Introduction

Temperature-controlled radio-frequency (TC-RF) volumetric tongue reduction has become an effective means of treating patients with obstructive sleep apnea in whom macroglossia is a contributing factor. Classifying patients as having medial, lateral, or diffuse tongue base hypertrophy allows us to direct therapy during each treatment session to areas contributing most to hypopharyngeal obstruction.

Methods

The degree to which the tongue obstructs the airway is assessed pre-operatively. Intra-operatively, following injection of a tumescent fluid containing local anesthetic, a Gyrus ACMI two-prong probe (85˚ C, rapid pulse, 600 joules) is inserted in each hemi-tongue three times (totaling 3600 joules). The heat energy is radially dispersed from the probe tip into the surrounding tongue musculature (Fig. 1). In patients having predominant lateral hypertrophy the probe is inserted at six sites in the configuration of two laterally-based equilateral triangles (“bow tie”) (Fig. 2). In patients with central hypertrophy, the probe is introduced at four paramedian and two lateral sites, creating two medially-based equilateral triangles (“barbell”) (Fig. 3). Non-specific hypertrophy warrants three staggered, wavy parallel probe insertions in the longitudinal direction on each side (“zigzag”) (Fig. 4). In the event of a secondary TC-RF procedure, to avoid overlapping treatment areas and to equitably distribute the heat energy, the size of the “bow tie” and “barbell” can be altered. Similarly, placement of the probes should be staggered in a “reverse zigzag” pattern.

Results

Application of TC-RF allows for site-specific tongue reduction. Interval home or hospital-based sleep studies determine the effectiveness of the procedure with respect to snoring, the apnea-hypopnea index, oxygen desaturation, and sleep disturbance. Configuring simple geometric shapes to target tongue contour irregularities, clinically significant muscle ablation can be achieved.

Conclusions

Assessment of tongue topography permits use of TC-RF to precisely ablate tongue muscle, requiring fewer treatment sessions, and achieving effective results following each intervention.

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