Deviated Nasal Septum and its management A straight nasal septum is rather rare

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Authors

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Introduction:

Nasal cavity is divided into two portions by the presence of amid linenasal septum. The nasal septum has two components i.e. Bony and cartilaginous ones. Bony components of nasal septum include:

1. Perpendicular plate of ethmoid superiorly – It articulates with the cribriform plate of ethmoid. Traumatic manipulation of perpendicular plate of ethmoid can lead to CSF leak. If this portion of nasal septum is the cause for nasal obstruction then it should be removed by sharp dissection rather than by twisting and pulling it out.

2. Vomer – Inferoposterior portion of nasal septum is formed by this bone. It is a keel shaped bone extending from sphenoid bone posteriorly and superiorly from the nasal crests of maxilla and palatine bone.

3. Nasal crest of palatine bone in the posterior portion of nasal septum

4. Nasal crest of maxilla forming the inferior portion of nasal septum

5. Anterior nasal spine forms antero inferior most portion of nasal septum

6. Nasal spine of frontal bone forms the antero superior portion of nasal septum

Cartilaginous portion of nasal septum include:

1. Septal cartilage forming anterior portion of nasal septum

2. Medical crus of alar cartilage

3. Vomeronasal cartilage: This thin strip of cartilage lies between cartilaginous nasal septum and the vomer

Fig. 1: Anatomy of nasal septum
Septal deviation:

Varying degrees of septal deviations have been documented at birth. These deviations have a tendency to accentuate as the child grows. A dot central nasal septum is a clinical curiosity. Eventhough septal deviations are common they are usually not severe enough to cause symptoms.

Etiology of septal deviation:

Direct trauma – Many septal deviations are a result of direct trauma and this is frequently associated with damage to other parts of the nose such as fractures of nasal bone. Fractures involving nasal bones are the commonest fractures involving the facial skeleton. Nearly 40% of nasal septal fractures are unidentified during closed reduction of fractures involving nasal bones. These unrecognized / untreated septal fractures usually cause septal deviations at a later date. Fractures involving nasal bones are rather uncommon in children under the age of 5. The incidence of nasal bone fractures progressively increases as the child grows older. The peak occurs around the age of 30. Studies stress the importance of identifying septal mucosa tear during clinical examination of these patients. Almost all patients with septal mucosal tear following nasal bone fracture invariably have associated fractures of nasal septum also.

Birth moulding theory – Many patients with septal deviation do not give history of trauma. Birth moulding theory was propounded by Gray. According to him abnormol intrauterine posture may result in compression forces acting on the nose and upper jaws. Displacement of septum can occur in...
these patients due to torsion forces that occur during parturition. Dislocations are more common in primipara and when the second stage of labour lasted for more than 15 minutes. Dislocations are generally to the right in the case of left occipitoanterior presentations and to the left with right occipitoanterior presentations. Subsequent growth of nose accentuates these asymmetries.

*Differentiation growth between nasal septum and palate* – This is the most acceptable theory today. When the nasal septum grows faster in certain individuals than the palate then the nasal septum starts to buckle under pressure.

**Pathophysiology:**

Deformity of nasal septum may be classified into:

1. Spurs
2. Deviations
3. Dislocations

Spurs – These are sharp angulations seen in the nasal septum occurring at the junction of the vomer below, with the septal cartilage and/or ethmoid bone above. This type of deformity is the result of vertical compression forces. Fractures that occur through nasal septum during injury to the nose may also produce sharp angulations. These fractures heal by fibrosis that extend to the adjacent mucoperichondrium. This increases the difficulty of flap elevation in this area.
Deviations – May be C shaped or S shaped. These can occur in either vertical or horizontal plane. It may also involve both cartilage and bone.

Dislocations – In this the lower border of the septal cartilage is displaced from its medial position and projects into one of the nostrils.

In patients with septal deviation a compensatory hypertrophy of the turbinates and bulla may occur on the side opposite to the deviation. If compression forces are involved the septal deviations are often asymmetrical and may also involve the maxilla, producing flattening of the cheek, elevation of the floor of the affected nasal cavity, distortion of the palate and associated orthodontic abnormalities. The maxillary sinus is usually slightly smaller on the affected side.

Anterior septal deviations are often associated with deviations in the external nasal pyramid. Deviations may affect any of the three vertical components of the nose causing:

1. Cartilaginous deviations
2. The C deviation
3. The S deviation.

Cartilaginous deviations:
In these patients the upper bony septum and the bony pyramid are central, but there is a dislocation/deviation of the cartilaginous septum and vault.

The C deviation:
Here there is displacement of the upper bony septum and the pyramid to one side and the whole of the cartilaginous septum and vault to the opposite side.

The S deviation:
Here the deviation of the middle third (the uppercartilaginous vault and associated septum) is opposite to that of the upper and lower thirds. With deviations of the nose, the dominant factor is the position of the nasal septum, hence the adage ‘as the septum goes, so goes the nose’. The first step, therefore in treating the twisted nose is to straighten the septum, and if this objective is not achieved, there is no hope of successfully straightening the external pyramid.

Effects of septal deviation:
Nasal obstruction – This is always found on the side of the deviation, and can also be present on the opposite side as a result of hypertrophic changes of the turbinates.

Mucosal changes – The inspiratory air currents are abnormally displaced and frequently gets concentrated on small areas of nasal mucosa, producing excessive drying effect. Crusting will occur and the separation of the crusts often produces ulceration and bleeding. Since the protective mucous layer is lost the resistance to infection is reduced. The mucosa around a septal deviation may become oedematous as a result of Bernouilli’s phenomenon. This oedema further increases nasal obstruction.

Fig. 5: Components of nasal septum
Fig. 6: S shaped deviation of nasal septum causing external deviation of nose

C shaped deviation of nasal septum causing external deviation of nose
Neurological changes – Pressure may be exerted by septal deviations on adjacent sensory nerves can produce pain. This was first explained by Sluder and the resultant condition became known as ‘the anterior ethmoidal nerve syndrome’. In addition to these direct neurological effects, reflex changes perhaps may result from septal deformities which affect the nasopulmonary and nasal reflexes.

Symptoms:

The symptoms caused by septal deviations are entirely the result of their effects on nasal function. The dominant symptom being nasal obstruction, but this is rarely severe enough to cause anosmia.

Signs:

Septal deviations are evident on anterior rhinoscopy. This should be done without the use of nasal speculum because the insertion of speculum is sufficient to straighten the nasal septum. When the tip of the nose is lifted septal deviation become evident. Nasal obstruction may also be present on the opposite side (paradoxical nasal obstruction). This is due to the presence of hypertrophied turbinates. If the hypertrophy is limited to turbinate mucosa alone then it will shrink when decongestant drugs are used in the nasal cavity. If the hypertrophy is bony then decongestant drops is useless.

Septal deviations in the region of the nasal valve area cause the greatest obstruction, since this is the narrowest part of the nasal cavity. This can be identified by the cottle test. A positive cottle test will confirm the fact that narrowing is present in the nasal valve area. This is done by asking the patient to pull the cheek outwards and this manuver is supposed to open up the area thus reducing the block. The septum should not be considered in isolation and it is necessary to do a careful examination of the lateral wall of the nasal cavity. When ever sinus complications like sinusitis is suspected due to obstruction to the drainage channel of the sinuses by the deviation xray sinus must be taken.

Septal deviation in new born is associated with asymmetry of the nostrils, an oblique columella and tip which points in the direction which is opposite to the deviation. Most of these patients are diagnosed by the use of Gray’s struts. These struts are 4mm wide and 2mm thick and after lubrication, are inserted into the nostrils and then gently pushed backwards along the floor of the nasal cavity, hugging the nasal septum. Normally these struts can be introduced for a distance of 4 – 5 cms, but in cases of septal deviation a frank obstruction is encountered, usually 1 – 2 cms from the nostril.

Role of Imaging:

CT scan can play a role in identifying septal fractures. These fractures may not be evident in routine radiographs of faciomaxillary regions.

Since fractures involving nasal bones have been implicated as common cause for septal deviations classification involving nasal bone fractures will have a bearing on management modality.

Stranc’s classification of nasal fractures 5:

Lateral oblique:

Unilateral nasal bone fracture with depression of bone

Unilateral depression and lateralization of the contralateralnasal bone

Bilateral nasal bone involvement with fracturing of the frontal process of the maxilla  

Frontal Type:

1: Does not extend posterior to a line drawn from thelower nasal bones to the
maxillary spine

2: Flattening of the cartilaginous and bony structures, septal fractures, and intranasal mucosal injuries

3: Severe collapse of the nasal bones and upper lateral cartilages with telescoping of the septum. Associated intracranial and orbital injuries may occur

Cottle has classified septal deviations into three types:

Simple deviations: Here there is mild deviation of nasal septum, there is no nasal obstruction. This is the commonest condition encountered. It needs no treatment.

Obstruction: There is more severe deviation of the nasal septum, which may touch the lateral wall of the nose, but on vasoconstriction the turbinates shrink away from the septum. Hence surgery is not indicated even in these cases.

Impaction: There is marked angulation of the septum with a spur which lies in contact with lateral nasal wall. The space is not increased even on vasoconstriction. Surgery is indicated in these patients.

**Mladina’s classification of septal deviation**:

Type I: Mild anterior deviation not compromising nasal function. This presents as a unilateral ridge along the nasal valve area. It does not involve the whole length of nasal septum and is not in contact with the lateral nasal valve the nasal air way is not compromised in anyway.

Type II: Anterior vertical deviation compromising nasal airway. There is unilateral vertical ridge in the nasal valve area compromising nasal airway.

Type III: Posterior vertical deviation. In this condition the unilateral vertical ridge lies next to the head of the middle turbinate.

Type IV: S shaped septal deviation

Type V: Horizontal spur is present in the nasal septum always in contact with the lateral nasal wall.

Type VI: Type V deviation with a deep horizontal gutter in the opposite side.

Type VII: Crumpled septum

Indications for submucous resection of nasal septum:

1. Marked septal deviation occurring behind the vertical line passing between the nasal processes of the frontal and maxillary bones. This deviation must be the cause for the patient's symptoms.

2. Closure of septal perforations

3. Source of grafting material

4. To obtain surgical access in hypophysectomy, and vidian neurectomy

Figure showing in which type of deviation SMR should be done. Surgically the septum is divided into anterior and posterior segments by a vertical line passing between the nasal processes of frontal and maxillary bones.
Procedure:

Submucosal resection of nasal septum is ideally performed under local anaesthesia. 4% xylocaine is used as topical anesthetic agent by nasal packing. 2% xylocaine is used as infiltrative anesthetic agent. It is mixed with 1 in 1 lakh adrenaline. Infiltration is done at the mucocutaneous junction on both sides just behind the columella. The floor of the nasal cavity is also infiltrated on the concave side. Killian’s incision is preferred for SMR operations. Killian’s incision is the commonly used incision. It is an oblique incision given about 5mm above the caudal border of the septal cartilage.

The cartilagenous and bony nasal septum is exposed by elevation of mucoperichondrial and mucoperiosteal flaps on both sides. This is done by slicing the septal cartilage just above the columella to access the opposite side. Flaps are elevated on both sides of the nasal septum. the cartilage is fully exposed from both sides and is remove using a Luc’s forceps or a Ballanger’s swivel knife. The flaps are allowed to fall back in place and wound is closed with catgut. Bony deviations along the floor of the nose if any are also chissled out before wound closure.

SMR should not be performed in children because it may affect growth.

Complications of SMR:
1. Septal hematoma
2. Septal abscess
3. Septal perforation
4. Nasal deformities due to excessive removal of dorsal strut of the septum
5. Removal of the columella cartilage will cause pig snout deformity

Diagram showing various types of incisions used in septal surgery
Septoplasty:

This is a more conservative procedure. The anesthesia is the same as described for SMR operation. The incision is always sited on the concave side of the septum. Freer’s hemitransfixion incision is preferred. This is made at the lower border of the septal cartilage. A unilateral Freer’s incision is sufficient for septoplasty. Three tunnels are created as shown in the figure.

Exposure: The cartilagenous and bony septum are exposed by a complete elevation of a mucosal flap on one side only. Since flap is retained on the opposite side the vascularity of the septum is not compromised.

Mobilisation and straightening: The septal cartilage is freed from all its attachments apart from the mucosal flap on the convex side. Most of the deviations are maintained by extrinsic factors such as caudal dislocation of cartilage from the vomerine groove. Mobilisation alone will correct this problem. When deviations are due to intrinsic causes like the presence of healed fracture line then it must be excised along with a strip of cartilage. Bony deviations are treated either by fracture and repositioning or by resection of the fragment itself.

Fixation:

The septum is maintained in its new position by sutures and splints.

Advantages of Freer’s incision:

1. The incision is cited over thick skin making elevation of flap easy.
2. There is minimal risk of tearing the flap
3. The whole of the nasal septum is exposed.
4. If need arises Rhinoplasty can be done by extending the same incision to a full transfixation one.

Use of Wright’s suture to prevent overlap
Advantages of Septoplasty:

1. More conservative procedure
2. Performed even in children
3. Less risk of septal perforation
4. Less risk of septal hematoma

References