Scandinavian Journal of Plastic and Reconstructive Surgery and Hand Surgery
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713691514

Iatrogenic collapse of the nasal valve after aesthetic rhinoplasty

Antonino Araco [a]; Gianpiero Gravante [b]; Pietro Gentile [c]; Francesco Araco [a]; Valerio Cervelli [c]
[a] Crown House Hospital, Oldburi, Birmingham, United Kingdom
[b] Departments of General Surgery, University of Tor Vergata, Rome, Italy
[c] Plastic Surgery, University of Tor Vergata, Rome, Italy

Online Publication Date: 01 January 2007
To cite this Article: Araco, Antonino, Gravante, Gianpiero, Gentile, Pietro, Araco, Francesco and Cervelli, Valerio (2007) 'Iatrogenic collapse of the nasal valve after aesthetic rhinoplasty', Scandinavian Journal of Plastic and Reconstructive Surgery and Hand Surgery, 1 - 4
To link to this article: DOI: 10.1080/02844310701694639
URL: http://dx.doi.org/10.1080/02844310701694639

Scand J Plast Reconstr Surg Hand Surg
2007, 1–4, iFirst article

informa
healthcare

ORIGINAL ARTICLE

Iatrogenic collapse of the nasal valve after aesthetic rhinoplasty

ANTONINO ARACO[1], GIANPIERO GRAVANTE[2], PIETRO GENTILE[3], FRANCESCO ARACO[1] & VALERIO CERVELLI[3]

[1]*Crown House Hospital, Oldburi, Birmingham, United Kingdom, Departments of* [2]*General Surgery,* [3]*Plastic Surgery, University of Tor Vergata, Rome, Italy*

Abstract

We present our experience of reconstruction of the nasal valve after iatrogenic collapse, and evaluate the feasibility and outcome of composite grafts. We selected all collapsed nasal valves that occurred after primary aesthetic rhinoplasties of the total number done at the University Tor Vergata in Rome. We excluded collapses that followed septoplasty for nasal deviation, reconstructions, and rhinoplasties for trauma. We selected 15 patients of 1252 who presented from January 1998 to December 2003. Eleven patients who had collapse of both the external and internal valve were treated with a composite graft (septum plus retroauricular) inserted by an "open tip" technique. Four patients (1 with both internal and external valve collapse, 3 with only internal) were treated with a section and opening of the upper lateral cartilages, transposition and repositioning of mucocartilaginous flaps. Good functional and aesthetic results were achieved in almost all patients without complications. Composite cartilaginous grafts are an easy and safe technique for the treatment of iatrogenic collapse of the nasal valve.

Key Words: *Aesthetic rhinoplasty, complications of aesthetic surgery, nasal pyramid reconstruction, autologous cartilage graft*

Introduction

The nasal valve was originally described by Mink in 1903, and is divided into external and internal portions. The external valve is formed by the columella, the nasal floor, and the nasal rim (or caudal border of the lower lateral cartilage). The nasalis muscle dilates this portion during inspiration, and the alar cartilages maintain the airways' open access [1–3]. The internal valve is located in the area of transition between the skin and respiratory epithelium, and is largely governed by the nasal skeleton and lateral cartilages [1–3]. It is the narrowest part of the nose and is of fundamental importance for respiratory function, as it accounts for most nasal resistance. For this reason, it is usually referred as the "valve" [1–3].

Malfunctioning of the internal valve is responsible for most nasal obstruction and respiratory difficulties. The collapse can be classified according to the structure that causes it; the most common being septal deviation, and the second being iatrogenic after rhinological surgery. Iatrogenic collapse is particularly common after excessive removal of the nasal roof, or excessive resection of the cephalic portion of the alar and lateral cartilages, or both. In many cases more than one structure is affected.

We present our experience with reconstruction of the nasal valve and evaluate the feasibility and outcome of the use of composite grafts.

Patients and methods

We followed the CONSORT criteria for the development and description of this study [4]. We selected all nasal valves that had collapsed after primary aesthetic rhinoplasties out of the total of those done at the Plastic and Reconstructive Surgery Department of the University Tor Vergata in Rome. We excluded patients who had symptoms after septoplasties, graft reconstructions, or rhinoplasties for trauma. Data were collected from case notes. The study was approved by the Institutional Review Board.

Correspondence: Dr. Gianpiero Gravante, via U. Maddalena 40/a, IT-00043 Ciampino (Roma), Italy. Tel: +39-348-6701961. Fax: +39-06-233216592. E-mail: ggravante@hotmail.com

(Accepted 11 September 2007)

ISSN 0284-4311 print/ISSN 1651-2073 online
DOI: 10.1080/02844310701694639

Preoperative investigations began with a careful history about causes of the collapse, and coexisting medical problems. A physical examination with an anterior rhinoscopy of the external and internal nose was the next step. During the first visit we collected pictures of all patients in the frontal, lateral, and oblique positions to act as controls for the postoperative aesthetic results. Radiographs in four projections of facial bones and a computed tomogram (CT) were taken as outpatients if there were breathing complaints to exclude septal deviation or hypertrophy of the turbinates.

We divided patients into two groups, the first of which consisted of patients who presented with collapse of the external and internal valves and the second of those with collapse of the internal valve alone. All were operated on by the same surgeon. Techniques used were the open (Rethy) method or the closed (endonasal) approach. The first group of patients was treated with autologous grafting, and those with internal collapse alone with only flaps. This choice reflected the need for more tissue to correct the collapse of both valves while within the internal valve myocutaneous flaps were sufficient. The cartilage was harvested from the ear and the septum. The patients were followed up 2 and 5 weeks postoperatively, then at 3, 6, and 12 months, and then annually for a maximum of 6 years.

The specific objectives of this study were to assess the incidence of collapse of the valves in a large number of rhinoplasties and, most important, to describe our approach and the results obtained. The outcome measures were the functional and aesthetic results, as judged by patients (functional) and by two plastic surgeons (aesthetic AA and AF).

Results

We selected 15 patients who presented with postoperative valvar collapse and cosmetic imbalance from a total of 1252 treated by primary rhinoplasty from January 1998 to December 2003. There were 12 women and 3 men, mean age 37 years (range 25–50). Twelve of them had functional problems caused by the collapse of the internal and external nasal valves (first group), and 3 of only cosmetic imbalance for the collapse of the internal valve only (second group). Eleven patients in group one were treated with a composite graft (septum plus retroauricular). We placed two sets of grafts: a spreader graft in the supratip area to correct the deficit of triangular and septal cartilages, and the second set on the lateral crus of the alar cartilages because of excessive alar resection during the original rhinoplasty to create the necessary support to the lateral nose during breathing. Three patients of the second group who had collapse of only the internal valve were treated with a section and opening of the upper lateral cartilages, and transposition and repositioning of mucocartilaginous flaps.

Median follow up was 4 years (range 3–8). All patients had improved respiratory symptoms both in the short and the long term. Good aesthetic results were obtained in all cases, with a visible improvement of the vertical deficit of the supratip, correction of the projection, and harmonisation of the nasal lateral and frontal projections (Figure 1). Only two patients were not satisfied with the aesthetic result caused by postoperative enlargement or asymmetry of the external valvar area. However, even in these cases the functional results were satisfactory.

Discussion

The internal nasal valve and the nasal valve area are important regions for breathing. Normally these are the flow-limiting segment of the nose [5,6]. The internal nasal valve is the cross-sectional area bordered by the lower portion of the upper lateral cartilage and the nasal septum. The anterior head of the inferior turbinate, the septum, and the pyriform aperture also constitute a portion of this flow-limiting segment. The nasal valve area includes the area described by the internal nasal valve and also by the anterior head of the inferior turbinate, the septum, and the tissues surrounding the pyriform aperture [7,8].

The external nasal valve is distinct from the internal nasal valve. It is composed of the cutaneous and skeletal support of the mobile alar wall up to and including the free edge of the opening of the nostril [9]. The external nasal valve may be compromised by excessive resections of the lateral crura during rhinoplasty and subsequent postoperative soft tissue contraction. The congenital cephalic position of the lateral crura will also leave suboptimal structural support in the mobile alar wall, with subsequent collapse of the external valve (alar agenesis). Narrowing of the external valve may be present only during inspiration or even at rest, according to its severity.

For comfortable nasal respiration, resistance must be produced by the intranasal structures. The absence of adequate resistance creates the sensation of nasal obstruction, which is evident in the overwide airway produced in patients with atrophic rhinitis, or who have had a complete turbinectomy or total septectomy. Symptoms such as nasal obstruction and congestion may have different outcomes ranging from chronic mouth breathing to the need for endonasal surgery. When history and physical examination lead to an anatomical diagnosis of

Figure 1. A 33-year-old woman with collapse of the nasal valves and total obstruction of the nasal airway one year after a cosmetic rhinoplasty operation. The collapse is more evident at the level of the right valve. Preoperative (left) and postoperative (right). (*a*) Frontal view. (*b*) Right oblique lateral view. (*c*) Right lateral view. (*d*) Left oblique lateral view. (*e*) Left lateral view. (Published with the patient's permission).

weakness of the nasal side wall, strengthening the side wall with grafts is a direct solution to the problem, as confirmed by previously published studies [10,11].

Cartilage grafts (spreader grafts) provided a functional support to the lower part of lateral cartilages in our patients, which in most cases had collapsed because of excessive resections during rhinoplasty. We also used grafts to establish the necessary support to the external nasal valve [12]. We preferred autologous cartilage grafts to allograft material. According to many authors autologous cartilage is an excellent material for reconstruction of the dorsum [13–16]. Its general advantages of elasticity, resistance, easy achievement of final shape, good vitality even with poor blood supply, and minimal resorption make it a good option for secondary corrective rhinoplasties [16]. Every type of donor site has specific advantages and disadvantages, that make a cartilaginous graft such a versatile material [16]. Despite this, autologous cartilaginous grafts have a few disadvantages, including the difficulty of harvesting large amounts, poor resistance to infections, and displacement. However, our patients developed no complications and the amount harvested was sufficient for their surgical needs.

Although no patient who had a cartilaginous graft had any complication, we preferred to avoid where possible this approach because of the increased risk of infection and necrosis compared with flaps. For this reason we used mucocartilaginous flaps for internal valvar collapse only, where less tissue was needed to re-establish the normal anatomy. Even in these patients the approach resulted in good aesthetic and functional results.

References

[1] Bruintjes TD, van Olphen AF, Hillen B, et al. A functional anatomic study of the relationship of the nasal cartilages and muscles to the nasal valve area. Laryngoscope 1998;108: 1025–32.

[2] Cardenas-Camarena L, Guerrero MT. Use of cartilaginous autografts in nasal surgery: 8 years of experience. Plast Reconstr Surg 1999;103:1003–14.

[3] Straatsma BR, Straatsma CR. The anatomical relationship of the lateral nasal cartilage to the nasal bone and the cartilaginous nasal septum. Plast Reconstr Surg 1951;8: 433–55.

[4] Moher D, Schulz KF, Altman DG. The CONSORT statement: revised recommendations for improving the quality of reports of parallel-group randomised trials. Lancet 2001;357:1191–4.

[5] Santiago-Diez de Bonilla J, McCaffrey TV, Kern EB. The nasal valve: a rhinomanometric evaluation of maximum nasal inspiratory flow and pressure curves. Ann Otol Rhinol Laryngol 1986;95:229–32.

[6] Gordon AS, McCaffrey TV, Kern EB, et al. Rhinomanometry for preoperative and postoperative assessment of nasal obstruction. Otolaryngol Head Neck Surg 1989;101: 20–6.

[7] Tardy ME. Rhinoplasty: The Art and the Science. Philadelphia: WB Saunders; 1997.

[8] Toriumi DM, Becker DG. Rhinoplasty Dissection Manual. Philadelphia: Lippincott Williams & Wilkins; 1999.

[9] Constantian MB. The incompetent external nasal valve: pathophysiology and treatment in primary and secondary rhinoplasty. Plast Reconstr Surg 1994;93:919–31.

[10] Gunter JP, Rohrich RJ. Correction of the pinched nasal tip with alar spreader grafts. Plast Reconstr Surg 1992;90: 821–9.

[11] Akcam T, Friedman O, Cook TA. The effect on snoring of structural nasal valve dilatation with a butterfly graft. Arch Otolaryngol Head Neck Surg 2004;130:1313–8.

[12] Kasperbauer JL, Kern EB. Nasal valve physiology. Implications in nasal surgery. Otolaryngol Clin North Am 1987;20: 699–719.

[13] Bateman N, Jones NS. Retrospective review of augmentation rhinoplasties using autologous cartilage grafts. J Laryngol Otol 2000;114:514–8.

[14] Emery BE, Stucker FJ. The use of grafts in nasal reconstruction. Facial Plast Surg 1994;10:358–73.

[15] Sheen JH. The ideal dorsal graft: a continuing quest. Plast Reconstr Surg 1998;102:2490–3.

[16] Araco A, Gravante G, Araco F, et al. Autologous cartilage graft rhinoplasties. Aesthetic Plast Surg 2006;30:169–74.