**Responsiveness of acoustic rhinometry to functional septorhinoplasty by comparison to rhinomanometry and patient-reported outcome measures**

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Introduction and Aim: objective measures and intruments assessing subjective health are increasingly being used in rhinology. However, there is very little evidence comparing existing methods' responsiveness to change. We evaluated the responsiveness of acoustic rhinometry to nasal valve surgery by comparison to anterior rhinomanometry and patient-reported outcome instruments.

Material and Methods: Between April 2015 and April 2016, 60 consecutive patients with internal nasal valve dysfunction and 20 healthy volunteers as control group were enrolled. Prospectively collected data included acoustic rhinometry, anterior rhinomanometry, NOSE score, SNOT-23 questionnaire, visual analogue scale and demographics. Our primary endpoint was the responsiveness of acoustic rhinometry to functionnal septorhinoplasty surgery at 3 months. Secondary endpoints were ability of acoustic rhinometry to reflect "known group" differences and correlation to subjective symptoms.

Results: Acoustic rhinometry was highly responsive to septorhinoplasty ($p<0.0001$) while anterior rhinomanometry was not ($p=0.08$). Based on the quartiles of the post-operative change in NOSE score, patients were classified as respectively non responders, mild, moderate and good responders to surgery. Logistic regression model showed that acoustic rhinometry was able to discriminate non responders to responders to surgery ($p=0.019$), while anterior rhinomanometry failed ($p=0.611$). Sensitivity and specificity of acoustic rhinometry were significantly higher (ROC area=0.76) than rhinomanometry (ROC area =0.48). Acoustic rhinometry was also superior than rhinomanometry to discriminate patients from control subjects, and correlated better to patients-based subjective questionnaires.

Conclusion: Our study confirms and quantifies the responsiveness of acoustic rhinometry to nasal valve surgery, with a higher sensitivity and specificity than rhinomanometry. Acoustic rhinometry could be used as a follow up measure of surgical efficacy and its changes are related to patient-reported symptoms regarding nose patency and quality of life.