All About Nasal Valve Collapse

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Abstract. For correcting collapsed alae, blunt dissection of the septal mucoperichondrium through the transfixion incision is extended on both sides up to the vault of the upper lateral cartilages, which are severed from their insertion. I remodel the lower lateral cartilage and secure the lateral crus together with the upper alar groove in a less concave position with mattress sutures in cases of anterior valvular disturbance. The upper lateral cartilages are also fixed in a more convex position, particularly in cases of posterior valvular disturbance. In both anomalies a slightly convex septal or auricular slice cartilage graft placed over the concerned cartilage helps to keep the valve more open and the lateral wall in proper position. If necessary, in extreme secondary cases, one needs the help of bilateral cartilaginous or bony supports embedded subperiostally at the nasal bones.

Key words: Nasal valvular collapse—Anterior valve disturbance—Posterior valve disturbance

The etiologies of nasal airway obstruction are septal deviation, turbinate hypertrophy, broad columellar base, excessively high vestibule floor, and position of the mobile lateral wall of the nose. The latter is known as collapse at the valve which can be anterior (i.e., alar) collapse (Figs. 1–6 and 11), posterior (i.e., middle third) collapse (Figs. 9–10 and 12), or both. Using other terminology, Constantian [8] distinguishes external valvular incompetence and internal valvular incompetence. We prefer anterior and posterior because to us external means the external skin which shows in these cases a marked depression of the alar–nasal crease. However, the expression valvular incompetence is quite appropriate.

Mink [35] first described in 1903 anatomic disturbances in the region of the nasal valve. Slight narrowing at the nasal valve can produce significant airway disturbance. The angle between the caudal end of the upper lateral cartilages and the nasal septum is normally 10°–15° and should be carefully examined in all patients suffering nasal airway obstruction. The nasal valve is considered by some authors [4,10,28] to be the slitlike opening between the caudal end of the upper lateral cartilages and the nasal septum. In fact, the valve is only a discrete and specific segment of the entire circumference of the nasal valve area. The latter is the narrowest part of the nasal passage and has many synonyms: os internum, os teum internum, limen vestibuli, valve area, and valve region. Synonyms of the nasal valve are luminal valve, flow limitary segment, and luminal chink [28].

The surface of the nasal valve area is between 55 [4] and 64 mm² [31] approximately and goes from the junction point of the caudal part of the upper lateral cartilages with the septum to the bony point of the piriform aperture and the soft fibrofatty tissue in this region. This opening in the nasal valve area is the narrowest portion of the nasal airway, and the nasal valve is the specific triangular slitlike portion between the caudal end of the upper lateral cartilages and the septum.

The cause of alar collapse or anterior valvular incompetence during inspiration is a particular slackness of the soft parts of the nose, hypoplasia, or malposition. It manifests as a nostril rim collapse, vestibular collapse, or valve collapse. The former is the only one in most cases that does not concern the valve and often corresponds to a pinched nose as shown by Juri et al. [27]. They showed a very useful method of correction using an anchor graft from the auricular concha. In corresponding cases of notched and pinched alar border, we use a similar ear cartilage graft but for that purpose prefer the easier and...
Fig. 1. A 28-year-old man with primary anterior valve collapse. (A) External and (B) internal views. (C) Manipulation of transalar suture after bilateral luxation of lateral crura and cartilage remodeling. (D) End of the operation with protected transalar sutures

more adequate open access instead of Rethi's incision, avoiding tertiary retraction.

The cause of middle third collapse or posterior valvular incompetence lies in the upper lateral cartilages because they are too slack or because they are lying firmly in a narrow angle with the septal cartilage (Fig. 4C). These are flaccid mobile collapses that have to be differentiated from a rigid collapse in which the lateral wall has limited mobility caused by traumatic or iatrogenic narrowing with fibrous tissue formation and is only slightly or not at all affected by inspiration. The surface of the lateral wall is then smaller than normal. This can be at the limit of vestibular or valvular stenosis.

For diagnostic distinction of this pathology, Fanous [15] proposed a probe test (described by Cinelli in 1971 [7]). The lateral wall can be easily mobilized outward with slight pressure by using a Q-tip. This leads to a marked improvement of the airway only in cases of flaccid collapse (positive test). The nasal musculature controls the position of the upper lateral cartilages and hence the area of the valve. The constrictor muscles tend to close the valve, whereas dilator muscles open them.

The internal part of the nose was compared by Bridger and Proctor [6] with a rigid tube comprising a short collapsible or flow-limiting segment.

A critical transmural pressure can be reached during inspiration that closes the flexible external part of the nose, i.e., the firmly open cartilages. Indeed, a maximal inspiratory effort increases the flow–pressure curve to a point where the nasal airflow will no longer be augmented by an increase in intranasal negative pressure [6].

In all cases the collapse is more a functional disturbance than an aesthetic one so that some authors used to speak of “aspiration” phenomenon because there is less airflow with maximal inspiratory effort than with quiet inspiration. The nostril is unable to resist the suction effect caused by the inspired air stream and its negative pressure. The ideal way of quantitatively measuring the degree of nasal obstruction would be by rhinomanometry. This can be done by anterior or posterior active rhinometry, where total nasal air flow is measured by connecting a face mask to a pneumotachograph. The problem is that the expected effect of valvular collapse (decreased flow with maximal inspiratory effort) cannot be observed in tabulated data, although it is visible in individual cases. This is because valvular collapse occurs only when a critical transnasal pressure is reached and the averaging influence of total airflow measurements will mask valvular effects. Therefore, the diagnosis of nasal valve collapse should be clinical. As for measurement of postoperative values, absolute figures are impossible to obtain, as great variations exist between two patients with the same pathology, as well as in the same patient over time, due to influences such as smoking, stress, and infections for example. We evaluated the postoperative improvement using patient satisfaction and physical examination.

Establishing the tension of the triangulo-alar skeleton,