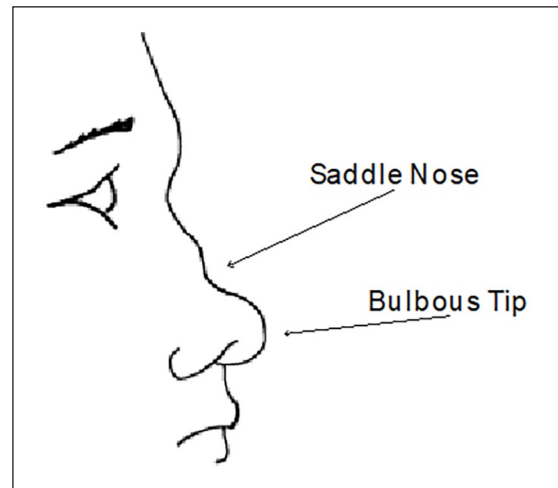
The remainder of the procedure consisted of craniotomy and epidural pus drainage. The patient's postoperative course was uncomplicated; the follow-up CT scan showed no abscess recurrence. Pus culture revealed growth of *Streptococcus constellatus*. The patient was discharged home on several weeks of intravenous antibiotics on post-operative day two following consultation with pediatric infectious disease (ID). Septal splints were removed 2 weeks postoperatively, and otolaryngologic, neurosurgical, and ID follow-up was arranged. The patient was healthy when seen again in clinic for follow-up six weeks after discharge, with no evidence of lasting complications from the NSA.

## Discussion

Beck provided the first classification of NSA in 1945, describing three aetiologies: infectious, trauma-evoked, or idiopathic.<sup>11</sup> Hematoma comprises the bulk of clinical presentations, with over two-thirds of NSA estimated to arise secondary to trauma—particularly in children.<sup>1</sup> However, despite the susceptibility of the nasal septum to injury, abscess formation has been uncommon since the advent of antibiotics.<sup>1,2</sup> Furthermore, reports of nontraumatic septal abscesses ordinarily involve immunocompromized patients<sup>12</sup>; spontaneous abscess formation in an otherwise healthy child, as in this case, is exceedingly rare.

We conducted a search of several databases in our review of the literature: PubMed/MEDLINE, Embase, Cochrane Library, Scopus, Web of Science, and Google Scholar. Our search yielded a total of seven cases of idiopathic NSA in immunocompetent children reported on to date.<sup>3-9</sup> Of these, six involved patients with no other medical comorbidities, as in our patient.<sup>3-6,8,9</sup> However, unlike our case, all involved *Staphylococcal* infection, two of which include methicillin-resistant *Staphylococcus aureus*.<sup>5,6</sup> One child had residual disease following abscess drainage requiring operative treatment under general anesthesia.<sup>5</sup> We identified two cases of meningitis secondary to NSA, one in 1977 and another in 2020.<sup>8,9</sup> However, ours is the first to document evidence of intracranial empyema formation in an otherwise healthy child with no known cause of NSA. While limited by the paucity of data, the result of our search suggests early operative intervention under general anesthesia to be superior to outpatient drainage, as both Cai et al.'s patient and our own had incomplete resolution with simple drainage.<sup>5</sup>

Aerobic bacteria are most commonly responsible for NSA formation, with *S. aureus*, *Pneumococcus* spp., and



**Figure 2.** Saddle-nose deformity due to cartilaginous erosion secondary to abscess formation.

*Hemophilus influenzae* serving as the most common causative organisms.<sup>1</sup> In this case, cultures isolated *S. constellatus*—a commensal Gram-positive, catalase negative cocci found within the oropharynx, gastrointestinal, and urogenital tracts with a proclivity for pathogenicity and abscess formation.<sup>13</sup>

The diagnosis of NSA is clinical. Patients most commonly present with complaints of bilateral nasal obstruction and pain localized to the nasal tip—manipulation often elicits pain.<sup>1,3,6,7</sup> Other symptoms may include fever, headache, epistaxis, and purulent nasal discharge.<sup>1,3-8</sup> In the case of an anterior abscess, rhinoscopy with nasal speculum or endoscope will reveal the fluctuant septal mass. However, posterior abscesses can also occur.<sup>4</sup> These represent a more significant diagnostic challenge and can be mistaken for turbinate swelling but should be suspected in the setting of rapid-onset nasal obstruction without evidence of anterior masses.<sup>4</sup> Radiological imaging can also serve as diagnostic confirmation and aid in assessing disease extent.<sup>10</sup>

Prompt diagnosis and treatment is critical to avoid facial deformities or skull-base and intracranial spread.<sup>1,2,10</sup> The former involves septal mucoperiosteal erosion causing blood supply compromise and rapid avascular necrosis of the septal cartilage, with formation of a saddle nose, as shown in Figure 2. The potential for life-threatening complications occur as the infection expands contiguously, leading to possible orbital cellulitis, meningitis, cavernous sinus thrombosis, and sepsis.<sup>1,2</sup> The latter is facilitated by valveless dural venous and cavernous sinus connections and anterior skull base lymphatics.<sup>14</sup>

The diagnosis of NSA also warrants immediate empiric, parenteral broad-spectrum antibiotics.<sup>1</sup> Fine-needle aspiration allows for bacterial culture and further antibiotic tailoring. However, surgical incision and drainage is required for definitive treatment.<sup>1,2,10</sup> Recurrence can occur, as highlighted in our case. Thus, nasal packing continued antibiotic therapy, and close monitoring are all important steps in managing NSA following surgery.

## Conclusion

NSA have become increasingly uncommon with current antibiotic therapy, but they still arise. We highlight here the case of idiopathic abscess formation in an otherwise healthy adolescent. Although rare, spontaneous abscess formation can occur. Prompt diagnosis and treatment are essential in mitigating the potentially life-threatening complications of the disease.

## Acknowledgements

None.

## Author contributions

J.M. and N.M. contributed to all aspects of this manuscript, including report conception, acquisition and analysis of data, and drafting of the article.

## Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## ORCID iD

James Robert Macaskill  <https://orcid.org/0000-0002-9169-6239>

## References

1. Alshaikh N and Lo S. Nasal septal abscess in children: from diagnosis to management and prevention. *Int J Pediatr Otorhinolaryngol* 2011; 75(6): 737–744.
2. Cheng LH, Wu PC, Shih CP, et al. Nasal septal abscess: a 10-year retrospective study. *Eur Arch Otorhinolaryngol* 2019; 276(2): 417–420.
3. Li J, Tao Y and Shi X. A case report of spontaneous nasal septal abscess in a child. *Ear Nose Throat J* 2023; 102(4): NP195–NP198.
4. Berlucchi M, Tomasoni M, Bosio R, et al. Spontaneous abscess of the posterior nasal septum: an unusual cause of nasal obstruction in children. *Ann Otol Rhinol Laryngol* 2021; 130(8): 966–969.
5. Cai Y, Saqi A and Haddad J Jr. Spontaneous nasal septal abscess presenting as a soft tissue mass in a child. *J Emerg Med* 2017; 52(4): e129–e132.
6. Huang YC, Hung PL and Lin HC. Nasal septal abscess in an immunocompetent child. *Pediatr Neonatol* 2012; 53(3): 213–215.
7. Swain SK, Gupta S, Banerjee A, et al. An unusual presentation of nasal septal abscess in 13-year-old boy. *Apollo Med* 2018; 15(1): 41–43.
8. Eavey RD, Malekzadeh M and Wright HT Jr. Bacterial meningitis secondary to abscess of the nasal septum. *Pediatrics* 1977; 60(1): 102–104.
9. Maan AS, Kaur G, Arora R, et al. An unusual case of a pediatric nasal septal abscess with life-threatening complications in COVID-19 pandemic. *Indian J Otolaryngol Head Neck Surg* 2022; 74(Suppl 2): 2795–2798.
10. Cheng J and Smith LP. Intranasal drainage for pediatric nasal abscesses. *Otolaryngol Head Neck Surg* 2014; 151(1): 179–181.
11. Beck AL (1925). Abscess of the nasal septum complicating acute ethmoiditis. *Arch Otolaryngol* 1945; 42: 275–279.
12. Shah SB, Murr AH and Lee KC. Nontraumatic nasal septal abscesses in the immunocompromised: etiology, recognition, treatment, and sequelae. *Am J Rhinol* 2000; 14(1): 39–43.
13. Faden H and Mohmand M. Infections associated with *Streptococcus constellatus* in children. *Pediatr Infect Dis J* 2017; 36(11): 1099–1100.
14. Fatima SN, Sarwar F and Khan MS. Nasal septal abscess as a sequela of orbital cellulitis: an uncommon presentation. *SAGE Open Med Case Rep* 2018; 6: 2050313X18778726.