Acoustic Rhinomanometric Findings in Deviated Nasal Septum

Esam Albawardi, MD, FRCSC
King Faisal Specialist Hospital & Research Centre

ABSTRACT

Objectives: (1) Study Acoustic rhinomanometric (AR) findings in patients with deviated nasal septum (DNS). (2) Study the effect of compensatory inferior turbinate (IT) hypertrophy on AR and compare it to healthy participants.

Methods: Prospective descriptive study, studying AR findings in patient with DNS and compare it to healthy participants. Adult patients with or without (DNS) who volunteered to participate in the study were included. All patient’s demographics and symptomatology were recorded in addition to complete nasal examination. AR was performed before and after decongestion. The minimal cross-sectional area (MCA) and nasal volume (NV) were used to analyze the results.

Results: 136 nasal cavities (68 participants) have been studied using AR. 35 healthy participants and 33 participants with DNS. There was no significant difference between the two groups with regard to any confounding factors. MCA and NV measurements on the larger airway in patients with DNS was statistically significantly higher than normal participants (P value < 0.5), however NV difference was more pronounced than MCA. In the DNS group, MCA measurements on the larger airway before decongestion were 0.681 cm² (sitting), 0.85 cm² (upside), 0.418 cm² (downside), showing significant statistical difference of posture in the larger airway due to compensatory IT hypertrophy. This difference was less pronounced in healthy participants.

Conclusions: (1) AR is a reliable objective assessment of nasal patency. (2) NV is more sensitive than MCA in assessing nasal airway. (3) Both NV and MCA are affected by body position. (4) Compensatory IT hypertrophy is more-responsive to postural changes in the larger airway in patients with DNS compared to normal participants.

INTRODUCTION

• Nasal obstruction is a common complaint, seen in multiple sino-nasal disorders.
• Objective documentation of the type and degree of obstruction can aid the clinician in making accurate diagnosis and provide appropriate therapies.
• One of the objective documentation of nasal obstruction is Acoustic Rhinometry.
• There are several factors that can affect the nasal patency and nasal resistance.
• One of these factors is the postural changes and anatomical obstruction like DNS.
• Few studies applied AR to investigate positional changes and DNS in nasal volume (limited sample size, did not compare lateral decubitus position).

OBJECTIVES

• Study the positional changes in AR in (sitting, left lateral decubitus, and right lateral decubitus position in pre and post decongestant state).
• Analyze postural changes in patients with fixed anatomical obstruction due to deviated nasal septum separately and compare it to healthy participants.
• Report patient’s symptomatology with regard to nasal obstruction in different positions.

MATERIAL AND METHOD

• Prospective comparative study (body posture and the outcome on nasal patency).
• All adult patients with or without nasal obstruction (DNS) who volunteers to participate in the study were included.
• Participants were divided in to two groups:
  1. Healthy participants.
  2. Participants with deviated nasal septum.
• All participants responded to a detailed history questionnaire and underwent complete nasal examination.
• AR was performed in both nostrils under the following conditions before and after decongestion:
  1. Base line seated AR.
  2. (180 seconds) right lateral decubitus AR.
  3. (180 seconds) left lateral decubitus AR.
• Standardized technique was used.
• The minimal cross-sectional area (MCA) and nasal volume (NV) was used to analyze the results.
• The t-student test was used to compare the means of each side at different postural positions.

RESULTS

• 68 participants (136 nasal cavities) has been studied using AR and divided to:
  35 healthy participants (70 nasal cavities).
  33 participants with DNS (66 nasal cavities).
• MCA measurements was smaller on the dependent side, but didn’t reach statistical significance.
• NV measurements resulted in more reduction on the dependent side and was statistically significant (P value < 0.001).
• MCA measurements on the larger airway in volunteers with DNS before decongestion showed significant statistical difference of posture in the larger airway only.

CONCLUSIONS

• AR is a safe, fast, and reproducible method in objective assessment of nasal volume.
• Body position is an important factor that can affect AR result.
• Body positional effects on AR is due to mucosal swelling and abolished by decongesting the nose.
• Both nasal volume and MCA are affected by body position.
• Nasal volume is more sensitive indicator in detecting mucosal swelling than MCA.
• Inferior turbinate is more responsive in the larger airway in patients with DNS to postural changes.
• These results can provide explanation to two clinical entities (Paradoxical nasal obstruction, posture-induced nasal obstruction).

REFERENCES