The occasional nasal septal hematoma management

Jason Thompson, MD[1], Kristina Pulkki, MD[2], Sarah M. Giles, MD[3,4]

[1]Resident, Department of Anaesthesia, Faculty of Medicine, Queen's University, Kingston, Ontario, Canada, [2]Department of Surgery, Thunder Bay Regional Health Sciences Centre, Northern Ontario School of Medicine University, Thunder Bay, Ontario, Canada, [3]Department of Family Medicine, Northern Ontario School of Medicine University, Thunder Bay, Ontario, Canada, [4]Emergency Room Department, Lake of the Woods District Hospital, Kenora, Ontario, Canada

Correspondence to: Sarah M. Giles, sgiles@lwdh.on.ca

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INTRODUCTION

Nasal fractures are the most common facial fracture in adult and paediatric populations.[1,2] Trauma seen in sports, motor vehicle accidents, domestic violence and non-accidental childhood injury[3] can cause nasal fractures. Many nasal fractures involve injury to the septum which can develop into a septal hematoma.[4] Once diagnosed, incision and drainage of the hematoma must be performed within 72–96 h[5] of onset to reduce the likelihood of septal cartilage necrosis, nasal deformities and complications from the infection.[4] In large centres, an emergency physician or otolaryngologist generally performs the procedure; however, it is firmly within a rural generalist's scope of practice to diagnose and manage septal hematomas.

ANATOMY AND PHYSIOLOGY [FIGURE 1][6]

The nasal septum has two main functions: creation of two cavities for air transmission and structural support for the nose.[7] It consists of the quadrangular cartilage which is inferior to the nasal bone[8] and superior to the maxillary, pre-maxilla and palatine crests.[7] Posteriorly, the septum is composed of bony structures including the vomer, the perpendicular plate of the ethmoid bone and the maxillary crest.[8] It is anchored by the upper and lower lateral cartilages.[8] The septum has four layers of tissue overlaying it, collectively named the mucoperichondrium.[9] Going superficial to deep, the layers of the mucoperichondrium are the mucosal layer, basal layer, lamina propria and perichondrium.[9]

Blood supply to the septum occurs from branches of both the internal and the external carotid artery [Figure 2].[7] Off the internal branch, the anterior ethmoidal artery supplies the superior aspect of the septum.[7] Off the external branch, the sphenopalatine artery supplies the posterior and inferior septum.[7] Finally, off the external branch, the superior labial artery and greater palatine artery supply the anterior portion of the septum, known as Little's area.[7,10] All of these arteries converge at Kiesselbach's plexus located within Little's area.[10] Venous flow leaves the septum through multiple outflow tracts. The anterior septum drains through the anterior facial vein.[11] The posterior septum drains from either the ophthalmic vein or the pterygoid plexus which converge at the cavernous sinus within the cranium.[8,11] Sensory innervation to the septum is supplied by the anterior and posterior ethmoid nerve, as well as the sphenopalatine nerve.[5]

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AETIOLOGY

Central proximity and protrusion from the face make the nose an optimal location for injury.[12] The force of trauma can disrupt blood flow to the perichondrium by rupturing the attached blood vessels within the mucoperichondrium, causing bleeding to accumulate in the subperichondrial space.[4,13] If the septal cartilage fractures, blood can migrate through the septum and cause a unilateral septal hematoma [Figure 3][14] to develop into a bilateral hematoma [Figure 4].[15,16] Blood contained within the subperichondrial compartment lifts the mucoperichondrium off the septum, and subsequently inhibits blood flow to the septum, resulting in ischaemia and septal necrosis within 72 h from onset.[5,17] Stagnant blood and necrotised cartilage are good media for infection. When present, bacteria can release proteolytic enzymes which further break down the septal cartilage.[4] This necrosis can lead to irreversible destruction of the nasal cartilage and result in a nasal bridge collapse.[18] This collapse, known as a 'saddle nose deformity', is only reparable by rhinoseptoplasty.[10,18] Furthermore, unmanaged septal hematomas may progress into an abscess, orbital cellulitis, sepsis, meningitis, osteomyelitis, intracranial abscess or cavernous sinus thrombosis.[4,10] Therefore, proper recognition-and-intervention for septal hematomas by rural clinicians is imperative.

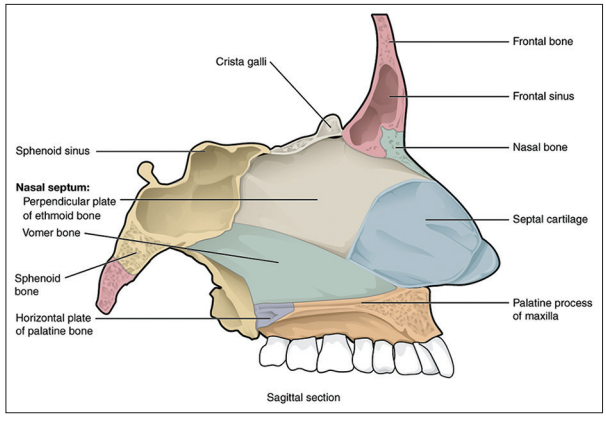


Figure 1: Bone of nasal cavity.[6]

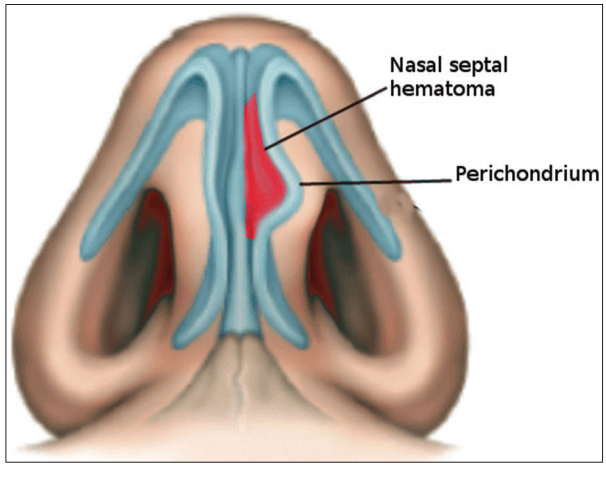


Figure 3: Nasal septal hematoma.[14]

PHYSICAL EXAMINATION AND DIAGNOSIS

Nasal injuries typically involve trauma of varying severity, so it is imperative to assess airway, breathing and circulation, conduct a full set of vitals and complete a thorough neurological examination before septum assessment.[19] Septal hematomas are a clinical diagnosis. The most common presentation is a septal bulge creating obstruction, but it may also present with facial pain, facial lacerations, fever or rhinorrhea.[4] An obstructing bulge may also represent a deviated septum.[3] To differentiate, take a cotton tip or blunt instrument and press it into the bulge.[13] If it is boggy or compressible, a septal hematoma is more likely.[4] If it is firm, a deviated nasal septum is more likely.[4] A practitioner can also confirm if a bulge is a hematoma by aspirating blood from the bulge with a needle.[19] Note, if the hematoma has coagulated, attempting to aspirate blood may fail.

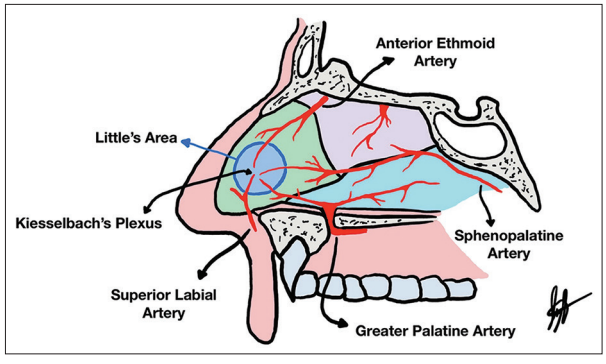


Figure 2: Septal artery flow.

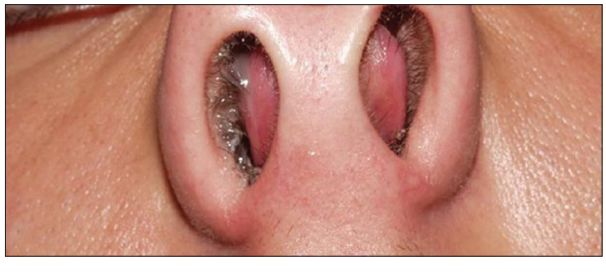


Figure 4: Bilateral septal hematoma.[16]

EQUIPMENT [FIGURE 5]

1. Visualisation:
   - Nasal speculum
   - Light source according to available resources (i.e. headlamp or otoscope).
2. Cleansing:
   - Seventy per cent isopropyl alcohol pad or chlorhexidine gluconate 2% and 70% isopropyl alcohol swab.
3. Vasoconstriction:
   - Cotton tip applicator, cotton balls or nasal pledgets
   - Xylometazoline or oxymetazoline and 2% lidocaine.
4. Local anaesthetic:
   - Two per cent lidocaine with epinephrine 1:100,000 (if epinephrine is available) for combined anesthetising and vasoconstricting
   - One millilitre syringe
   - 25–27 g needle × 1.5″ L.
5. Aspiration:
   - Ten millilitre syringe
   - 18 g needle × 1.5″ L.
6. Incision:
   - Scalpel size #15 or #11.
7. Forceps:
   - Bayonet forceps.
8. Suction:
   - Frazier suction.
9. Irrigation:
   - Angiocatheter (20 g intravenous angiocatheter)
   - Normal saline in a 10-mL syringe.
10. Nasal packing:
    - Nasal tampon with strings size 5.5 or 7.5 cm for anterior packing/sponge with water-soluble antibiotic ointment or saline 100 mL bottle.

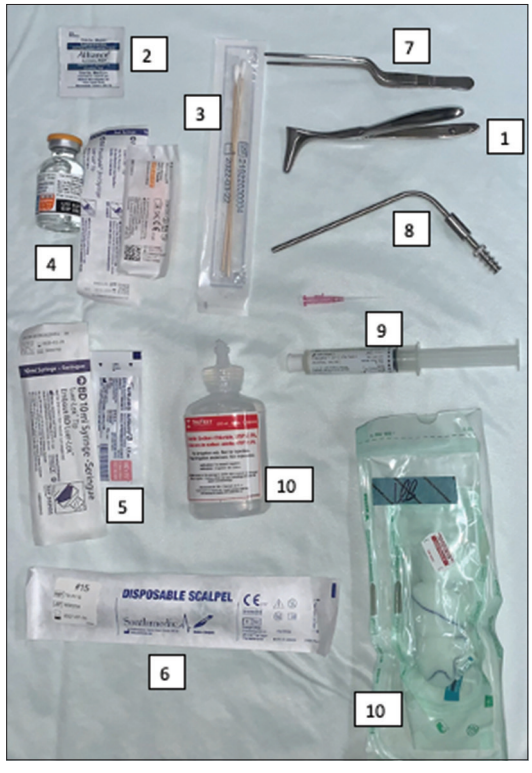


Figure 5: Nasal septal tray.

PROCEDURE

1. Position the seated patient by extending their head[10]
2. Cleanse the surrounding external skin of the nares using either antiseptic 70% isopropyl alcohol swab or chlorhexidine gluconate 2% and 70% isopropyl alcohol solution.[12] Let the site dry for 30 s–1 min[12]
3. Insert a nasal speculum, opening it vertically to visualise the nasal cavity,[12] and use an otoscope/headlamp as a light source [Figure 6]
4. Soak either pledgets, cotton balls or cotton tip applicators in vasoconstricting agents xylometazoline or oxymetazoline[20] mixed with anaesthetising 2% lidocaine in a 1:1 ratio.[3] If using cotton balls, stretch them out horizontally to lengthen the balls and match the length of the septum. Use bayonet forceps to insert pledgets or cotton balls bilaterally into the nares. Leave these in place for 5–10 min to anaesthetise and vasoconstrict the nares[17,21]



Figure 6: Nasal speculum insertion.

- If using a cotton tip applicator, place it on the roof of the nasal cavity to create a nerve block bilaterally as demonstrated in Figure 7.[12]

5. Remove the pledgets/cotton balls/cotton tip applicator. Using a 1 mL syringe with a 25–27 g × 1.5″ needle inject 2% lidocaine, with 1:100,000 epinephrine if available, to the anterior aspects of the septal epithelium known as the caudal edge and the columella between nares.[7] Allow it 10 min to act to ensure the septal hematoma is anaesthetised[21]
6. Attempt to aspirate blood from the septal hematoma using an 18-g needle on a 10-mL syringe.[18] If any concern of infection, send the aspirate for gram staining and anaerobic and aerobic culturing[12]
7. To remove any remaining clot and prevent accumulation of another hematoma incise the hematoma with a size #15 or #11 scalpel, making either a horizontal incision of 5–10 mm,[17,22] or vertical incision 1–2 cm along the caudal septum[12] down to the cartilage. One technique is to make a vertical 'L'-shaped incision.[12] Care must be taken to only cut into the hematoma and avoid any of the surrounding structures [Figure 8]
8. Gently spread apart the incision using bayonet forceps and evacuate any clots with Frazier suction.[10] Make the incision wider if required to remove coagulated blood and examine the septum for necrosis.[17] A bilateral septal hematoma, in the majority of cases, can be evacuated out of a single nasal cavity incision as the fractured septum allows passage of blood from the opposite cavity when contralateral nasal septal pressure is applied.[12] If this fails to excise the hematoma, repeat the same steps listed above in the other nasal passage
9. With an angiocatheter attached to a 10-mL syringe of normal saline, irrigate within the incision to flush out any remaining clots[22]
10. The final step is to pack the nares bilaterally with a nasal tampon/sponge to prevent recurrence of a septal hematoma [Figure 9][17]
    - Select appropriately sized tampon that has the length for anterior packing, such as 5.5 cm.[23] Smear it with either antibiotic ointment or petroleum jelly before placement.[23] In the horizontal plane, aligned with the ear lobe, insert the nasal tampon or nasal sponge with bayonet forceps to assist if needed.[12] Once in place, infiltrate it with sterile water for further expansion.[23] This compresses the tissue in the nasal cavity and prevents the recurrence of a hematoma.[17] Note, if available, the tampon is an easier approach and better tolerated than packing, from a patient's perspective.[12]



Figure 7: Cotton tip applicator.

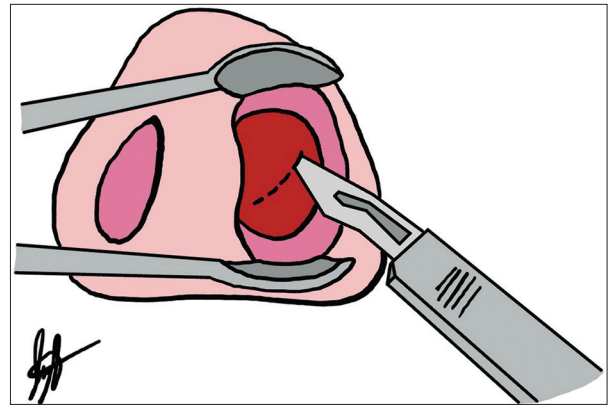


Figure 8: Nasal septal hematoma incision.



Figure 9: Nasal tampon insertion.

FOLLOW-UP INSTRUCTIONS

Best practice is to remove the packing after 24–36 h.[10] Discharge the patient with pain control, such as acetaminophen, informing them that hematomas take approximately 1 week to heal.[12,17] Tell patients to avoid non-steroidal anti-inflammatory drugs as they increase the risk of bleeding.[12] If there is concern for infection, or if packing is to remain *in situ* for >24 h, one should consider starting the patient on antibiotic coverage for common bacteria such as *Streptococcus pneumoniae* or *Staphylococcus aureus*.[17,22] Inform patients they need to return to the emergency department if they develop signs or symptoms of infection, signs of meningitis or if any nasal bleeding occurs.[12] Finally, consultation with ear, nose and throat needs to be established for patients who go on to develop repeat septal hematomas, abscesses, structural saddle deformities or complications listed previously.

CONCLUSION

Septal hematomas may result from direct trauma to the nose. Rural clinicians should look for nasal septal hematomas when assessing patients with facial or nasal trauma. If missed, permanent saddle nose deformities from septal necrosis can occur, and possible complications such as sepsis, abscess or meningitis may develop.[4,13] Septal hematomas are manageable in a rural setting and the steps to promptly assess, diagnose and treat them have been provided here for a clinician to follow.

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