Robotic Thyroidectomy

F. Christopher Holsinger, MD[a,*], Woong Youn Chung, MD[b]

KEYWORDS

• Robotic • Thyroidectomy • Transaxillary

KEY POINTS

- Robotic thyroidectomy is ideal for patients with indeterminate, likely benign lesions less than 3 cm, and a body mass index less than 35 kg/mg^2.
- Informed consent should include a clarification that robotic thyroidectomy is currently considered an off-label use of the da Vinci Surgical System in the United States.
- Careful attention to arm position and proper padding before the procedure is important to facilitate exposure and development of the working space from axilla to thyroid bed.
- The working space is developed using headlight and retractors without robotic assistance, establishing exposure of the thyroid bed from a 5-cm incision in the axilla.
- Three robotic instruments and a stereoscopic endoscope provide excellent visualization of the associated thyroid neurovasculature anatomy.

A video of a surgeon confirming the dimensions of the working space before robotic thyroidectomy accompanies this article at http://www.oto.theclinics.com/

INDICATIONS

Patients with an indication for unilateral thyroid lobectomy may be candidates for robotic thyroidectomy. Surgeons considering this approach should have extensive experience in head and neck endocrine surgery, and familiarity with the lateral neck and pectoralis major muscle. Contraindications include tumors greater than 3 to 5 cm and/or lesions located more deeply and posteriorly in the tracheoesophageal groove. The patient's body habitus and body mass index (BMI) are also important considerations, because the transaxillary approach in patients with a low BMI (<35 kg/mg^2) is much easier and faster to perform. If the distance between the axillary incision and thyroid is greater than 18 to 20 cm, establishing and maintaining an adequate working space may be difficult. In addition, coexisting Hashimoto thyroiditis and Graves disease may also be relative contraindications. Great caution should be taken when using the transaxillary approach for lesions that extend to the posterior aspect of the thyroid adjacent to the tracheoesophageal groove, because an increased risk may be present

[a] Division of Head and Neck Surgery, Stanford University School of Medicine, 875 Blake Wilbur Drive, CC-2227, Palo Alto, CA 94304-2205, USA; [b] Department of Surgery, Severance Hospital, Yonsei University School of Medicine, 50-1 Yonsei-Ro SeoDaemun-Gu, Seoul 120-752, Korea
* Corresponding author.
E-mail address: holsinger@ohns.stanford.edu

Otolaryngol Clin N Am 47 (2014) 373–378
http://dx.doi.org/10.1016/j.otc.2014.03.001 **oto.theclinics.com**
0030-6665/14/$ – see front matter

for injury to the trachea, esophagus, and recurrent laryngeal nerve. The role of robotic thyroidectomy for malignancy is currently not well studied in the United States.

Surgeons should thoroughly discuss the risks and benefits of robotic thyroidectomy, presenting a balanced approach to the patient. Informed consent should include a clarification that robotic thyroidectomy is currently considered an off-label use of the da Vinci Surgical System in the United States.

SURGICAL TECHNIQUE

Axillary Incision and Approach

While the patient is sitting in an upright position, just before surgery, the incision should be outlined in the holding area to best camouflage the scar.

- First, the inferior limit of the incision is identified by a horizontal line drawn from the sternal notch laterally to the folds of the axilla. Chung recommends then drawing an oblique line 60° from the midline from just above the laryngeal prominence of the thyroid cartilage and thyrohyoid membrane to the axilla.
- Depending on patient-specific anatomic landmarks within the axilla and body habitus, a gentle taper or even a C-shaped incision can be considered to accommodate the incision into the relaxed skin tension lines of the axilla.

Surgical Note: Close coordination with the anesthesia team is important for laryngeal nerve monitoring and to optimize patient arm and shoulder positioning.

- For robotic thyroidectomy, the authors prefer to use an endotracheal tube with a laryngeal nerve monitor.
- After general anesthesia is induced with the patient in supine position, the authors confirm that the incision is hidden well by placing the arm in a comfortable resting position, as initially described by Chung.
- The ipsilateral arm is then gently rotated nearly 180° cephalad, placed on an armboard, and carefully padded.

Surgical Note: Great care must be taken to minimize stretch injury of the brachial plexus from hyperextending the arm or overly rotating the arm medially. Ikeda and colleagues described a comfortable position for the arm to minimize these complications.

- Whether using Chung's (**Fig. 1**A) or Ikeda's approach (see **Fig. 1**B), proper patient positioning rotates the clavicle superiorly, effectively reducing the distance between the axilla and the thyroid.
- Padding the forearm and especially the elbow is essential to prevent neuropraxia and stretch injury.
- The arm and shoulder should be at the same vertical height, further minimizing risk for neuropraxia.
- Finally, the use of a thyroid pillow may be optimal for providing neuromuscular support, because this platform supports not only the neck and shoulder but also the scapula and upper back.
- Covered with sterile drapes, the da Vinci patient cart is positioned on the contralateral side of the operating table.
- The arm is secured with tape, and the neck, axilla, and upper chest are prepared and draped in standard sterile fashion.
- A 5-cm skin incision is made in the axilla just lateral to the anterior transaxillary fold at the posterior border of the pectoralis major muscle, as outlined earlier, both parallel to but lateral to the lateral edge of the pectoralis major muscle.