Study on Septal Correction: Review of literature and clinical findings

Abstract

Septal reconstruction has many needs and usages. Nowadays people are very much concerned about the way they look and would like to correct them. Septal reconstruction has been immensely used in the field of cosmetics. A successful septoplasty would lead us to know about the pathology of the septum by which we can avoid further complications. It would be further important incase of any sort of nasal obstruction or difficulty in breathing. Deviation of the nasal septum can also be corrected by septal reconstruction by various techniques used for septoplasty. For deviations like extreme S-shaped and wave-like deviation or multiple fractures complete septal reconstruction is the best method to use. The septoplasty is performed endonasally for caudal septal deviation. The use of traction suture to rectify the caudal septum deviation is another type of surgery. Septoplasty usually opens the way for all other rhinoplasty procedures, as a straight, stable septum reflects the attractiveness and functionality of the nose. The patient's history and the surgeon's expertise both have a role in the favourable outcome. Septoplasty is frequently done in conjunction with other nose procedures, such as cosmetic rhinoplasty and endoscopic sinus surgery, to alleviate nasal airway obstruction or headaches induced by rhinologic irritation produced by touch. Endoscopic septoplasty requires the same amount of time and delivers equal, if not better, results than previous procedures. Visualization is vastly improved by endoscopic technology. Isolated deviation, spurs, perforations, and contact sites are examples of distinct septal disorders that can be treated individually using this procedure. In this review article the importance of traction suture is mentioned. The article gives us an idea about the Septoplasty and the ways it can be achieved, its complications, risk factors and a few postoperative points.

Key Points - Septoplasty, Nasal Septal Deviation, Endoscopy, Septal Correction.

Introduction

The septum is made up of three parts:

- Columellar Septum[1]
- Membranous Septum[1]
- Septum Proper - It is made up of a cartilaginous framework that iscovered by the mucous membrane of the nose. Its constituents are:
    1. The perpendicular plate made up of ethmoid bone[1]
    2. Vomer[1]
    3. A large septal cartilage wedged between the above two bonesanteriorly.[1]

Septal correction is a very useful and convenient method for any sort of septal defect. Correction of pathologies is easily achieved by this method. There are various methods by which this can be achieved and septoplastyis one of the commonly used methods. For any type of septal defect, septal repair is a very beneficial and convenient approach. For this procedure many innovative techniques like bone grafts, ethmoid bone graft, caudal septal batten grafting and endoscopic septoplasty are being used. The type and site of the malformation, the patient's target, and the surgeon's choice and experience of all methods of septoplasty. This can be accomplished in a variety of ways, with septoplasty being one of the most popular.

Deviated Nasal Septum usually causes nasal obstruction.

Types of nasal septal deviation (NSD):

- S-shaped deformity[1]
- Spur[1]
- Anterior dislocation[1]
- C-shaped deformity[1]
- Thickening[1]

Indications of Septoplasty

- Severe S-shaped deformity
- Severe wave-like deformity
- Multiple fractures
- C-shaped deformity
- Cosmetic surgery
- Thickening
- Spur
- Difficulty in breathing
- Anterior dislocation of the septum

Objective

The objective to write this piece of literature is to study the methods of septal correction and septoplasty. To study a better approach for the same.

Materials and Methodology

In this article we have gained the literature on Nasal Septal Reconstruction from PubMed, Lancet, StatPearls [Internet], Elsevier, Google Scholar,
Sage journals. While searching various databases. The given key wordsand phrases were used in different platforms and amalgamation: septal
correction, nasal septal deviation, septoplasty, endoscopic septoplasty. A potential source of information was also the reference list of pertinent
articles. There were no attempts to find unpublished data.

Discussion

There are different types of septal deviation and there are different methods to correct them as well. NSD is caused by trauma, for some it is a congenital anomaly, it can be hereditary and pathologic as well. The patient usually complains of feeling a foreign body in the nasal cavity and

it can steer to difficulty in breathing. Collet's test is performed to confirm NSD in a patient. Nowadays people are very conscious about the way theylook, hence it plays a very important role in the cosmetic industry as well.

Etiology for NSD:

- Trauma - It can be caused at birth. Trauma can take place by a sidewise punch on the nose.[1]
- Developmental error - Nasal septum buckling can be caused by unequal growth between the palate and the base of the skull. The palate is frequently and strongly arched in mouth breathers, as it is inadenoid hypertrophy. There is deviated septum.[1]
- Racial factor- It is more common in caucasians.[1]
- Hereditary factors - nasal septal deviation can be present in other family members.[1]

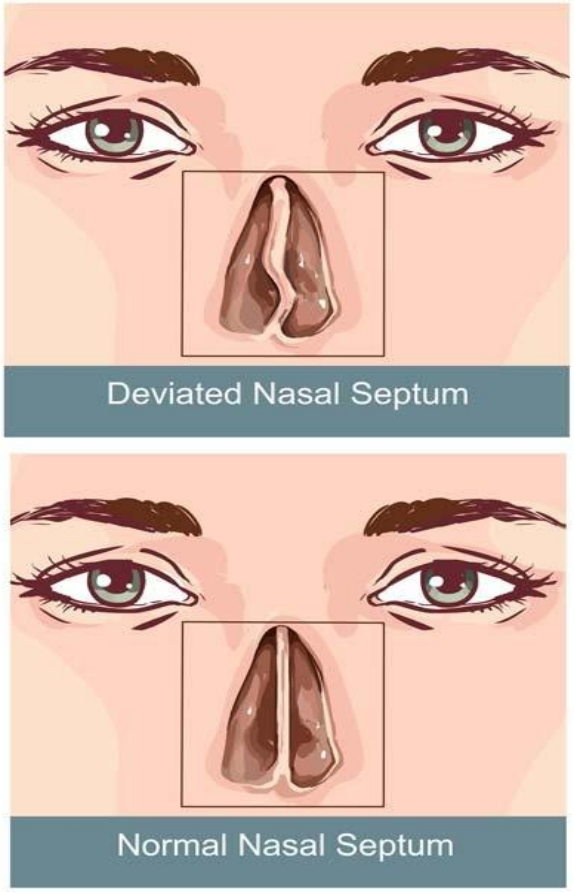

Fig no. 1 [2]

Surgeries for Nasal Septal Deviation

Usually septoplasty paves the way for every other surgeries in rhinoplastyas a linear, stable septum tells about the attractiveness and functioning result. The good result is determined by the patient's history and the
expertise of the surgeon.

According to **Heppt W, Hildenbrand[t] ,** For deviations like extreme S-shaped and wave-like deviation or multiple fractures complete septal reconstruction is the best method to use. If there are cases like
uncomplicated C and S-shaped deformities can be treated endonasally. The septal malformations where the types are complicated s-shaped or multiplefractures septoplasty are one of the best methods to use. It can be even
suitable for wave-like deviation. A procedure using caudal septal batten graft tells us about low risk of complications[4]. Here the septoplasty is performed endonasally for caudal septal deviation. They carried out this procedure under general anaesthesia. The endonasal technique was used tomake a unilateral hemitransfixion incision 2 to 3 mm posteriorly to the
caudal region of the concave side of the nasal cavity. This incision revealed the whole of the caudal margin of the septum from the anteriorseptal angle to the anterior nasal spine. Mucosal elevation has been
conducted on the convex side till just posterior to the maximally convex portion. After conserving a section of the L-strut of the dorsal and caudal cartilaginous septum that was at least 1.5 cm long, the curved portion of the septal cartilage and bone was extracted. Subperichondrial dissection into the nasal floor was conducted after bilateral flap elevation to the pointwhere a bone graft could be placed. The harvested septal bone caudal
septal batten graft was fitted to the desired site, usually on the concave side (but both sides if graft tilt was an issue), and fastened with 5-0 polydioxanone sutures. 1 or 2 through-and-through transcartilage and
transbony sutures were used to repair the gap between the posterior section of the caudal septal bony batten graft and the caudal septum (5-0 polydioxanone sutures). 6-0 chromic gut sutures (Ethicon Inc) were used to close the hemitransfixion incision, and 2 or 3 through-and-through transmucosal sutures (4-0 chromic gut sutures) were utilised to secure both

mucosae to the newly formed caudal septum.[4] The caudal septal deviation surgery can be performed endonasally. This surgery is usually carried out under general anaesthesia. Here a unilateral hemitransfixation incision is used. Septoplasty has been proved important in the treatment of crooked nose. **Lee JW, Baker SR**[5] suggested nasal septal bone grafts can help to rectify caudal septal deviation and stabilise severe cartilaginous malformations or deviations. Nasal septal bone transplants are used to

correct septal deviation. Caudal septal deviation and severe cartilaginous abnormalities or deviations can both benefit from nasal septal bone transplants. In order to rectify septal deviation, nasal septal bone grafts are employed. The septal bone can be used to rectify the caudal bone graft[5].

Aksakal C, Akti S.[6] described the use of traction suture to rectify the

caudal septum deviation. The patients' preoperative nasal obstruction symptom evaluation (NOSE) scores were compared to their six-month postoperative NOSE scores. Furthermore, the findings of the patients' preoperative nasal examinations were compared to those in the postoperative period. This method was found out to be safe to treat caudal septum deviation. **Vatamanesku IV, Ciurea M, Popa DG, Nica OL, Parasca SV**[7] suggested that the most common method for correcting complex septal and pyramid defects is extracorporeal septoplasty. Extracorporeal septoplasty has demonstrated its worth in crooked noses even in our limited series, however it requires ingenuity and a precise dissection approach[7].

To correct the lateral cartilage which is on the lower side can be corrected

by using Columellar strut graft[8]. The partial cutting and suture approach is simple and successful in correcting caudal septal deviation[9].

Endoscopic septoplasty, as opposed to the typical open approach, allows for a better view of nasal anatomy and is especially useful for problems with the posterior septum[10].

Iimura J, Miyawaki T, Kikuchi S, Tsumiyama S, Mori E, Nakajima T,

Kojima H, Otori N[11] told us about a main downside of the Killian incision is the failure to reach the caudal septum and correct caudal septal deviation. In such circumstances, open and hemitransfixion

septorhinoplasty are regarded as required. Due to this difficulty

'J-shaped'[11] incision has been giving results. The J septoplasty procedure for minor caudal septal deviation is simple to execute using a modified

Killian incision and appears to be effective in some patients.

Van Egmond MM, Rovers MM, Hannink G, Hendriks CT, van Heerbeek N[12] conducted an experiment where they found out that septoplasty is more effective than non-surgical treatment for nasal obstruction in people with a deviated septum.

Yazici A, Er HC[13] suggested that different values may be seen in different sections of nasal tomography scans. However, it is still debatable whether the clinical usage of tomography scans might be employed as one of the indication criteria for septoplasty surgery.[13] The evidence for the

superiority of suturing procedures over standard septoplasty packing is now strong, and suturing techniques as a first-line intervention is becoming recommended[14].

Septoplasty performed with Endoscopic Method

Septoplasty is frequently used in conjunction with other nose surgeries, such as aesthetic rhinoplasty and endoscopic sinus surgery, to treat obstruction in nasal airway or headache due to rhinologic reasons caused by irritation due to contact. **Raynor EM**[15] suggested a traditionally

performed using a "headlight" approach prior to these procedures. In cases

of solitary septal spurs or modest septal deviations, power-assisted

endoscopic septoplasty is a beneficial adjuvant. Traditional headlight

septoplasty is preferable for patients who have significant nasal blockage caused by the septum's caudal displacement from the nasal spine.

The other endoscopic surgery was performed by **Getz AE, Hwang PH**[16]**.**

He told about Endoscopic septoplasty procedures and apparatus are discussed, as well as the indications for endoscopic septoplasty and the perks it has over conventional headlight septoplasty. By this method it is much more likely to stay away from recurrent symptoms and new

complications. Endoscopic septoplasty takes the same time and produces similar results as older methods, if not better. Endoscopic technology
substantially improves visualisation. In this method isolated deviation, spurs, perforations, and contact sites are examples of discrete septal diseases that can be handled in a targeted manner.

Gupta N[17] were keen to tell us that in complicated abnormalities,
endoscopic septoplasty has a restricted role. However, it is unquestionably a supplement to the standard method because the condition of the septum may be easily determined during surgery. As a result, the deformity can be better corrected. Septoplasty is frequently used in conjunction with ESS to gain access to the surgical site as well as to improve postoperative nasal
cavity cleaning. Endoscopic septoplasty is becoming more popular as a supplement to ESS. It provides a better view than the classic headlight procedure, when used in conjunction with video monitors, endoscopic septoplasty is also a great teaching tool.
Endoscopic septoplasty is the advanced method of regular septoplasty surgery. It is less invasive and better to operate with. This method improves visualisation. Sometimes it is preferred over the traditional
headlight procedure. Endoscopic septoplasty is useful in removal of focal spurs, this is done when the incision is given just above the spur apex.[18] **Prepageran N, Lingham OR**[19] stated that complications due to
endoscopic method are very less as it increases the visualization.

Endoscopy improves the assessment of posterior nasal septal
abnormalities, identifies the degree of mucosal involvement of the posterior ends of the inferior turbinates and assesses the middle meatus simultaneously. It allows for unbiased evidence of the aetiology of nasal
blockage, which can then be used to evaluate the outcome. The endoscope can readily pass through the septal flaps with only a small amount of flap retraction necessary for optimum visibility. With this as the incision can be made way posterior than others which is just anterior to the deviation, mucosal elevation from the anterior side is evidently reduced. Due to this there are very less chances of edema. **Hong YK, Jeun SS, Park JS, Kim SW, Cho JH, Park YJ, Kim SI, Kim SW**[20] suggested the solution to

treating a deviated nasal septum is the separation of a deviated complex surrounding the sphenoidal process of the septal cartilage. The posterior
septectomy (which includes the removal of this deviated complex) can be accomplished using endoscopic endonasal transsphenoidal approach (EETSA)[20] in combination with the two nostrils–four hands approach.
Thus, as it happens in cases of severe nasal septum abnormalities, EETSA
can begin without prior septoplasty.

Complication

Intranasal drug users, especially people using cocaine are highly
contraindicated[21]. Patients having rhinosinusitis and vasculitis where there is no appropriate medical treatment is contraindicated[21].
Vasoconstriction decongestant nasal spray should be avoided[21]. CSF leak is one of the complications followed by septoplasty surgery which was
commonly seen in patients aged 2.5 to 20 year old, it was usually commonin the right side of the brain[22]. Unilateral blindness[23]. In Crouzon Syndrome, there is a Cerebrospinal Fluid Leak Following Septoplasty[24]. It is one of the very rare complications.

Post Operation

Dubin MR, Pletcher SD[25] suggested that the use of nasal covering afterseptoplasty has been proposed for a variety of reasons. Preventing postoperative problems like bleeding and the formation of synechiae or aseptal hematoma is one of the most prominent reasons for using packing.
Another reason packing may be utilised is to stabilise the remaining cartilage and prevent postoperative deviation. Although it may seem
natural that packing could prevent or reduce the occurrence of these issues,the data to support this claim is at best inconclusive. Furthermore, certain forms of nasal packing have been shown to enhance postoperative pain
and to be a contributing cause in catastrophic complications such toxic

shock. The usual use of postoperative packing following septoplasty

should be questioned due to a lack of data to demonstrate a favourable benefit and the potential for adverse side effects. Risk factors are:

- ➔ Toxic shock syndrome[25]
- ➔ Formation of synechiae[25]
- ➔ A septal hematoma[25]
- ➔ Pain[25]

Nanda MS and Kaur M's[26] research concluded that in comparison to other current medicines such as NSAIDs, oral enzymes are extremely

effective in managing post-operative inflammation and infection. When oral enzymes are given after surgery, patient satisfaction is substantially higher. When oral enzymes are used, the symptoms of post-operative discomfort, nasal blockage, and nasal discharge are significantly reduced.When oral enzymes are used, there is reduced nasal oedema and faster healing of post-operative scars. In comparison to NSAIDs, they have far less negative effects and are far safer.

Risk

Concerns associated with septoplasty include:

- Symptoms such as nasal blockage that persist[27]
- Loss of blood[27]
- A alteration in nose's form[27]
- The septum has a hole in it[27]
- Reduced olfactory perception[27]
- Blood clots in the nasal cavity that must be drained[27]
- Numbness in the upper gums, teeth, or nose for a short time[27]
- Adhesions[28]
- Anesthesia of tooth and upper lip[28]
- Complications of the eyes[28]
- Infection[29-34]

Conclusion

There are various ways to do septoplasty. It is one of the main procedures for septal reconstruction and correction. The incisions given are hemitransfixion incision, Killian incision and Cottle elevator incision. Theway the nose can be altered for the best with the help of septoplasty. It solves the problem of aesthetic look as well as any pathologic problem. Indications for septoplasty are difficulty in breathing, cosmetic purpose, pathology, obstruction in breathing and septal deviation. Various techniques used for this procedure are bone grafts, ethmoid bone graft, caudal septal batten grafting and endoscopic septoplasty. These techniques are widely used and doing a greater good. Regular septoplasty and septoplasty performed endoscopically has its own advantages and disadvantages. Regular septoplasty is majorly used in complicated deviations. It has been used more since it's been an old procedure. It has got many success rates. Endoscopic septoplasty is a more advanced method. It is less invasive. Therefore more looked upon. It is easier to perform and gives more visualisation. It is less invasive and better to operate with. This method improves visualisation. Sometimes it is preferred over the traditional headlight procedure. More encouragement is given to endoscopic septoplasty nowadays as there are very less chances of complication due to better visualisation. There is also a good explanation based on if we artificially procure oral enzymes and give it to patients aftersurgery, it plays a more effective role than NSAIDs. Packing the nose aftersurgery would eventually lead to a decrease in the number of complications like bleeding and hematoma. Both of the methods are important in their own way.

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