Ultrasound-Guided Transcutaneous Tru-Cut Biopsy to Diagnose Laryngopharyngeal Masses

A Pilot Study

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BACKGROUND. Patients with bulky laryngopharyngeal masses and a relative or absolute contraindication to general anesthesia present diagnostic difficulties. In the current study, the authors assessed the utility of transcutaneous ultrasound-guided Tru-Cut biopsy (USGTCB) under local anesthesia in such individuals.

METHODS. The current report was a prospective, nonrandomized study. Patients meeting the inclusion criteria underwent USGTCB as outpatients.

RESULTS. Ten patients were recruited, 4 of whom had an untreated mass obstructing the laryngeal lumen and 6 of whom were previously treated for laryngeal cancer. All tolerated the procedure well. The only adverse event noted was spontaneously resolving near-syncope in 1 patient. In 9 patients the biopsy was diagnostic: invasive squamous cell carcinoma in 7 patients and chondronecrosis in 2 patients. In the remaining patient, radiologically suspected cricoid chondrosarcoma was confirmed based on the surgical specimen.

CONCLUSIONS. The results of this pilot study are encouraging. USGTCB of laryngopharyngeal masses was found to produce no local morbidity, was diagnostic in each of the 5 patients with suspected disease recurrence after radiotherapy, was feasible in the outpatient setting, and had high sensitivity and specificity. The procedure is particularly useful for patients contraindicated for general anesthesia or those with a risk of tracheotomy due to intubation difficulties.


KEYWORDS: Tru-Cut biopsy, laryngeal cancer, ultrasound, diagnosis, histology.

Transcutaneous fine-needle aspiration biopsy (FNAB) is the method of choice for the initial investigation of many palpable head and neck masses.1–3 The technique is even more useful when real-time ultrasound (US) or computed tomography (CT) are used to guide sampling.5–7 However, for endolaryngeal lesions, the cartilaginous framework can hinder needle advancement, and the cytologic sample is unable to distinguish in situ from invasive carcinoma. A further difficulty is that of obtaining a significant specimen in cases of suspected disease recurrence after radiotherapy or chemoradiotherapy. Such patients usually develop edema that makes it difficult to distinguish tumor from normal tissue, and the specimen is often inadequate for diagnosis or falsely negative.8,9

Endolaryngeal lesions are usually biopsied by microlaryngoscopy under general anesthesia to obtain material for histologic diagnosis, determine the extent of disease, and assess the feasibility of conservative surgery. However, in patients with large tumors that obstruct the airway, breathing difficulties due to hemorrhage or edema may arise. In severe cases, protective tracheotomy may be
required. Preoperative factors (eg, poor general condition, dyspnea, cardiovascular disease, or pulmonary comorbidities), intraoperative factors (eg, difficult intubation, airway obstruction by tumor or postradiotherapy edema, etc.), and treatment options (in particular the possibility of conservative surgery), all can influence the decision to perform, or the eventual need for, tracheotomy.

Transoral laryngeal biopsy under local anesthesia is a possible alternative but it too is contraindicated in patients with airway-obstructing masses, and also carries with it specimen inadequacy problems in cases of suspected disease recurrence.\textsuperscript{10,11}

With a view toward overcoming the disadvantages of FNAB in patients with bulky laryngopharyngeal masses who are contraindicated for general anesthesia (including those who would not be candidates for conservative surgery if the mass was malignant), we assessed transcutaneous ultrasound-guided Tru-Cut biopsy (USGTCB) performed under local anesthesia in a prospective nonrandomized study.

**MATERIALS AND METHODS**

Patients with suspected laryngopharyngeal disease recurrence after radiotherapy or a suspicious, untreated bulky endolaryngeal mass were eligible if they 1) had stress dyspnea due to airway stenosis and were at risk of tracheostomy if diagnostic laryngoscopy was performed under general anesthesia, 2) presented with signs indicating difficult intubation,\textsuperscript{12} or 3) had clinical contraindications to general anesthesia. We excluded those patients with massively calcified thyroid cartilage, with initial or superficial cT1-T2 disease, or who refused to provide informed consent.

The locoregional workup was comprised of examination by fiberoptic laryngoscopy (Pentax Imaging Company, Golden, CO) and multislice spiral CT (Advantage Lightspeed; GE Medical Systems, Milwaukee, WI) (Fig. 1). In all cases, the US apparatus used was a Sequoia 512 USG with a linear multifrequency 15L9W probe (Siemens, Erlangen, Germany). With the patient reclining and the head extended, US images of the lesion were obtained to verify good lesion visibility and determine the optimal biopptic approach. The skin was cleaned with antiseptic and covered with a sterile drape, and 10 mL of 2% carbocaine was injected using a 25-gauge spinal needle (Terumo Medical Corporation, Tokyo, Japan).

For lesions located supraglottically or in the region of the aryepiglottic and pharyngoepiglottic folds, the best approach is through the thyrohyoid membrane; subglottic lesions are best approached through the cricothyroid ligament and for hypopharyngeal locations an approach lateral to the free edge of the thyroid cartilage is indicated. If the cartilage is not calcified, the needle can be introduced directly through it (Fig. 2). Having chosen the approach, the semiautomatic needle (16-gauge or 18-gauge; Biopsybell, Mirandola, Italy) is advanced percutaneously under US guidance until it reaches the interior of the lesion.
The procedure time was approximately 30 minutes. Patients remained in the recovery room for an additional 30 minutes and then were discharged if no complications developed.

RESULTS
From August 2004 to December 2005, 10 consecutive eligible patients (7 men and 3 women, with a mean age of 65.4 years [range, 45–78 years]) underwent USGTCB of their laryngopharyngeal masses. Four patients had an untreated mass obstructing the laryngeal lumen, 3 patients had received external beam radiotherapy (at a dose of 65-70 grays [Gy]) for laryngeal cancer, 2 patients had undergone endoscopic laser cordectomy and postoperative radiotherapy for laryngeal cancer, and 1 patient had undergone supraglottic laryngectomy and postoperative radiotherapy. Patient characteristics are summarized in Table 1. Patient 4, with newly diagnosed second synchronous oropharyngeal cancer, and Patient 3, with severe ischemic cardiopathy contraindicating general anesthesia, were not indicated for surgery. The remaining 8 patients had bulky disease or marked edema with a high risk of requiring tracheotomy if biopsy was performed under general anesthesia. In Patients 1 and 2, tracheotomy would have compromised the possibility of conservative surgery. All 10 biopsies were performed successfully with no technical problems. Nine patients had no adverse events; Patient 6, who previously received external beam radiotherapy for T1 squamous cell carcinoma, developed near-syncope, which resolved spontaneously.

Nine of the 10 specimens were sufficient for diagnosis (Figs. 3 and 4). Pathological findings, all of which were concordant with clinical hypotheses, were invasive squamous cell carcinoma in 7 patients and postradiotherapy fibrosis plus chondronecrosis in 2 patients. Seven of these patients underwent surgery and in all of them, definitive histologic examination confirmed the biopsy diagnosis; Patients 3 and 4 received chemoradiotherapy. Patient 1, who had a nondiagnostic core needle biopsy, underwent laryngotracheal resection of the stenosing subglottic mass that was suspected to be well differentiated chondrosarcoma (which was confirmed pathologically). Review of the original biopsy showed a few small islands of cartilaginous tissue that were suspicious for chondrosarcoma.

DISCUSSION
Our pilot experience of USGTCB in 10 patients with bulky laryngopharyngeal masses and absolute/
relative contraindications for general anesthesia suggests that biopsy was sufficient for diagnosis in 9 of 10 cases, and that the diagnostic specificity and sensitivity in these 9 cases were 100%. These findings indicate that USGTC more often provides a correct diagnosis of laryngopharyngeal masses (Figs. 3 and 4) than transcutaneous FNAB, particularly after previous organ-sparing treatment, including radiotherapy, for malignancy. Although the literature regarding the use of FNAB to investigate head and neck mass is abundant, to our knowledge the few studies concerning USGTCB to investigate laryngopharyngeal masses published to date are mainly case reports of successful diagnoses and staging of rare tumors such as adenoid cystic cancer\textsuperscript{13} and plasmocytoma.\textsuperscript{14}

With regard to the feasibility of USGTCB, we emphasize that it was performed successfully with no technical problems in all 10 patients, and that there was no local morbidity noted. A major advantage of the procedure compared with microlaryngoscopic biopsy performed under general anesthesia is that it is performed on an outpatient basis and therefore is much less costly. The fact that it is not performed under general anesthesia is particularly advantageous in patients who are not recommended for further surgical treatment. USGTCB would not substitute for microlaryngoscopic biopsy under general anesthesia in patients who are candidates for conservative laryngeal surgery. The low invasiveness of the technique suggests it may be preferable to microlaryngoscopic biopsy for the differential diagnosis of disease recurrence and postradiotherapy chondronecrosis (in such cases biopsy is usually contraindicated because it exacerbates pre-existing tissue damage).

We conclude that USGTCB appears to be a promising diagnostic procedure in patients with untreated or previously treated suspicious bulky laryngopharyngeal masses in the following situations: 1) no indication for conservative laryngeal surgery (bulky recurrence after radiotherapy or, more generally, chemoradiotherapy); 2) contraindication for surgery (eg, the patient is at high risk for serious comorbidity or multiple concomitant malignancies in the oropharyngeal area); and 3) the patient is at high risk of requiring tracheotomy during diagnosis under general anesthesia, which would compromise the possibility of later conservative surgery if indicated (eg, laryngotracheal resection, which must be performed without tracheotomy). We emphasize that USGTCB is a diagnostic technique and cannot replace staging in patients in whom full staging should be the standard of care. Patients with small laryngeal lesions are best approached using endoscopic CO\textsubscript{2} laser surgery, which is reliably diagnostic and is often definitive treatment.\textsuperscript{15}

\textbf{REFERENCES}


