The occasional nasal fracture

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This article has been peer reviewed.

INTRODUCTION

Due to its prominence, it is not surprising that the nose is the most commonly fractured bone in the face.[1-3] Blunt facial trauma from contact sports, motor vehicle collisions and violent assaults account for the majority of nasal fracture incidents.[1-5]

As with all presentations to the emergency room, the priorities in treating a suspected nasal fracture are to manage the airway, breathing and circulation. Nasal fractures can herald intracranial trauma and orbital or midface fractures. Careful examination is essential to distinguish between an isolated nasal fracture and more extensive injury.

The diagnosis of a nasal fracture is based on a focused history and physical examination. Most patients will complain of pain, swelling, deformity and epistaxis with or without deformity after facial trauma. It is not unusual for patients to delay presentation to the Emergency Room (ER) in hopes that the swelling and deformity will resolve.[6]

During the physical examination, a step-off defect can be detected by palpating a bony "step" interruption in the smooth contour of the nasal cartilage. Intercanthal distance should be measured for traumatic telecanthus (increased intercanthal distance) to determine the presence of nasoorbital ethmoid fractures.[4] Normal intercanthal distance ranges are 28–34 mm in adults or approximately the horizontal distance of one eye.[4] Early identification of a septal haematoma is important as delays in draining them can lead to abscess formation and significant cartilage loss.

WHEN TO IMAGE?

Plain X-rays can be obtained; however, they do not change management. Some otolaryngologists suggest that nasal bone X-rays do not need to be obtained if:

1. Pain and swelling are isolated to the bony bridge of the nose
2. The patient can breathe through each nostril
3. No septal haematoma is present.[2]

The views for a nasal X-ray, if required, are a lateral view to evaluate the nasal dorsum and an occipitomental view for the lateral nasal walls if the above conditions are not met.[3] Patients should be referred to a regional centre for computed tomography (CT) scan if concern exists about a more extensive injury in the nasal region or a serious co-morbid head injury.[2] For instance, an increase in the intercanthal distance suggests a potential naso-orbito-ethmoid fracture, rather than an isolated nasal fracture, and may be associated with a basal skull fracture.[2]

Access this article online

Quick Response Code:

Website: www.cjrm.ca

DOI: 10.4103/CJRM.CJRM_7_18

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How to cite this article: Ollier M, Ollier S, Giles SM. The occasional nasal fracture. Can J Rural Med 2019;24:18-22.

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UNDISPLACED VERSUS DISPLACED FRACTURES

An undisplaced nasal fracture can be treated conservatively with analgesia and ice.[5] If evaluated within the first few hours of injury, simple, non-comminuted isolated displaced nasal fractures can be reduced immediately in the ER.[7,8] The key principle of closed reduction is to apply force opposite to the vector of trauma.[6,9] Although contention exists surrounding the use of local versus general anaesthesia for preferred means of closed reduction, both methods are found to be effective.[5]

Procedure

1. For local anaesthesia, use 1% lidocaine with 1:100,000 epinephrine. If available, administer spray lidocaine to the fracture
2. Soak nasal packs in lidocaine or cocaine and insert into anterior nasal cavity. Stretched out cotton balls can be used if nasal packs are unavailable. Let sit and allow for the first round of anaesthetic to develop
3. Then, inject 5 mL over the dorsum of the nose from a single skin puncture on the midline dorsum between the eyes [Figure 1]
4. Applying local anaesthetic intranasally can be very helpful if doing a nasal elevation. This is done by injecting both the septum and lateral nasal wall with more lidocaine, using a 30G needle [Figure 2]. Complications of aesthesia can arise if too much volume is injected, which obscures the nasal shape and obscures the reduction[10]
5. Following anaesthesia, apply digital pressure to the side that is outfractured and move it medially. Often this will also outfracture the depressed side because the nose is fractured as a single unit
6. If this does not work, inject a small amount of lidocaine inside the nose on the lateral rim.
7. Then, use a Boies' elevator or simply the widest portion of a scalpel handle to apply the outward pressure to elevate a depressed nasal bone [Figure 3]
8. Careful measurement of the intercanthal distance is required, or otherwise, the instrument will apply pressure to the unfractured bone above the fracture. Complications of reduction can include injury to the cribriform plate if the elevator is advanced too far into the nasal vault.[10] Care is also required not to let the instrument inadvertently slip below the lower edge of the nasal bone when applying outward pressure – this can happen very suddenly, leading to a tear in the ala
9. Some force may be required to correctly reposition the bones; this will vary depending on the degree of the fracture.[9,10] A septal reduction is beyond the scope of an occasional operator and should be done under general anaesthesia
10. All reduced nasal fractures must be splinted following a completed procedure[6,8-10] [Figure 4].

Nasal fractures with severe septal deformity may be reduced using closed reduction; however, this method alone is unlikely to correct the nasal dorsum and may lead to cosmetic concern.[11] Closed comminuted, open comminuted and complicated fractures (fractures involving a haematoma, cerebrospinal fluid (CSF)



Figure 1: (a) Alcohol wipes, 30G needles, 1% lidocaine. (b) 5 ml of 1% lidocaine is injected from a single skin puncture on the midline dorsum of the nose.

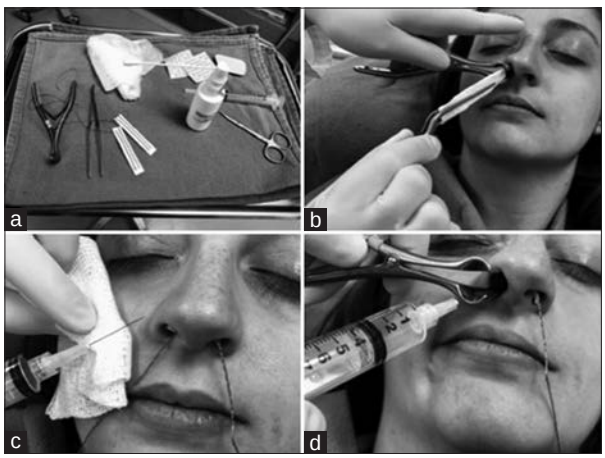


Figure 2: (a) Subnasal speculum, Bayonet forceps, nasal packs, gauze, steri strips, nasal cast, spray lidocaine and 30G needle, scissors. (b) Bilateral anterior nasal packing. (c and d) 5 ml of 1% lidocaine is injected intranasally to both the septum and lateral nasal wall.

rhinorrhoea, nerve damage and severe displacement) should be referred to ear, nose and throat (ENT) for appropriate care.[12] If a displaced nasal fracture involves exposure of nasal cartilage, prophylactic antibiotic therapy is necessary.[2]

CO-MORBID HEAD INJURY AND EPISTAXIS MANAGEMENT

Nasal fractures are often associated with epistaxis. Epistaxis should be managed in the usual manner with persistent bleeding raising the possibility of a posterior bleed.[13] Sometimes, a bad fracture can cause a bleed from the anterior ethmoid artery. These are difficult to control and often fail conventional packing. Occasionally, a bleed between the cartilage and the septum will form a septal haematoma.[2] The haematoma should be drained immediately to prevent septal necrosis.[2] Blunt facial trauma causing a nasal fracture can also cause a co-morbid head injury. Rhinorrhoea suggests a CSF leak[2] and a basal skull fracture. Fluid can be tested for glucose content or, if mixed with blood, for a halo sign [Figure 5]. Specialised laboratories can test for B2 transferrin, a definitive test for CSF, but this is unlikely to be available in the remote and rural environment.

A suspected CSF leak is an indication for a CT scan of the head if feasible in the rural environment.[2] Although the majority of CSF leaks resolve spontaneously, contact otolaryngology for further advice if the leak persists for more than 7 days. Patients should be counselled to avoid the supine position to minimise pressure at the site of the dural tear. At this time, the literature does not suggest prophylactic antibiotics for CSF leaks.[14]

Conservative treatment has been advocated in cases of immediate-onset CSF rhinorrhoea following accidental trauma, given the high likelihood of spontaneous resolution of the leak.[15] Conservative management consists of a 7–10 days trial of bed rest with the head of the bed elevated approximately 15°–30°.[15,16] This angle of inclination is sufficient to reduce the CSF pressure at the basal cisterns.[15,16] Coughing, sneezing, nose blowing and heavy lifting should be avoided as much as possible.[15,16] Stool softeners should be used to decrease the strain and increased intracranial pressure associated with bowel movements.[16]



Figure 3: Closed reduction. Digital pressure is applied to the outfractured bone. A bayonet forceps handle is used to reduce depressed bone.

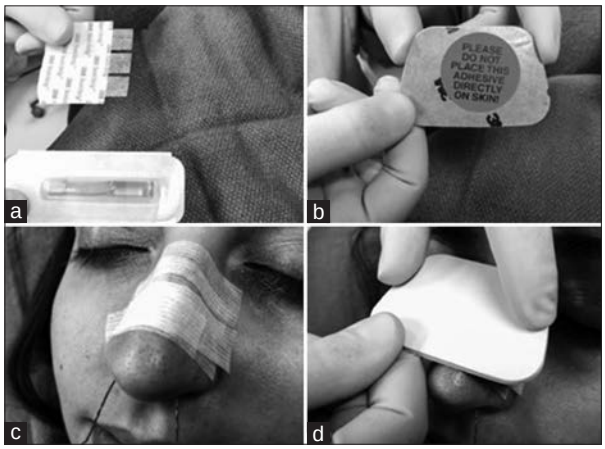


Figure 4: Splinting of a reduced nasal fracture. (a) Steri strips and mastisol. (b) Nasal cast. (c) Mastisol is applied to the skin, followed by steri strips. (d) Soften the nasal cast in warm water and apply over steri strips.

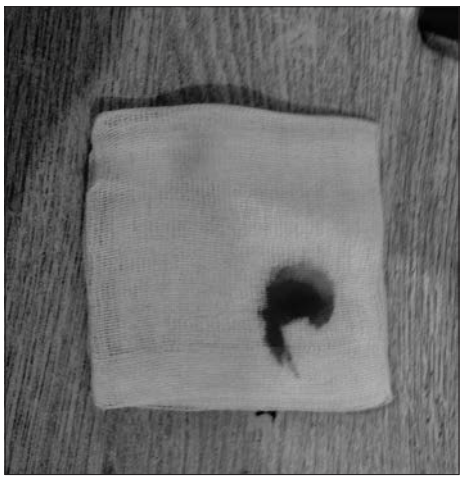


Figure 5: An example of the "halo sign." Cerebral spinal fluid produces a clear ring around the blood from the nose of a patient who sustained facial trauma. The halo sign should increase suspicion of a basal skull fracture.

DELAYED PRESENTATION

In general, three windows of treatment exist for managing nasal fractures. If the patient presents within a few hours following the injury, reduction can be performed immediately. Often, many hours pass before the patient receives care in an emergency setting. In these cases, swelling in the nasal region obscures a proper physical assessment of the fracture. The next window of treatment occurs 5–7 days following the injury, to allow swelling to subside.[8] Reduction of a nasal fracture is optimally preformed within 2 weeks following the injury before the fractured bones begin to fuse.[8] If a patient is delayed in seeking medical care past 2 weeks, the nasal bones will begin to heal in the deformed configuration. Surgical interventions to realign and to correct disfigurement can be performed by ENT 3–6 months following the injury.

COSMETIC VERSUS MEDICAL

In addition to functional concerns, nasal fractures are associated with psychological concerns surrounding cosmetic appearance. The primary concern of treatment is ensuring that nasal airways are open and unobstructed. An unreduced septal fracture is the most common cause of residual nasal deformity.[9] If persisting functional concerns exist, provincial and territorial governments will cover corrective surgical treatment; however, they will not cover cosmetic procedures alone.[17]

MANAGEMENT IN CHILDREN

Nasal fractures in children require some special considerations, but otherwise follow general treatment guidelines for adults. A bluish discolouration of the nasal bridge is a common clinical finding in paediatric nasal fractures[18] and should not cause concern. Trauma is less likely to be the mechanism of nasal injury in children; however, special attention should be given to the nasal region as septal injuries are often missed.[10] Similar to adults, closed reduction of displaced nasal fractures is effective in paediatric cases presenting within 2 weeks of the injury. In cases requiring rhinoplasty, age-specific anatomy and facial growth must be considered. Surgery is recommended if the fracture interferes with nasal airways and breathing or if the deformation of the septum is so significant that regular growth will be impeded. Otherwise, surgical intervention ideally is performed around 16 years of age when growth of the nasal region is complete.[6,19-20]

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest.

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