Abstract

Objective: 1. Review our first 13 robotic assisted trans-axillary thyroidectomy and parathyroidectomy (TART/TARP) cases, looking at the clinical and pathological data as well as technical challenges associated with this approach. 2. Examine and discuss complications associated with this approach.

Methods:
Retrospective series of 13 patients who underwent TART/TARP at our institution. Patient demographics, pathology and size of thyroid glands removed, intraoperative details, length of stay, and postoperative complications were recorded.

Results:
Over a 14-month period from 10/2011 to 12/2012, 11 patients (12 female, 1 male) underwent TART, and 2 patients underwent TARP. Mean age was 54 years (range: 29-76 years). All thyroidectomies were partial. Both left-sided parathyroid adenomas had been localized with preoperative imaging to fit criteria for single gland exploration. The largest thyroid lobe removed was 6.5 x 3.5 x 2.8 cm. Pathology was benign thyroid disease in 9 and well differentiated thyroid cancer in 2. Complications included a brachial plexus neuropaxis (n=1), recurrent laryngeal nerve paresis (n=1), and inadvertent parathyroid gland removal (n=1). Both nerve injuries resolved completely in follow up. Long-term follow up suggest good patient outcomes and patient satisfaction.

Conclusions: Robot-assisted trans-axillary thyroidectomy and parathyroidectomy are feasible procedures with good outcomes. Patient selection is key to successful outcome. Surgeons should recognize distant-access related risks including brachial plexus injury, chest paresthesias in addition to conventional thyroidectomy risks and understand how best to diagnose, prevent, and manage these complications.

Introduction

Minimally invasive thyroid surgery has been developing since the 1990’s first with the description of endoscopic thyroidectomy and then in 2008 with the first description of Trans-Axillary Robotic Thyroidectomy (TART). TART was originally described in South Korea,1 and this group has performed thousands of TART procedures, showing it to be safe and have equivalent surgical outcomes to open, trans-cervical thyroidectomy.

TART and Trans-Axillary Robotic Parathyroidectomy (TARP) are becoming increasing popular in the United States and more head and neck surgeons are becoming trained in this technique. The objective of this study is to review the early experience of a single surgeon to review not only the clinical data but the technical challenges and complications that occur early in the learning curve of these procedures.

Methods

The charts of all patients who had undergone TART and TARP at our institution were retrospectively reviewed. A single surgeon at our institution performs this surgery. Patient demographics, thyroid characteristics and pathology, surgical technique, intraoperative details, post-operative course and complications were reviewed and are described here.

Results

Eleven patients underwent TART and two patients underwent TARP between October 2011 and December 2012. All but one patient was female; the male patient underwent TART. Mean age was 54 years. The mean Body Mass Index (BMI) for all patients was 27.5 (range: 20.9 to 32.0). Nine TART patients underwent unilateral thyroid lobectomy (5 right, 4 left) and 2 underwent isthmusectomy; the 2 TARP procedures involved the removal of a single adenoma that was localized using pre-operative imaging.

All procedures were completed using the trans-axillary robotic approach. In four of the first five patients treated, a second incision was made on the anterior chest wall for placement of a fourth robotic arm in addition to a 6 cm axillary incision. In the 7-9th procedures, a longer, single, axillary incision was used (7-8cm). In the 11th and 12th treated patients, a second incision was made in the axilla for placement of the fourth robotic arm. Operative time decreased throughout the series ranging from 245 minutes for the first surgery down to 98 minutes for surgery number 13 (mean operative time for series: 198 min). On preoperative imaging, the mean thyroid nodule size ranged from 1.0 cm to 3.8 cm. The mean size of the removed thyroid lobes was 4.7 cm in greatest dimension (range: 2.8 - 6.5 cm). Pathology revealed parathyroid adenoma for both TARP procedures. In the TART procedures, 9 lobes were benign, one gland contained papillary thyroid cancer and one gland contained follicular thyroid cancer.

All patients were monitored in house overnight. Ten patients were discharged on post-operative day 1 and three patients on post-operative day 2. Mean drain output in the first 24 hours was 47mL. Three patients experienced complications. One patient had a temporary vocal cord paresis confirmed by fiberoptic scope examination in the recovery room after it was noticed that the patient had a breathy voice. The paresis completely resolved by the one week follow-up visit. A second patient (the sole male patient) experienced weakness of the ipsilateral upper extremity and was found to have a brachial plexus injury on neurological exam. The patient was treated with physical therapy and the paresis resolved over the course of 6 weeks. In a third patient, a parathyroid gland was noted in the specimen. No patient developed hypocalcemia.

Discussion

Numerous published series describe the safety and efficacy of TART/TARP.1-4 The objective of this paper is to show a single-institution, preliminary experience and highlight unique challenges in the early learning curve of a surgeon performing TART/TARP.

Several points can be taken from this initial series of 13 patients, with an emphasis on patient selection, obtaining adequate access, and unique complications associated with this approach. In this series, all surgeries were able to be completed robotically and there were no major complications. However, complications unique to this approach were encountered. Chest paresthesias are encountered in all patients due to the plane of dissection. While self-limited, patients should be counseled on this pre-operatively. Brachial plexus neuropathy occurred in one patient. After this complication, there was increased diligence to patient positioning and patient confirmation of comfortable positioning prior to the induction of anesthesia.

Access is one of the most challenging aspects of TART/TARP, especially in a surgeon’s early experience as he or she is also learning the differences in endoscopic anatomy. As can be seen in this series, there was a progression from a two incision approach with chest incision, single incision, longer single incision and then adding a second incision in the axilla to increase access space but maintain cosmesis. We recommend diligent patient selection early in the learning curve. As has been recognized by ourselves as well as other authors,5-7 the anatomy of patients with higher BMI will result in more difficulties achieving adequate visualization.

Conclusions

Robot-assisted trans-axillary thyroidectomy and parathyroidectomy are feasible procedures with overall good outcomes. Patient selection is key to successful outcome. Surgeons should recognize distance-access related risks including brachial plexus injury and chest paresthesias in addition to conventional thyroidectomy risks and understand how best to diagnose, prevent, and manage these complications.

References