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Surgery for bilateral nasal valvular collapse

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SUMMARY

The nasal valve is an important regulator of nasal airflow. Patients may suffer from nasal obstruction due to bilateral nasal valvular collapse combined with a drooping tip. A simple, effective technique of cartilage grafting to open the valve is forwarded. The advantages of this method include placing the graft in the submucosal plane which preserves mucosa and protects the graft from nasal secretions while healing.

INTRODUCTION

The nasal valve was first described by Mink (1903) and consists of the junction of the septum with the inferior aspect of the upper lateral cartilage. This angle measures 10 to 15 degrees in most individuals. Nasal valves with less of an angle often collapse with normal inspiration, producing airway obstruction. This condition is particularly common in elderly patients. Older patients also often have a concomitant drooping tip, exacerbating the obstruction.

When patients present to the otolaryngologist with nasal obstruction, the septum is thoroughly examined but often the nasal valve is ignored. To examine the nasal valve, the patient should be placed in the supine positition and the nose viewed from the base with a good light source. The nasal tip may be rotated upwards with a finger to see the valve; using a speculum usually distorts this area. Frequently one will see dislocation or deviation of the caudal septum, but more importantly, one can examine the nasal valve. In some people, especially older men, the vibrissae may have to be judiciously trimmed. We use an iris scissors with clear antibiotic ointment smeared on the tynes so that the hairs will be extracted with the scissors instead of falling inside the nose.

Next, one has the patient inspire deeply, without sniffing. If the nasal valve is obstructing the airflow, it will collapse against the septum. Sometimes it is helpful to have the patient place a finger lightly over the other nostril to increase airflow. The most helpful diagnostic tool is the Cottle manoeuvre. The patient's cheek is retracted laterally and superiorly. This opens the nasal valve by pulling away the upper lateral cartilage from the septum. If the nasal valve collapses easily the patient's obstruction will be immediately relieved by this manoeuvre. We have developed a technique of stenting open the nasal valve which has

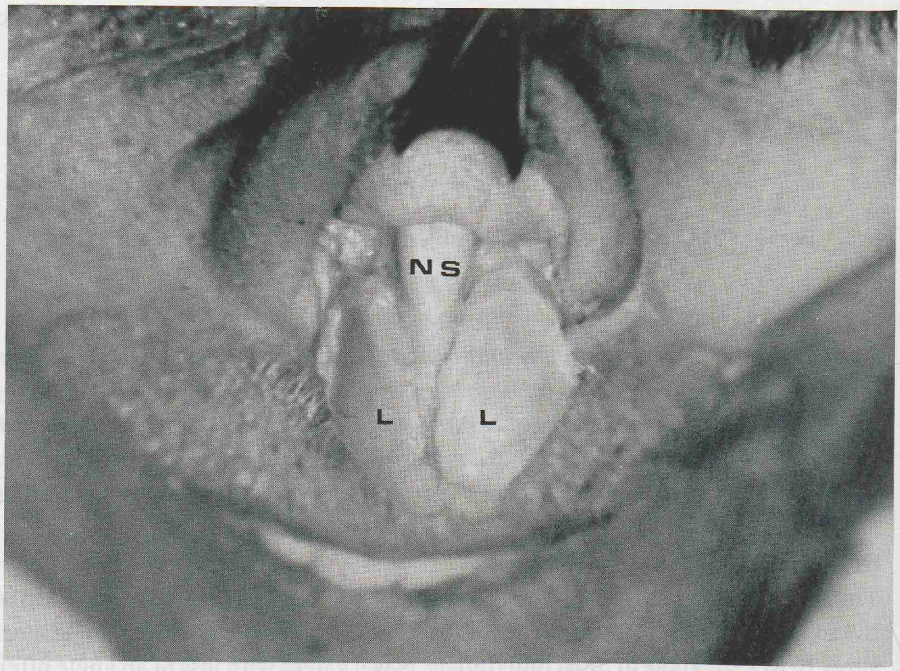

Figure 1. Cadaveric open rhinoplasty exposure revealing lower lateral cartilages (L) and the nasal septal complex (NS) of upper lateral cartilages and septum left intact.

produced gratifying results in our patients; this communication is a preliminary report on this new technique.

TECHNIQUE

Surgery of the nasal valve is aimed at permanently widening the angle of the valve and raising the tip. Tip elevation is undertaken first and may be done in any of the usual ways as long as some cartilage is removed from the cephalic rim of the lower lateral cartilages bilaterally. This step provides space for the graft to be placed, in addition to helping alleviate airway obstruction. The second step involves separation of the upper lateral cartilages from the dorsal septum in the submucosal plane, followed by a cartilage graft to permanently anchor the valves in a more lateral, open position. This procedure is usually done using a closed approach; the pictures that follow were taken of a cadaveric open nasal dissection to best demonstrate the anatomy of this operation.

The septum is entered and repaired using conventional technique through a right hemitransfixion incision; the thick strong cartilage from the area over the premaxillary wings or paraseptal cartilage is removed and saved. This cartilage is roughly cylindrical, approximately 3 mm in diameter and 10 mm in length.

The standard intercartilaginous incisions are then made and the skin over the

nasal dorsum is elevated up to the nasal bones, exposing the nasal septal complex (Figure 1). The lower lateral cartilages are decreased in width using a retrograde approach, being careful not to narrow or weaken the nasal domes. The upper lateral cartilages are then separated from the septum submucosally, up to the attachment of the nasal bones (Figure 2). This plane of dissection ensures that the ensuing graft will not be exposed in the nose during postoperative healing. The graft is prepared with three 4-0 dexon sutures. These are tied at both ends and the center. The center suture has the free end cut at the knot and the other two are left long (Figure 3). The center needle is passed through the nasal skin at the dorsal junction of the upper and lower cartilages, thus anchoring the graft in the midline. The graft and end sutures can now be pulled up into the nose on either side through the intercartilagenous incisions (Figure 4). The lateral graft sutures are passed through the upper lateral cartilages and tied, fixing the cartilages in a more lateral position. The center suture is cut flush with the skin at the end of the surgery.

The upper lateral cartilages need to be separated from their attachment to the dorsal septum before the graft is inserted to allow the graft to be sewn in place without tension. An open rhinoplasty exposure would facilitate this part of the procedure but is rarely necessary.

The septum may need to be shortened slightly and "returning" of the upper

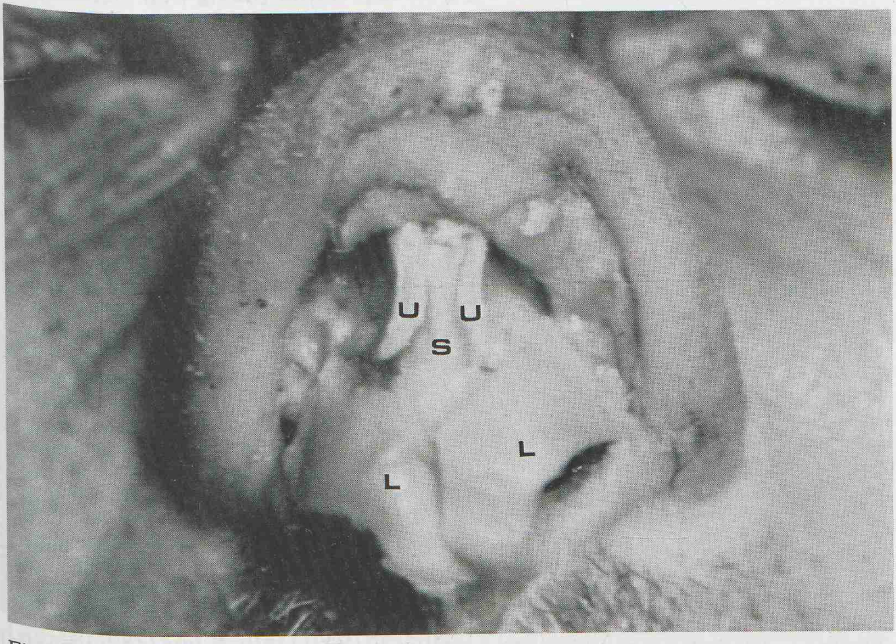

Figure 2. Cephalic rim of lower lateral cartilages (L) removed. The upper lateral cartilages (U) are dissected from the dorsal septum (S).

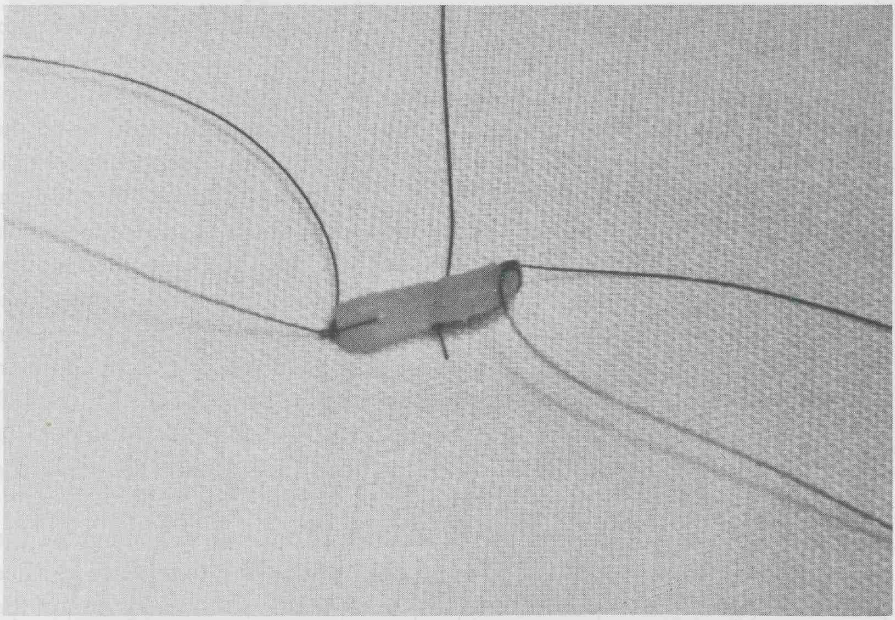

Figure 3. The cartilage graft prepared with sutures.

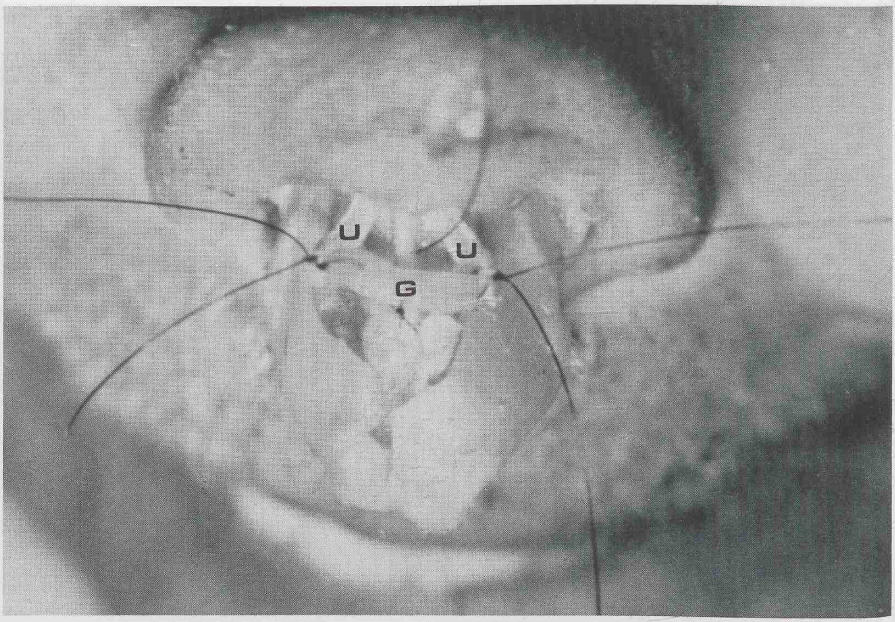

Figure 4. The graft (G) sutured in place, splinting laterally the upper lateral cartilages (U) and opening the nasal valve.

lateral cartilages (see Discussion) excised if it is contributing to the obstruction. All incisions are then closed in the usual manner and the nose can be packed and treated the same as one would a rhinoplasty.

The cosmetic deformity is minimal as the elevation of the tip produces enough extra projection to conceal the graft. If the skin is thin or the graft is too prominent, the graft may be sculpted or the nasal dorsum slightly notched to accommodate the graft. Too much notching, however, would likely blunt the valvular junction with the septum and be counterproductive.

DISCUSSION

The physiology of the nasal valve was described by Bridger (1970) in a landmark article. He showed that the nose acts as a Starling resistor; that is, greater inspiratory effort beyond a certain point does not increase airflow. The nasal valve thus limits airflow, protecting the nasal mucosa so that warming, humidifying and cleaning of inspired air can occur.

In patients with pathologic valvular collapse, the valve closes with much less difference in transmural pressure than in normal persons, causing obstruction. Rhinomanometry performed during the Cottle manoeuvre revealed that the resistance was halved, the maximal flow more than doubled and the critical transmural pressure of collapse became more negative (Bridger, 1970). These results demonstrate how greatly airflow parameters are altered by small changes in the angle of the valve.

Frequently, patients with nasal valvular collapse have septal deviation or thickening. Correction of the septal deformity may be all that is needed to open the valve and alleviate obstruction. We tend to use the techniques described by Cottle et al., (1958) to mobilize the caudal septum from the maxillary spine and premaxillary wings, and to separate the upper lateral cartilages from the septum subperichondrially.

The upper lateral cartilages are most often responsible for blockage of airflow. The most prevalent pathologic finding is excessive "returning" of the upper lateral cartilage. A small degree of returning is physiologic is that this lends more resistance to collapsing of the cartilage, whereas excessive returning obstructs airflow. We usually excise most of the returned cartilage before inserting the graft. Complete excision of returning cartilage has to be avoided as this may weaken the cartilage, compromising the beneficial effects sought by grafting.

Sheen (1984) described a grafting technique to reconstruct tissue deficits in the nasal valve area secondary to trauma or surgery. Our technique addresses the situation in the aging nose where the problem is lack of support of what appears to be excessive tissue. At this time we have limited experience with our technique in reconstructive efforts.

Goode (1985) and Walter (1969) described a composite grafting technique in the nasal valve area. They suggest using composite cartilage grafts inserted into the

septal angle area, between the upper and lower lateral cartilages. Our technique differs from theirs in that the graft is placed entirely in the submucosal plane, preserving the existing nasal mucosa and protecting the graft from nasal secretions during healing.

Kern (1978) provides a thorough review of the anatomy, physiology and surgical approaches to the nasal valve.

We have performed this operation for the last several years on patients who suffer from nasal valvular collapse due to an aging nose. All have experienced a marked increase in nasal patency and are pleased with the cosmetic effects of tip elevation; no deformity from the cartilage graft has been observed to date.

RESUMEN

La válvula de la nariz es un importante regulador del flujo de aire que pasa atraves de la nariz. Los pacientes pueden tener una obstruccíon bilateral de la válvula nasal en combinacíon con la punta de la nariz caida. Una técnica simple y efectiva como el implante de cartílago para abrir la válvula es presentada.

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