

SEPTUM SURGERY GENERAL CONSIDERATIONS

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Introduction

General considerations of surgery of the nasal septum embraces the very extensive field of rhinologic surgery from the submucous resection of the septum alone, to the extensive and complicated combined surgery of the septum and external nasal pyramid.

The surgical judgement required to determine the proper management of problems concerning the nasal septum is developed only after years of diligent study of the anatomy and physiology of the nose in the laboratory and on the operating table.

Pre-operative study of patients including careful history physical examination, photographs, and rhinomonametric studies must be correlated with similar studies post operatively of the patients.

Surgical techniques advocated for rhinologic procedures are many. All must be evaluated, and as many as possible should be mastered so that we will be better prepared to handle problems that may develop at the time of surgery. Individual capabilities of course, must be considered, however thorough knowledge of the basic principles of surgery together with a sound basis of anatomy and nasal physiology as we now understand it, will potentiate whatever our basic capabilities may have been originally.

INDICATIONS

A) Unquestionably the most common indication for surgical correction of the nasal septum is an obstruction of the nasal airway sufficient to prevent adequate nasal respiration. The cause of the deviation whether due to trauma or of congenital origin is only didactic in interest. Aside from the anatomical deformity of the septum itself, arrangement of adjacent structures must be evaluated. These are: upper lateral cartilages, nasal bones, and structures of the external nasal pyramid; structures of the floor of the nose, premaxilla and vomer, the lobule, and the base of the nose.

B) In regard to nasal function. Severe septum deviation may completely block the nasal air passages resulting in mouth breathing, and its unpleasant side affects. The degree of obstruction of course may vary from minimal to complete obstruction.

Minor deviations of the septum may interfere with normal air currents, which in turn are responsible for the development of either localized or generalized atrophy of the nasal mucosa. The deformities of the septum which block drainage from the sinuses, and a spur that may be responsible for recurrent epistaxis, must be corrected.

It must be emphasized that age is no contra indication to rhinologic surgery, and it is especially important to recognize these problems in young children, and correct them as early as possible.

Septum surgery on children will be elaborated upon.

- C) Severe septal deviations are frequently accompanied by deformities of the external nasal pyramid and lobule. These structures also must be modified to properly align the internal nasal structures to provide adequate nasal respiration, and in addition will provide a more pleasing cosmetic appearance.

Surgical Considerations

New concepts of nasal physiology have caused us to revise our thinking in regard to surgical treatment of the nasal septum, and external nasal pyramid.

- a) The so called classical submucous resection of Kilian, Ballenger, Metzbaum and Frier, are no longer suitable in view of these concepts.
- b) The maxilla pre-maxillary approach as advocated by Dr. Cottle affords adequate exposure of the entire septum, and one may select, for removal only that portion of the septum whether it be at the caudal or cephalic border, or any portion in between. This selective removal of the offending portion of the septum provides adequate correction with the removal of only that portion that may be producing symptoms, allowing the remainder of the septum to remain attached to the mucosa on one side, thereby maintaining its blood supply and stability. This is the concept of conservation of tissues in rhinologic surgery which is maintained throughout the procedure, and particularly when the septum and the external nasal pyramid surgery is combined in one procedure. However, should it be necessary to remove the entire septum to adequately eliminate the obstruction, we are prepared to do so. The septum is then reconstructed using autogenous or isogenous bone or cartilage. Specially prepared heterogenous bone and cartilage has been used successfully by Dr. Cottle and others in the reconstruction of the nasal septum. Plastic materials such as Teflon, likewise, has been used.

Personal experience with these materials has been insufficient to permit comment.

Post - traumatic complications

Further surgical considerations of surgery of the nasal septum involves perhaps the most common problem of all, the severely injured nose, auto accidents, participation in contact sports such as: football, boxing, basketball, soccer, etc., are most common in adults, but relatively minor accidents of children who fall on their face while learning to walk, or fall of a swing or high chair, may cause injury to the growth centers to such a degree, that abnormal development of the important structures of the nose may result.

Some of the nasal structures involved in severe nasal injuries which must be evaluated are:

1. Fracture of the cartilagenous septum with buckling alone.
2. Fracture of the nasal bone with displacement to one side carrying the septum to the side of the displacement.
3. A combination of 1 and 2 is most common, presenting the deformity of the external nasal pyramid together with deformity of the nasal septum which produces obstruction of the air passages within the nose.

When an injury sufficient to disarrange the septum and bones of the external nasal pyramid has been inflicted, other structures of the nose are involved, and upon closer examination we will frequently observe:

1. Deformity of the external bony pyramid.
2. Changes in the external cartilagenous vault namely sagging, or saddling.
3. Upper lateral cartilages,
 - a. May be spread laterally producing a ballooning, or
 - b. One side may be ballooned, and the opposite side firmly pressed against the septum, eliminating the valve on that side.
 - c. Returning of the upper lateral cartilages.
4. Changes in the lobule
 - A. Widening of the lobule
 - B. Rounding of the ala
 - C. Widening of the base of the nose, and
 - D. Retraction of the columella.

These changes may be observed following the submucous resection of the nasal septums, where the so called classical type procedure was performed, without attempting to reconstruct the septum and allowing the septum to remain simply as a membrane. The above mentioned changes in the nasal structures in this case is due primarily to scarring and constructions of the membrane. In addition to the changes described above, following the submucous resection of the nasal septum, other complications are frequently encountered, and these are perhaps the most serious of all, that of:

- A. **Perforation** of the nasal septum
- B. **Atrophy** of the nasal mucosa which may develop into
- C. **Nasal Atrophy** in general extending to the skin of the external nose.

It has been observed clinically that deformities of the external nasal pyramid produced by extensive resection of the nasal septum, has in common many of the deformities presented in the severely injured nose where there has been no removal of the septum at all, but where the septum has been fractured and displaced from its normal position in the groove of the vomer and premaxilla. Therefore, it is of utmost importance that steps be taken at the time of surgery to prevent these deformities from developing. However, in spite of careful surgery to prevent unnecessary incisions or lacerations of the membranes, submucous resection of all cartilages and preservation of all tissue changes in the cartilagenous vault, lobule, and base of the nose, occasionally some of these deformities may be seen to develop on the table during the surgical procedure. Being prepared for these complications has helped develop means for their correction. This is one of Dr. Cottle's great contributions to Rhinologic surgery for it is the reconstruction of the septum and external nasal pyramid that has changed the classical submucous resection of the nasal septum to one of reconstructive surgery of the nasal septum and external nasal pyramid. To begin reconstruction of the septum and external pyramid, cartilage and bone that has been removed during the course of the operation is crushed and straightened and replaced into the septal pocket. Sutures taken in the base of the nose, taken from one side of the nose to the other (alar facial groove on one side to that of the opposite

side) known as Base Stitch Sutures, this immobilizes the tissues while healing takes place, thereby, preventing widening of the base of the nose, and also helps prevent widening and rounding of the lobule and nostril. Careful uncovering of the upper lateral cartilages, allowing them to fall into position normally, thus preventing ballooning of the cartilages. By careful dissection of these cartilages, the tendency of the caudal margin to curl, known as returning of the caudal margin, is detected and this portion of cartilage is removed. Finally, crushed bone and cartilage either autogenous, isogenous or in some cases specially prepared heterogenous material is placed over the dorsum, thereby reconstructing the roof of the nose, and fill in the area over the cartilagenous vault and where a sagging or even saddling has developed where extensive removal of septal cartilage high along the ventral margin has been necessary. This serves a two fold purpose, that of re-insulating and reconstructing the nasal dorsum, and producing a straight dorsum which is more acceptable from a cosmetic standpoint.

Septum surgery in children

We have mentioned that age is no longer a factor in performing necessary surgery, and this applied to particularly young children who have been the victim of a severe nasal injury resulting in obstruction of the nasal air passages. It has been established that injuries to the nose will in most cases cause disturbances of the growth center of the nose, the primary center being in the region of the junction of the septum and pre-maxilla. This area has been extensively described by Dr. Cottle and is known as the center of the septum mosaic.

When this area has been injured and the septal cartilage has been fractured or dislocated it will continue to grow in this abnormal manner further disturbing the air passages, as well as increase the deformity of the external nose. It is therefore of extreme importance that these structures be straightened and allowed to grow in a straight line this affording better nasal respiration during the important stages of growth in the child. Should the bony dorsum be displaced, osteotomies are done to re-align the external bony structures as well. The line of the medial and lateral osteotomies will not interfere with the growth of the nasal bones for the growth centers of these bones are not along the line of the naso-optic groove where the lateral osteotomy is made. The growth potential of the septal cartilage is undetermined in any one case, but as a rule the remaining septum continues to grow and may even produce an obstruction on one side or many years later, which may need further correction, and parents of a child who has had an operation at the early ages, are advised that there is a possibility, and when this does occur at the age or 15 years or more, another procedure will usually permanently correct any deformities that may have developed. Children under ten years of age are operated upon under general anesthesia. Those of 10 years or older who are stable children are done under adequate sedation and local anesthesia. Elderly patients, as a rule tolerate surgery of this nature very well, but as a precautionary measure a complete physical examination must be undertaken to be certain that there are no medical contra-indications for this type of surgery. Local anesthesia is preferred in elderly patients.

Repair of septal perforations

Repair of septal perforations is another important consideration of septal surgery. The causes of septal perforations are many, and are well known to all of us. However the cause in each case should be determined for it will help in planning the repair. Perforations of the nasal septum produces many annoying symptoms such as: crusting, bleeding, and whistling noises on respiration.

A large perforation removes the medial wall of the internal os of the nose, and connects to the two nasal cavities. Air currents are disturbed and normal respiration is impaired. Basically, repair of a septal perforation depends upon the size of the perforation, and the amount of mucous membrane remaining that can be developed into flaps that can be utilized as sliding grafts to close the dehiscence in the septum. Many methods of repair of these perforation have been described. These include single or double pedice sliding grafts, multiple flaps, skin grafts, etc.

Summary

General considerations of surgery of the nasal septum has been briefly discussed. The important aspects of the subject in my opinion are:

1. The maxilla - premaxillary approach to the nasal septum.
2. Combined septum and external nasal pyramid surgery.
3. Reconstruction of the septum and external nose.
4. Septum surgery in children.
5. Repair of septal perforations.

Conclusion

The general health and well being of patients can be affected by improper and inadequate nasal respiration. Therefore it is within the province of the rhinologic surgeon to help provide proper function of this important organ. In order to be able to provide this service to our patients a profound understanding of the anatomy and physiology is of course basic. Concepts of nasal surgery, together with sound basic surgical principles are essential but above all, continued study, teaching colleagues in otolaryngology, and in particular the young men in their residencies to encourage and stimulate them to carry on basic research in this important field of medicine.

SEPTUM SURGERY - GENERAL CONSIDERATIONS SUMMARY

General considerations of surgery of the nasal septum embraces the very extensive field of rhinologic surgery which includes simple selective submucous resection of the nasal septum to the complicated and extensive procedures involved in the combined septum and external nasal pyramid surgery. Repair of septum perforations and repair of severe nasal deformities produced by trauma are included.

Surgical procedures upon the septum and nasal pyramid in children must be carried out conservatively, yet adequately to afford good nasal respiration, and allow the nasal structures to continue their growth in the straight and mid line position.

An approach to these problems has been developed in which all the structures of the septum are exposed with a minimum of trauma. Proper handling

of the structures involved will afford the most satisfactory result. This procedure developed by Dr. Cottle is known as the maxilla pre-maxillary approach to the nasal septum.

An important concept in nasal surgery is that of conservation of tissues, especially of the mucous membranes, to prevent scar tissue formation with its subsequent contraction and possible external nasal deformities.

Perhaps the most important consideration in surgery of the septum and external nasal pyramid is that of repair of the structures that have been injured, or may be deformed at a later date as a result of the surgery.

Because the general health and well being of our patients may be affected by improper and inadequate nasal respiration, it is important that the fundamentals of nasal anatomy and physiology be thoroughly understood, and that the patients be adequately studied pre-operatively, so that the post operative results may be correlated and compared with the pre-operative studies.

CHIRURGIE DU SEPTUM CONSIDÉRATIONS GÉNÉRALES

Les considérations générales concernant la chirurgie de la cloison nasale comprennent un vaste domaine de la chirurgie rhinologique. Il va de la simple résection sousmuqueuse de cloison nasale aux interventions étendues et compliquées combinant la chirurgie de la cloison à la chirurgie de la pyramide nasale externe. Cette chirurgie comprend également la fermeture des perforations de la cloison et la correction d'importantes déformations nasales produites par un traumatisme.

Les interventions chirurgicales sur le septum et la pyramide nasale doivent être conservatrices chez l'enfant, elles doivent cependant assurer une bonne respiration nasale et permettre aux structures nasales de continuer leur croissance dans une position centrale et rectiligne.

Une étude de ces problèmes a été développée dans laquelle toutes les structures du septum sont exposées avec un minimum de traumatisme. Un maniement adéquat de ces structures donnera un résultat très satisfaisant. Ce procédé, développé par le docteur Cottle, est connu sous le nom de voie d'accès maxillaire-prémaxillaire à la cloison nasale.

Une notion importante dans la chirurgie du nez est celle de la conservation des tissus, principalement des membranes muqueuses afin d'empêcher la formation de cicatrices, provoquant une contraction et éventuellement des déformations de la pyramide nasale externe.

La réparation des structures endommagées ou déformées à la suite d'une intervention chirurgicale antérieure est une des notions les plus importantes dans la chirurgie du septum et de la pyramide nasale externe.

Les principes généraux de l'anatomie et de la physiologie du nez doivent être étudiés, l'état général de nos malades étant fortement affecté par cette respiration nasale défectueuse. Pour cette raison il est important de comparer les situations pré- et post-opératoires aussi bien du point de vue anatomique que du point de vue fonctionnel.

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