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Nasal valve surgery; our experience with the valve suspension technique*

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SUMMARY

Objective: *To describe and evaluate our experience with the surgical technique of nasal valve suspension for treating nasal valve insufficiency.*

Methods: *Twenty patients with nasal valve insufficiency underwent nasal valve suspension (a total of 33 sides). The patients were prospectively studied and their nasal patency was rated per side pre- and postoperatively, by subjective self-evaluation on a scale from 1 to 10.*

Results: *Post-operatively 7 sides (21%) were rated as unchanged, on 17 sides (52%) the improvement was from 1 to 3 out of 10, and on 9 sides (27%) 4 or more out of 10. The average post-operative improvement for all sides was 2,3 out of 10. In five patients (25%) complications occurred, such as pain, inflammation and suborbital swelling and three eventually underwent a re-exploration of the surgical area, resulting in a permanent scar in one patient.*

Conclusions: *Although nasal valve suspension may be beneficial for some patients, based on our experience, we would not recommend this technique as first line treatment for nasal valve insufficiency. In this series we found relatively limited improvement in most patients and a far higher complication rate compared with other nasal valve procedures we have had experience with in the past.*

Key words: nasal valve, suspension, surgery, nasal patency, nose

INTRODUCTION

The ostensibly simple complaint of a blocked nose is often a complex clinical problem involving mucosal, structural and even psychological factors. Although closely related to airflow resistance, sensation of nasal airflow is a subjective perception. In individual patients more than one cause can be involved in nasal obstruction, and the relative contribution of the various structural and mucosal factors, let alone the psychological ones, may be difficult to assess. Over the last few decades, the importance of the internal and external nasal valves in maintaining nasal patency has been increasingly recognized. It was Zuckerkandl [(1)] who first described the slit-like area between the caudal border of the upper lateral cartilage and the septum and termed it “inneres Nasenloch” or “ostium internum” of the nose. This area generally constitutes the narrowest part of the nose and accounts for most of the inspiratory airway resistance. The term ‘nasal valve’ was first introduced by Mink [(2-3)] and with it he referred to the dynamic properties of the lateral nasal wall, mainly the upper lateral cartilage, and the importance of this nasal segment in regulating airflow through the nasal cavities. Since then, the term has evolved, and nowadays the most common definition includes an internal and an external nasal valve. [(4-6)]. The internal nasal valve is located at the caudal end of the upper lateral cartilage and is formed by the angle that it makes with the nasal septum. This so-called ‘nasal valve angle’, is normally between 10 and 15 degrees. The internal valve area is the space that is bounded laterally by the caudal end of the upper lateral cartilage and the head of the inferior turbinate, medially by the septum and inferiorly by the floor of the nose. This is the narrowest segment of the nasal passages and accounts for most of the inspiratory airway resistance. The external nasal valve includes the caudal septum, columella and premaxilla medially and the alar lobule, ala and dilator muscles laterally [(6)].

Nasal obstruction attributable in part or entirely to nasal valve collapse is closely related to the dynamics of movement of the lateral nasal wall during inspiration as well as the cross-surface area and therefore the airflow resistance of the nasal valve area. Although semantically and anatomically separate, both the internal and external nasal valves are usually involved in varying degrees in cases of excessive inward movement of the lateral nasal wall during inspiration.

Internal valve incompetence is often related to ageing where weakening of the muscular and fibrous support is present, reducing the nasal valve angle, or alternatively it is the consequence of previous reductive rhinoplasty surgery in which the

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attachments of the upper lateral cartilages to the septum have been severed [7]. The collapse of the external valve is most often seen in patients with narrow nostrils, a projecting tip and thin weak sidewalls [8], especially after over resection of the lateral crus of the lower lateral cartilage during rhinoplasty. Some patients demonstrate a variant anatomy involving the lower lateral cartilages, such as cephalic positioning of the lateral crura, concave lateral crura or wide columella footplates [9,10].

The diagnosis of nasal valve insufficiency can be made by observing the movement of the lateral wall during quiet and forced inspiration and by the diminishment of nasal obstruction by lateralisation of the collapsed segment. This lateralisation can be done either with the classic Cottle manoeuvre which lateralises the entire lower two thirds of the nasal wall or more specifically by intranasally supporting and/or lateralizing the collapsing segment with a fine instrument. The effect of a spreader graft may be mimicked by placing a small cotton tip in the apex of the internal nasal valve [11].

A multitude of surgical techniques have been described for dealing with nasal valve pathology and new ones are being described with increasing frequency [6-8,10-20]. All such techniques have in common that they aim at strengthening and/or lateralizing (a part of) the lateral nasal wall, thereby facilitating nasal airflow. Since 1996 several articles have been published describing treatment of nasal valve incompetence using valve suspension procedures [21-23]. In this article we describe the technique and present our results with it as carried out by the senior author.

PATIENTS AND METHODS

Description of technique

As with all nasal valve surgery, the main goal of the procedure presented herein is to increase the diameter of the nasal valve area, and the resilience of the nasal valve(s). In this technique, sutures are used to lateralize (a section of) the lateral nasal wall by suspending the relevant part to the inferior orbital rim. In this series an infraorbital incision was made at the junction of the thin lower eyelid skin and the thicker cheek skin on the medial part of the inferior orbital rim. A permanent suture is then tunnelled below the facial soft tissue to the involved part of the lateral nasal wall. The needle is subcutaneously reversed endo-nasally within the subcutaneous fibro fatty tissue, usually slightly above the alar groove often encompassing the lateral part of the lateral crus and the sesamoid cartilages, and guided back towards the inferior orbital rim. At this point, the suture is tied to the periosteum of the inferior orbital rim, thereby opening and supporting the nasal valve.

Twenty patients with complaints of reduced nasal patency, caused at least in part, by nasal valve incompetence, were operated on by the senior author between August 2002 and January 2005. Nasal valve suspension was carried out on 33 sides; in thirteen patients the valve dysfunction was bi-lateral and in seven unilateral. There were 17 men and 3 women and the average age was 46 years (range: 25-68 years). The average follow-up in this series was 5 months (range: 3-27 months). Sixteen patients were revision cases having had at least one previous nasal operation, and of these, 9 patients had undergone previous nasal valve procedures (5x spreader graft, 4x sub-alar batten graft). Only four patients had no prior history of nasal surgery.

In five patients nasal valve suspension was the only surgery performed, while 15 patients underwent one or more concomitant procedures such as septoplasties, turbinate reductions and ethmoidectomies. Eight patients had additional nasal valve procedures apart from the valve suspension (5x spreader graft, 2x composite alar grafts, and 1x sub-alar batten graft). On 19 sides goretex 3.0 was used as suture material and on 14 sides ethilon 3.0 was used. On all 33 sides an infraorbital incision was made. On 11 sides a single suture was used, on 20 sides a double and on 2 sides the suture was fixated at three separate points between the lateral nasal wall and the periosteum of the inferior orbital rim.

RESULTS

The main criteria upon which the results were evaluated during follow up was subjective self analysis by the patients. There are varying reports as to the value of objective nasal testing with acoustic rhinometry and rhinomanometry in clinical practice [24-27]. Based on our past experience, we found that the correlation between these tests and patients' subjective sense of nasal patency was too low to warrant their use for evaluating surgical results. Pre- and postoperatively, (subjective) scores for nasal airflow per side were collected on a 10-point scale; 1 indicating total obstruction and 10 a perfect nasal airway. The average pre-operative score for the 33 sides involved was 4 out of 10 (range: 1,5– 6). The average post-operative score was 6,3 (range: 3-10). Post-operatively 7 sides (21%) were rated as equal, on 17 sides (52%) the improvement was from 1 to 3 out of 10, and on 9 sides (27%) 4 or more. Overall, post-operatively 79% of sides operated on showed subjective improvement. The average improvement was 2,3 points (range: 0-8). Five patients underwent nasal valve suspension without any concomitant procedures. The average improvement of the eight sides operated upon in this subgroup was only 1 point. In several patients it was observed that the initial results were better than later on during follow-up. At the time of this writing, three patients with insufficient improvement have elected to undergo revision valve surgery with butterfly graft implantation.

In five patients (25%) complications occurred: In three of these patients ethilon was used and in two goretex. One patient experienced temporary tenderness between the orbital rim and the nose. One patient had relatively mild complaints of a slight thickness under the eye for which no further action was con-

Figure 1. (Sutures exposed through paranasal incision): Three patients underwent an exploration of the surgical area because of pain, inflammation and swelling and in two of those patients the sutures were removed.

Figure 2. (Paranasal scar): In the third patient no sutures were found during the first exploration. Because the symptoms persisted a re-exploration was performed and the entire affected area was removed, resulting in a visible scar.

sidered necessary. Three patients experienced a painful swelling under the eye, which did not respond to antibiotic treatment. In two of these patients the area was explored and the sutures were removed (Figure 1). In the third patient no sutures were found during the first exploration. However, because the symptoms persisted a re-exploration was performed and the entire affected area was removed, resulting in a visible scar and an area of hypoesthesia (Figure 2).

DISCUSSION

As mentioned in the introduction, many procedures have been developed to tackle the problem of nasal valve insufficiency. While all have their relative advantages and drawbacks, they all aim at widening the nasal valve area and/or strengthening (a part of) the lateral nasal wall. What makes the technique of nasal valve suspension a seemingly attractive option, is the fact that it aims at achieving both those goals, while being relatively simple to perform and generally less time consuming than most other nasal valve procedures. In essence it mimics the Cottle manoeuvre in opening the nasal valve(s) by lateralizing and fixating a portion of the lateral nasal wall. In this series 79% of sides had improved post-operative scores, although the average improvement was fairly limited, especially when one takes into account that in a majority of cases one or more concomitant procedures aimed at improving nasal patency were performed. Not only did the functional outcomes as judged by the patients show limited improvement, but in several cases, the initial improvement diminished during a relatively short follow-up period. We are aware that this phenomenon occurs sometimes in other functional nasal surgery as well, but in our experience, not as frequently or rapidly. We also found a higher than average complication rate: inflammation, swelling or pain under the eye was evident in five patients (25%). Two of these patients had relatively mild and transient complaints, but three underwent an exploration of the affected area, and one of these three even needed a re-exploration resulting in a permanent scar and hypoesthesia.

Taking into account the small size of our patient group it would obviously be unwise to make a strong recommendation regarding this technique. However, because of the high complication rate in this series, as well as because of the relatively disappointing results and the availability of other, more reliable nasal valve techniques, we would not recommend this procedure as a first line treatment for nasal valve insufficiency.

CONCLUSION

Many surgical procedures for treating nasal valve incompetence have been described and new techniques are being developed with increasing frequency. This can be seen as a reflection of the growing recognition of the role of the nasal valve in maintaining nasal patency. Based on this (small) series, we conclude that nasal valve suspension as treatment for nasal valve incompetence may be beneficial in some patients. However, the overall results were disappointing and less reliable than with other nasal valve procedures. Moreover, the complication rate was higher than we consider acceptable, which has caused us to cease performing this procedure.

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ANNOUNCEMENT