The Role of CT Virtual Endoscopy for Evaluation of the Airway

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Purpose
Evaluation of airway stenosis secondary to head and neck lesions has been performed routinely with CT scan and endoscopy (1). Endoscopy of a stenotic airway can be difficult, and can be associated with compromise of the airway (2). CT virtual endoscopy (CTVE) provides a noninvasive means of evaluating the airways while simultaneously studying the head and neck soft tissues including vasculature(1–3). We will assess the utility of CTVE in individuals with airway compromise.

Materials & Methods
CTVE was performed on 35 patients with history of airway stenosis secondary to tumor mass, trauma or long term intubation. Images were acquired employing 1.25 mm collimation, a pitch of 6:1, from the base of skull to tracheal bifurcation after the introduction of 120–150 cc of intravenous contrast for tumor patients. Noncontrast scans were performed for nontumor patients. Direct axial images as well as coronal and sagittal reconstructions were evaluated. Virtual endoscopic images of the tracheobronchial lumen were generated employing GE Navigator Software and read on a standard workstation. The clinician then was asked whether the clinical question was answered adequately.

Results
CTVE confirmed that endoscopy subsequently could be performed safely. In each of these patients, the findings at endoscopy and CTVE were identical when evaluating the airway proximal to the stricture. However, CTVE was able to access the airway distal to the stenosis, which could not always be visualized by endoscopy. In one instance, tracheostomy was cancelled, and in one case, immediate emergency tracheostomy was performed based solely on finding on CTVE. There were no complications during the CT examinations.

Conclusion
Endoscopy is subject to the need for anesthesia, and can be associated with patient discomfort and airway obstruction. In cases of severe stenosis, distal anatomy cannot be evaluated. Major complications occur in about 1% of patients. CTVE is noninvasive and cost-effective means of evaluating the airways particularly on an emergency basis in cases where conventional endoscopy appears to be contraindicated. The findings at CTVE may delineate lesions requiring immediate open intervention or can direct the safe completion of subsequent endoscopy. The virtual endoscopy images provide additional information such as the submucosal extension of lesions and the status of the lymph nodes.

References
