



Transoral endoscopic thyroidectomy-vestibular approach: starting a program in an inner-city hospital

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Contributions: (I) Conception and design: V Banuchi; (II) Administrative support: V Banuchi; (III) Provision of study materials or patients: V Banuchi; (IV) Collection and assembly of data: KA Vlaming; (V) Data analysis and interpretation: All authors; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

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Abstract: Transoral endoscopic thyroidectomy vestibular approach (TOETVA) is quickly gaining popularity as the only truly scarless approach to central neck surgery. The literature reports more than 1,000 cases completed around the world. Starting a program incorporating this approach has obvious challenges in regards to surgeon training, building a team and recruitment of patients. We describe the methods of training and recruitment strategies used in the establishment of a transoral endoscopic thyroid program in an inner-city community hospital. In addition, we describe the demographics, nodule characteristics and operative times for our initial experience with 4 cases. These cases were performed successfully without any complications and great patient satisfaction. On review of the case load of the senior author we estimate that approximately 56% of our head and neck endocrine cases will be eligible for this approach in the future.

Keywords: Transoral thyroidectomy; remote access thyroidectomy; scarless thyroidectomy

Received: 01 January 2020; Accepted: 05 June 2020; Published: 30 September 2020.

doi: 10.21037/aot-2019-mtt-11

View this article at: <http://dx.doi.org/10.21037/aot-2019-mtt-11>

Introduction

Transoral endoscopic thyroidectomy vestibular approach (TOETVA) and transoral endoscopic parathyroidectomy vestibular approach (TOEPVA) are novel approaches to surgery of the midline neck. These are currently the only approaches to thyroid and parathyroid surgery without a cutaneous incision as they are performed through small incisions in the natural orifice of the oral vestibule. The first TOETVA procedure was reported in 2016 (1). Since then there have been nearly 1,000 thyroid/parathyroid cases reported in the literature (2) and it has gained acceptance as a safe alternative to the traditional open cervical approaches in patients motivated to avoid a midline neck incision (3).

Recent literature suggests that transoral endoscopic approaches to the midline neck may be widely applicable. Grogan *et al.* reported in his cross sectional study that

55.8% of patients presenting to 3 high-volume academic centers would be adequate candidates for transoral endoscopic approaches (4).

We present here the development and recruitment strategies of a TOETVA program in an inner-city hospital in the Bronx. We aimed to offer this procedure in this community in an effort to expand access to this novel approach and with this effort understand the applicability of transoral endoscopic thyroid and parathyroid surgery in this setting.

Patient population

Lincoln Medical and Mental Health Center is a New York City Health and Hospitals Corporation (NYCHHC) hospital serving the South Bronx community. The Bronx has an estimated population of over 1.4 million. Forty-three

point six percent identify as black or African American and 56.4% identify as Hispanic. Thirty-five percent are foreign-born and 59% speak a language other than English at home.

According to the U.S. Census Bureau, nearly 9% of members of the Bronx population are without any insurance coverage and 28% live below the poverty line. Due to lack of health insurance, proper knowledge of government assistance, and burden of losing daily income during hospital visits, Lincoln may appear to be an unlikely place to introduce a cosmetically advantageous procedure. Anecdotal evidence suggests that patients present with more severe pathology due to later presentation in this center. Despite these, the patients undergoing thyroidectomies at LMMHC have comparable TOETVA candidacy rates to those found in high volume tertiary academic centers (4).

Thyroid/parathyroid procedures

The senior author of this paper performed 51 thyroid and parathyroid procedures between November 2017 and July 2019 at Lincoln Hospital. Of note, the senior author also has an appointment as a Head and Neck Surgeon at Weill Cornell Medical Center and is present only as a part time employee at Lincoln Hospital limiting the volume of procedures done at this institution. Of the patients that had a thyroid and parathyroid procedure 44 were female and 7 were male. Mean age at surgery was 50 years with a standard deviation of 16 years. The nodule size means for those that had surgery for management of a suspicious thyroid nodule was 3.9 cm with a standard deviation of 1.7 cm. Twenty-eight patients ultimately had benign disease and 23 had a thyroid malignancy on final pathology. On review 29 out of 51 cases would be eligible for a transoral endoscopic vestibular approach (56%). The exclusion criteria used to assess for candidacy to transoral endoscopic approach were serious medical comorbidity that would contraindicate a prolonged procedure time; previous external beam radiation to the neck; previous open neck operation; benign single nodule larger than 6 cm; malignant thyroid tumor larger than 2 cm; total thyroid lobe diameter larger than 10 cm; substernal thyroid; indications for therapeutic central neck dissection and indication for a lateral neck dissection (5,6). Of note the senior author of this paper performed and offered this procedure only to patients with thyroid nodules less than 4 cm, benign or indeterminate cytology and highly motivated patients given that this cohort represented the initial experience of the surgeon with this approach. The use of this modified criteria for the initial experience of the

surgeon when adopting this approach was encourage by the proctoring team.

Recruitment strategies

When beginning the TOETVA program at Lincoln, education was paramount in recruitment of patients for a transoral endoscopic vestibular approach. The surgical procedure was explained in detail to those patients meeting criteria for the surgery. Additional risks to this procedure when compared to the open traditional approach were discussed including possible damage to the mental nerves, additional operative time, neck skin burn or tethering and risk of conversion to open procedure. Risks inherent to traditional thyroid surgery including damage to the recurrent laryngeal nerves, damage to the parathyroid glands, bleeding and infection were also discussed. The experience of the surgeon and process of training was adequately described to patients. In addition we disclosed that the only known benefit of this approach to date is avoiding a midline cervical incision/scar. As there are risks and benefits to both the open and transoral approaches, patient preference, priorities, and personal values play a large part in the process of decision making. The main challenge to recruitment of patients was patient comfort level with being part of the initial experience of the senior author performing this novel approach. It was important to invest enough time with patients in the decision-making process, answering questions, developing a trusting surgeon-patient relationship, and to insure that the patient understand the surgeon is invested in the patient's best interest.

Factors affecting patient preference

There were a number of anecdotal factors that affected patient preference for the open *vs.* transoral approach to thyroidectomy. One in particular that stands out is the fear of a difficult recovery. One author reported that a number of his patients who underwent transoral thyroidectomy complained of an uncomfortable "pulling" sensation over the access tract (7). Indeed, one patient was offered TOETVA but elected for an open approach due to fear of a painful recovery. The increased post op pain experienced by some patients may be caused by trauma at the dissection site, learning curve, hand skill, instruments, technique or CO₂ pressure and flow rate (8). There are also authors who report less post op pain in TOETVA *vs.* open

Table 1 Case reports overall features

Case	Age/gender	Date of surgery	Nodule/lobe size	Complications	Duration of surgery	FNA	Histopathology
Case 1	60/female	3/27/2018	3.4 cm	None	195 min	Bethesda II	Benign
Case 2	63/male	6/26/2018	2 cm	None	150 min	Bethesda III	Benign
Case 3	29/female	9/11/2018	2.1 cm	None	300 min	Bethesda II	Benign
Case 4	27/male	10/9/2018	3.5 cm	None	480 min	Bethesda III	Papillary thyroid carcinoma

thyroidectomy (9,10). There is a need for more research to elucidate whether a difference in pain with recovery exists and what are the causes in order to aid in patient decision making pre-operatively, as well as to aid with post-operative pain management in these patients.

Another common hesitation to the approach was due to the novelty of the procedure or preferring the approach where the surgeon was most experienced—i.e., transcervical. Those who agreed to the transoral approach all strongly valued and preferred avoiding a cervical incision/scar.

From November 2017 until July 2019, 4 patients (2 males, 2 females) at Lincoln Hospital underwent TOETVA. It is important to note that pure cosmesis was not the only motivating factor. Cultural factors, and maintaining health privacy played a key role in patient decision making. The first patient in this series had a history of keloid scars from previous surgery and had refused thyroid surgery despite discomfort associated with a large thyroid nodule for a year since diagnosis. While 3 out of 4 patients wanted to avoid a scar for cosmetic reasons the second patient in this series was clear that patient privacy of health information was his main motivator. He felt that a scar on his neck, which at first glance would be immediately visible to anyone he met, would immediately alert others that he had surgery and that it would affect how he was viewed within his community.

Initiation of a TOETVA program at Lincoln Hospital

In order to prepare for the first transoral thyroidectomy case at Lincoln, the surgeon undertook a number of steps. The senior author travelled to Johns Hopkins Medicine to observe several live procedures, she attended a formal course and participated in cadaveric dissections with her mentor and proctor. Cadaveric dissections were performed at her main institution in preparation as well with the resident team scheduled to assist in the case. The operative team was debriefed about the procedure and a “dry run”

with the equipment was scheduled in anticipation of the first case. In addition, paperwork pertaining to quality assurance relevant to this procedure was submitted to administration. The first case was proctored by an experienced TOETVA surgeon and remote proctoring for the subsequent cases was ensured. The technique utilized has been described elsewhere (11).

TOETVA cases data

Ten patients met the modified criteria outlined above. All of the patients that selected to opt out of the procedure did so stating fear of complications of a relatively novel approach and would prefer the more standard method. Of these, 4 patients underwent TOETVA. The details of these cases are presented in *Table 1*. The mean operative time was 281 [150–480] minutes. All procedures were performed successfully without conversions and without recurrent laryngeal nerve palsy or hypocalcemia. The patients were evaluated with flexible laryngoscopy in the office 2 weeks after procedure. In one case the pathology revealed a papillary thyroid carcinoma but as there were negative surgical margins with no extra-thyroid disease, per current NCCN guidelines lobectomy with surveillance was offered as an option and patient opted to not undergo a completion thyroidectomy.

Conclusions

Transoral endoscopic vestibular approach, is a novel surgical approach to surgery of the thyroid and parathyroid that is gaining traction in the United States and around the world. Our series serves to illustrate that with careful planning one can safely bring TOETVA into a community hospital in the inner city setting. Furthermore, the candidacy rates for this procedure measured in academic centers appear to be generalizable to this setting. The patients involved were extremely grateful for the availability of this approach. We

have continued to see a growing interest in this procedure among this population for varied reasons including cosmetic advantage as well as enhanced patient privacy. Access to novel approaches in inner city hospitals is important to further the field and continue progress.

Acknowledgments

VB would like to acknowledge the support of Drs. Rita Roure, Jonathon Russell, Ralph Tufano and Michael Stewart during the process of training and implementation of this procedure.

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the Guest Editors (Jonathon Russell and Jeremy Richmon) for the series “The Management of Thyroid Tumors in 2021 and Beyond” published in *Annals of Thyroid*. The article has undergone external peer review.

Conflicts of Interest: Both authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/aot-2019-mtt-11>). The series “The Management of Thyroid Tumors in 2021 and Beyond” was commissioned by the editorial office without any funding or sponsorship. The authors have no other conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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doi: 10.21037/aot-2019-mtt-11

Cite this article as: Banuchi V, Vlaming KA. Transoral endoscopic thyroidectomy-vestibular approach: starting a program in an inner-city hospital. *Ann Thyroid* 2020;5:11.