Surgical Management of Nasal Valve Collapse

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KEYWORDS

- Internal and external nasal valve Nasal valve collapse Nasal obstruction
- Nasal valve repair

KEY POINTS

- Nasal valve collapse is a common cause of nasal obstruction and is oftentimes iatrogenic due to previous reductive rhinoplasty.
- Nonsurgical methods of management exist, and newly designed implants can significantly improve lateral wall and nasal valve collapse.
- Surgical management of the nasal valve is focused primarily on widening the valve and providing support to the lateral wall with appropriate autologous grafting techniques.

INTRODUCTION

Nasal valve collapse is a common cause of functional upper airway obstruction that leads to varying difficulty with nasal inspiration, diminished exercise tolerance, and significant decreases in quality of life. Nasal valve collapse can be innate to patient anatomy, iatrogenic, congenital, or traumatic, but regardless of cause, causes significant patient distress.

The nasal valve can be subdivided into internal and external components. The internal nasal valve refers to the area defined by the nasal septum medially, the upper lateral cartilages superolaterally, and the head of the inferior turbinate inferiorly. The cross-sectional area of the nasal ala, or opening of the nasal vestibule, defines the external nasal valve.¹ The muscles responsible for maintaining nasal valve patency during inspiration include the nasalis and dilator naris muscles. Both muscles prevent nasal valve collapse on deep inspiration by acting directly on the upper lateral cartilages and alar soft tissue.² Furthermore, the nasal valve provides the greatest resistance to airflow in the nose and, when compromised, can lead to nasal valve

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collapse with significant functional deficiencies with worsened quality of life. As the airflow increases through the nasal valves, negative pressure is produced, which leads to collapse of the nasal valve and lateral wall. Because of velocity of airflow inherently creating negative pressure within the nasal valve, iatrogenic narrowing or loss of lateral wall support reliably leads to significant supra-alar pinching and eventual obstruction.

Rhinoplasty is the most common cause of nasal valve dysfunction.² In a study series of 100 secondary rhinoplasty cases, Constantian² found that 50% of patients endorsed external nasal valve obstruction and 645 of patients complained of nasal obstruction at the internal valve.¹ Overresection of the upper lateral cartilages, excessive narrowing of the dorsum, and displacement of short nasal bones correlate with internal nasal valve obstruction. Aggressive narrowing of the nasal tip, overresection of lateral crura, and displacement of weak alar cartilages correlate with external nasal valve obstruction. Although patients may not experience severe obstruction in the immediate postoperative period, negative pressure through the nasal airway will lead to eventual displacement of the lateral wall medially leading to a worse cosmetic appearance and significant functional obstruction that may require revision surgery.

Nasal valve clinical assessment includes not only history taking for likely etiologic causes but also a thorough physical examination. Assessing patient nasal airflow at rest and on inspiration is paramount to determine the presence and severity of nasal valve collapse. The Cottle maneuver, which is a lateral distraction of the cheek away from the airway, is a rather nonspecific test and almost uniformly shows improvement in breathing without specificity for site of obstruction.² The authors prefer the use of a wire loop curette to stent the lateral crus, which is the most common location of lateral wall collapse (modified Cottle maneuver). In regards to external nasal valve compromise, there are several physical examination findings often noted: thin skin, deep supra-alar groove, parenthesis deformity of tip, narrow nostrils with overprojection of the tip, short medial crus with associated widened columella, and caudal septal deviation with contralateral external nasal valve collapse on deep inspiration.³ With cephalically malpositioned lateral crura, there may be a bulbous tip and alar retraction, which also manifest as external nasal valve collapse. The cephalic positioning of the lateral crura leaves the lateral wall of the nose void of cartilage support, potentially resulting in collapse upon inspiration.

Defining the degree of nasal obstruction is an important outcome measure. The NOSE questionnaire, a validated quality-of-life assessment instrument, allows standardization of the symptoms of nasal obstruction in assessing functional improvements.⁴ The questionnaire comprises 5 questions to better understand their nasal obstruction and is a powerful adjunct, but does not supplant a good history and physical examination.

Once a diagnosis of nasal valve collapse is made and the cause is determined, appropriate management can be discussed with the patient. There are several nonsurgical options as well as a wide array of surgical maneuvers to improve nasal valve collapse. Nonsurgical management focuses on stenting or providing external support to the nasal valve and lateral wall. Surgical maneuvers focus more on widening the nasal valve and providing support with cartilage grafts.

Nonsurgical Management of Nasal Valve Collapse

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