

A New Method of Evaluation of Upper Airway in Patients with Obstructive Sleep Apnoea—Computer-assisted Quantitative Videoendoscopic Analysis[†]

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Abstract

Introduction: Prospective study to quantitatively examine the static and dynamic changes of upper airways in patients with obstructive sleep apnoea (OSA) by engaging a new inexpensive clinical method which accurately evaluates the morphology of obstructive sites of upper airway. The aim was to minimise the subjective visual estimations and eliminate individual variations of the traditional method of nasopharyngoscopic assessment of upper airway. **Method:** Videoendoscopic (video-nasopharyngoscopic) examinations of upper airways of 15 patients were carried out with a calibrator inserted through the scope and placed at the levels of interest. Images of upper airways during quiet respiration, muller manoeuvre at erect and supine positions were obtained, digitalised and analysed by computers to generate the actual dimensions, surface areas and hence collapsibility of obstructive sites of upper airways. These measurements were validated by comparing videoendoscopic measurements (supine, quiet respiration) with upper airway magnetic resonance imaging (MRI) scans. We compared the area measurements of 30 videoendoscopic images with MRI scans of 15 patients at two levels (points above uvula and epiglottis) and calculated the accuracy percentage by examining the differences of surface areas of these two methods of measurement. The MRI scan measurements were used as standard, and the differences were presented as an accuracy percentage. **Results:** The accuracy for the first level was 89.50% and the second level was 88.15%; the mean accuracy was 88.82%. The mean area of MRI was 1.50 cm² (SD = 0.69) and the mean area of videoendoscopic images was 1.45 cm² (SD = 0.64), with a correlation of 0.93 and a P value of less than 0.001. **Conclusion:** This new cost-effective and convenient clinical method of upper airway evaluation enables us to quantitatively and accurately examine the morphology of obstructive sites of upper airway, so that we could further research the pathophysiology of upper airway obstruction, engage the most appropriate treatment and provide accurate pre and postoperative assessments for patients with obstructive sleep apnoea.

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