Are Diagnostic Tests Useful for Nasal Valve Compromise?

Lisa E. Ishii, MD, MHS; John S. Rhee, MD, MPH

BACKGROUND

The nasal valve region, bordered by the septum, inferior turbinate, and nasal sidewall, is the most resistive flow-limiting segment of the nasal cavity. As air enters this constricted segment, acceleration of airflow occurs. This results in a drop in intraluminal pressure by the Bernoulli principle. The pressure drop can lead to collapse of the segment of the airway during inspiration, dependent on the rigidity of the structures. The septum and turbinate are typically rigid structures, whereas the nasal sidewall is less rigid and therefore may determine the nasal valve rigidity. Very minor changes to the structures in the nasal valve region can have significant impact on nasal airflow. However, it can be difficult to determine which of the three structures of the nasal valve area is most responsible for nasal airway obstruction in any given patient.

An objective diagnostic test to distinguish between the three possible sources as the cause for nasal airway obstruction has not been defined. Conflicting reports on distinguishing between the three sources exist in the literature, with some advocating anterior rhinoscopy, others suggesting rigid nasal endoscopy, and others additional tests. Multiple surgical techniques to minimize nasal obstruction have been described to differentially affect the three contributing structures. These range from septoplasty, turbinate reduction, and techniques to lateralize the sidewall (spreader grafts, alar batten grafts, or suture techniques). Ideally, an objective preoperative test would be able to determine the cause for nasal valve compromise and therefore guide the patient-specific surgical strategy. For the purpose of this review we consider nasal valve compromise (NVC) as a sidewall rigidity problem and review the methods described to distinguish sidewall incompetence.

LITERATURE REVIEW

In their review on diagnosis and treatment of NVC, Wittkopf et al. describe the importance of anterior rhinoscopy for making the diagnosis. They recommend anterior rhinoscopy alone, followed by anterior rhinoscopy after nasal decongestion, to discriminate between anatomic obstruction and obstruction from mucosal congestion. They point out that nasal endoscopy may be useful to identify additional pathology that could also contribute to the obstruction not visualized with anterior rhinoscopy, but not for making the diagnosis of NVC.

Apaydin describes the importance of inspection of the internal and external nasal valves during quiet breathing and forced breathing, with the head neutral and in flexed positions. He further describes elevating the nasal tip with the thumb to examine the nostrils and valves, and using a cerumen curette to lateralize the ala and determine if the maneuver changes airflow. He notes that patients who experience improved airflow with use of the curette lateralization may benefit from nasal valve surgery. The Cottle test (distractions the cheek adjacent to the ala in an attempt to improve airflow) is also described as useful for diagnosis. He mentions rhinomanometry to measure airway resistance and acoustic rhinometry for topographic information as primarily research tools. Similarly, Fischer and Gubisch emphasize the importance of the clinical exam, and particularly the importance of inserting a glass spatula into the valve area to execute changes in valve area. They go on to suggest that patients try external spreaders or internal nasal dilators at night, noting that improvements with those in place will indicate nasal valve area pathology.

The American Academy of Otolaryngology–Head and Neck Surgery convened a consensus panel to create a clinical consensus statement on NVC. To form their consensus statement, Rhee et al. performed an updated systematic review and used a modified Delphi method to come to establish a consensus opinion on the diagnosis and management of NVC. The consensus panel agreed that NVC is best evaluated with history and physical
exam findings, and that endoscopy or photography could be useful adjunctive measures but are not routinely indicated. They further reached consensus that radiographic studies are not useful for evaluating NVC, and reached consensus that there is no current gold standard test to diagnose NVC. Finally, they reached consensus that there is no current gold standard test to diagnose the cause for NVC. This is significant because it is not uncommon for payors to request such diagnostic tests prior to authorizing a surgical intervention.

**BEST PRACTICE**

Nasal valve compromise is a common source of nasal airway obstruction, with multiple effective methods for correction. Currently, in the absence of a gold standard test to diagnose the specific source of nasal valve compromise, history and physical exam are key measures for distinguishing among septal, turbinate, and sidewall causes. Nasal endoscopy may be useful as an adjunct test to rule out other pathology that could also contribute to nasal airway obstruction with photography being useful for documentation. Future research is needed to define a diagnostic test to measure the nasal valve area and objectively distinguish among the possible sources of compromise. A diagnostic test is not recommended to diagnose the cause of nasal valve compromise based on the existing data to support any diagnostic tests.

**LEVEL OF EVIDENCE**

Two articles are level 4, three articles are level 5.

**BIBLIOGRAPHY**


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**TABLE I. Summary of Referenced Articles.**

<table>
<thead>
<tr>
<th>Article</th>
<th>Study Type</th>
<th>Patients</th>
<th>Diagnostic Recommendation</th>
<th>Use of Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wittkopf</td>
<td>Literature review (level 5)</td>
<td>N/A</td>
<td>Anterior rhinoscopy with and without decongestion</td>
<td>View nasal valve region</td>
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<tr>
<td>Apaydin</td>
<td>Literature review (level 5)</td>
<td>N/A</td>
<td>Physical exam, curette lateralization, Cottle test</td>
<td>View nasal valve region</td>
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<tr>
<td>Fischer</td>
<td>Literature review (level 5)</td>
<td>N/A</td>
<td>Physical exam, glass spatula sidewall lateralization</td>
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<tr>
<td>Gruber</td>
<td>Case series (level 4)</td>
<td>Thirty patients, nasal obstruction without septum or turbinate pathology</td>
<td>Physical exam and nasal strip test</td>
<td>View nasal valve region</td>
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<tr>
<td>Rhee</td>
<td>Systematic review, consensus opinion (level 4)</td>
<td>N/A</td>
<td>History and physical exam, possible benefit of endoscopy and photography, nasal strips to confirm</td>
<td>View nasal valve region</td>
</tr>
</tbody>
</table>

N/A = not available.