Importance of Topo Diagnosis in the Treatment of Obstructive Sleep Apnea Syndrome

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Breathing disorders during sleep represented by sleep apnea syndrome are created by various causes. These causes are divided into two groups: obstructive and nonobstructive. Most patients with apnea have obstruction in the upper airway between the nose and the larynx, varying in extent and severity.

Satisfactory therapeutic results in obstructive sleep apnea (OSA) should be attained after precise diagnosis of the site, cause and severity of obstruction. Several methods are used in the diagnosis of obstructive sleep apnea. Rhinoscopy and pharyngoscopy cannot determine the site and grade of obstruction exactly. Cephalometry on plain x-ray films and computerized tomographic scans of the head and neck regions are useful, but do not show these structures in dynamic conditions. X-ray fluoroscopy gives excellent dynamic studies but has a risk of excessive radiation exposure. Transnasal fiberscopy with the Muller maneuver can estimate the site and obstruction, but may not be relevant to sleep because the observation is done while the patient is awake. Fiberscopy during sleep can determine the sites only when the patient remains asleep during the manipulation of fiberscope. In contrast, intraluminal pressure measurements can determine sites of obstruction correctly.

In this study, we measured intraesophageal and mesopharyngeal pressures using intraluminal pressure measurements. Among various parameters used for evaluation of the severity of obstruction, apnea index, saturation of blood oxygen and intraluminal pressure are useful. We find intraluminal pressure measurements the most reliable because they will show changes even when clear-cut apneas and oxygen desaturations are absent. Evaluation of the site of obstruction during sleep is possible. If pressures in both the mesopharynx and the esophagus are abnormally high and approximately equal, the obstruction exists between epi- and mesopharynx—the level of the soft palate. If the intraesophageal pressure is abnormally high but the mesopharynx pressure remains in normal range, then the hypopharynx is the site of obstruction. If both pressures are abnormally high and the intraesophageal pressure is much higher than that in the mesopharynx, both sites are responsible. In our experience with 49 adult patients with sleep apnea, >50% of the cases had obstruction at the level of the soft palate, 30% at the root of the tongue and 20% at both sites (Fig. 1).

For treatment of sleep apnea in patients with up to moderate obstruction medical treatment is recommended first. In general, nasal continuous positive airway pressure (CPAP), anti-inflammatory medication and weight reduction programs are also useful. In the case of severe obstruction, suitable surgical treatments should be chosen, depending on the site and cause of obstruction. Uvulopalatopharyngoplasty (UPPP) is indicated in patients with obstruction at the soft palate level. Median partial glossectomy (MPG) is used in patients with obstruction at the root of the tongue. Both methods (UPPP and MPG) are necessary in the combined type of obstruction. In cases of marked obesity or micrognathia, temporary tracheostomy during surgery is recommended to prevent postoperative asphyxia. In the early periods of our surgical experience candidates with obstruction at the pharyngeal level received only UPPP. The mean values of the intraesophageal pressure of before and at least 6 months after UPPP were compared in each patient. In two thirds,
it reduced to <50% of the preoperative data. In one third, it reduced to a certain extent, but did not exceed the 50% level. The apnea index in the former reduced dramatically; however, in the latter it did not reduce as much.

For the last 2 years, the combination of UPPP and MPG has been used on 10 patients who had obstruction both at the soft palate and the root of the tongue. Postoperative results were satisfactory, expect for a few patients who were obese beyond a moderate degree.

CONCLUSIONS

Polysomnography, including intraluminal pressure measurements, demonstrated the site and severity of airway obstruction clearly in patients with OSA. In order to produce satisfactory surgical results in patients with OSA, precise diagnosis of the sites of obstructions and selection of appropriate operative methods are imperative.