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Starting a Transoral Thyroid and Parathyroid Surgery Program

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Abstract

Purpose of Review—To describe the necessary steps to facilitate safe implementation of a transoral thyroid and parathyroid surgery program.

Recent Findings—Transoral vestibular approaches to the central neck have been demonstrated to be safe and feasible, while avoiding the morbidity of a cutaneous scar. As operative volume expands from a select few high-volume centers, a framework for implementation has been recommended to allow the evidence-based outcomes to translate into clinical practice for new adopters of these techniques. These include securing institutional support, choosing the appropriate candidate (both patient and surgeon), appropriate case observation and instruction (live and cadaver), and adequate first-case preparation and knowledge of the learning curve(s) for the techniques.

Summary—The recommendations in this article provide a foundation from which a transoral thyroid and parathyroid program may be successfully built. An intricate understanding of conventional transcervical central neck surgery and institutional support are absolute prerequisites to safe and successful implementation of these transoral vestibular techniques.

Keywords

Transoral thyroidectomy; Endoscopic thyroidectomy; TOETVA; Robotic-thyroidectomy; Transoral parathyroidectomy

Introduction

Remote-access approaches (RAA) to the central neck have historically been met with caution and a degree of skepticism in the North American health care community [1]. This is despite the robust international literature and positive out-comes with many of these techniques [2–5]. Concerns regarding technical difficulty, novel complications, cost, and

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Compliance with Ethical Standards

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generalizability of the international data to the North American cohort have often been cited as reasons [1, 3, 6–10]. Recently, the transoral vestibular approach to the central neck has been popularized for performing thyroidectomy (transoral endoscopic/robotic thyroidectomy vestibular approach; TOE/RTVA), parathyroidectomy (transoral endoscopic/robotic parathyroidectomy vestibular approach; TOE/RPVA), and central neck dissections via both endoscopic and robotic techniques [10–23].

In contrast to previously described RAA techniques, such as the transaxillary and facelift approaches, the transoral vestibular approach utilizes dissection planes that are familiar to surgeons who perform thyroid and parathyroid surgery. Moreover, this approach facilitates equivalent access to the bilateral thyroid beds [20]. Most importantly, from the patient perspective, it leaves no cutaneous scar. Perhaps as a result, adoption has been comparatively broad, with nearly 1000 thyroid/parathyroid cases described using this approach since 2016 [10, 13, 15–19, 21, 24–29]. As positive outcomes with these transoral vestibular techniques continue to be reported, one anticipates that an increasing number of institutions and surgeons will wish to add the procedure to their surgical armamentarium. In this context, it is important to develop a framework for safe and effective adoption of these transoral vestibular techniques [30]. Here, we present our recommendations for successful implementation of a transoral thyroid and parathyroid surgery program based on review of the transoral vestibular literature to date.

Candidacy–Surgeons

Although many surgeons and/or institutions may be interested in incorporating transoral central neck surgery within their scope of practice, as most centers have the necessary technology, ubiquitous adoption without appropriate preparation is discouraged. Surgeons considering implementation should be those already well versed in procedures of the central neck, including thyroidectomy, parathyroidectomy, and central neck dissection [30]. A thorough understanding of the central neck anatomy is not only critical to translating the transcervical view to the top-down visualization of transoral vestibular techniques, but also necessary in the case of failure of the transoral technique with requisite conversion to an open approach.

The precise number of yearly open central neck procedures for transoral vestibular approach candidacy is a topic of debate [30]. However, evidence is clear that high-volume thyroid surgeons have superior outcomes to their low-volume counterparts [31]. Recent studies have defined high-volume thyroid surgeons as those completing more than 25 cases yearly [31]. As such, this should be considered the absolute minimum number of yearly open thyroidectomies to be considered for candidacy; however, the true minimum may be higher and has yet to be defined [30]. Moreover, these open thyroid procedures also need to be supplemented with an appropriate number of open parathyroidectomies and central neck dissections by the candidate surgeons.

If the candidate surgeon aims to utilize the robotic-assisted techniques, he/she must be appropriately credentialed for the use of said technology. Furthermore, an experienced robotic surgeon, familiar either with transoral robotic surgery (TORS) or other robotic-

assisted RAA techniques, would be the most ideal surgeon candidate for TORTVA/TORPVA. Similarly, for the endoscopic approaches, the surgeon should be familiar and facile with the associated endoscopic instrumentation. Likewise, surgeon-directed ultrasound is an important aspect of this technique for many reasons. In our experience, the surgeon is best able to appreciate the relevant anatomy as it relates to transoral surgery, and may thus best anticipate potential pitfalls with individual tumors, ultimately guiding appropriate patient selection. As such, competence with thyroid and neck ultrasound is a valuable tool for the candidate surgeon (Fig. 1).

Contemplation and Building a Team

After review of the salient literature and case videos describing technique, surgeons considering incorporation of transoral approaches to the central neck should secure institutional support for this endeavor. This includes but is not limited to, discussions with members of their surgical department (department/division chair), risk management, and administrative leads [30]. Taking these steps ensures the availability of resources, a qualified operative team, and having a plan in place for any unexpected or adverse outcome. Although these transoral techniques have proven to be safe and feasible, the risk to patients is heightened during a surgeon's preliminary operative experience with any procedure. Institutional Review Board (IRB) approval is not required prior to performance of a new or novel surgical procedure; however, a detailed and complete informed consent should be obtained, with a frank discussion of the surgeon's experience to date with the patient for the planned procedure [32]. Of course, IRB approval is mandatory if patient outcomes are planned to be reviewed/ reported for research purposes, which is strongly encouraged given the relative infancy of these techniques.

Observation and Instruction

Once a surgeon appropriate for candidacy has become familiar with the surgical technique through literature/video review and has secured institutional support, skill acquisition and education may begin. The first proposed step is live observation of an experienced transoral central neck surgeon, of which a minimum of two cases is recommended [30]. These cases should be via the approach the candidate surgeon intends to use, i.e., robotic-assisted if the surgeon plans to use the robotic techniques. If the candidate surgeon intends to utilize both robotic and endoscopic techniques, it is reasonable for he/she to observe two cases each via both modalities. While some have recently debated the role of live case observation, it is our opinion that this technique varies from existing techniques enough that potential surgeons will benefit greatly from aspects of live observation that are not adequately addressed with surgical videos or other remote learning techniques. Following case observation, cadaver dissection has been recommended. The proposed recommendation is again for two cadaveric dissections [30]. These can be supplemented with instructional courses, but it is our opinion that the exercise of planning a cadaver lab and performing the operative steps independently greatly enhances the likelihood of early success. It also allows the potential team the opportunity to recognize shortfalls in instrumentation and training.

Candidacy–Patients

Indications and contraindications for transoral vestibular approaches to the central neck have been well described [18, 20, 33]. For TOE/RTVA, the patient first must meet criteria for thyroid lobectomy or total thyroidectomy as per the 2015 American Thyroid Association guidelines and be highly motivated to avoid a cutaneous scar. Fine needle aspiration cytologically benign and indeterminate nodules ≤ 6 cm and a thyroid lobe with a maximum dimension ≤ 10 cm meet the recommended inclusion criteria [33]. Select patients with T1 well-differentiated thyroid carcinoma can also be considered; however, such patients are not recommended as part of a candidate surgeon's initial cohort [22, 34]. In a similar fashion, candidate surgeons may also wish to begin their transoral vestibular experience with lobectomies exclusively, as they gain familiarity with the approach [30]. Although there has been no data to date that demonstrates larger nodules/lobes create cases of greater difficulty via transoral vestibular techniques, anecdotal description by high-volume transoral surgeons suggests that nodules < 4 cm and lobes < 7 cm may be those best suited for one's preliminary experience. We recommend that these nodules be situated away from the expected position of the recurrent laryngeal nerve to ensure that no remnant of the nodule is left adjacent to the nerve, and reiterate that surgeon-directed ultrasound is a valuable part of the preoperative process to help avoid this. Benign nodules are likewise ideal. Furthermore, most right-handed surgeons will anecdotally experience some advantage when removing right-sided pathology (Table 1). Finally, while BMI has not been associated with increased operative times, we again feel that a lower BMI is associated with improved facility, as is a relatively small chin.

There is less specific data regarding inclusion criteria for TOE/RPVA. Patients with both primary, secondary, and tertiary hyperparathyroidism have been successfully managed via these techniques [15, 17]. However, a well-localized parathyroid adenoma would be the most ideal case, given the desire to avoid four-gland exploration if at all possible during a surgeon's initial experience with the technique. A detailed preoperative discussion should be had with the patient regarding their preferences regarding four-gland exploration and open conversion if there is inadequate intraoperative parathyroid hormone response. Alternatively, given the high confidence of concordant imaging, some patients prefer to avoid a scar even if this may mean an additional surgery in the future.

The First Case and Learning Curve

The surgeon's first transoral vestibular case should be carefully selected, as outlined above. Moreover, there should be access to on site or remote real-time proctoring for the initial cases [30]. In one study, the learning curve for TOETVA lobectomy has been defined as 11 cases, while others have similarly estimated a learning curve of between 7 and 10 cases [19, 26]. Although it may be impractical to have available proctoring for the entire duration of the skill acquisition period, we believe this to be vital for the surgeon's first two cases at the minimum. The presence of the proctor enhances patient safety early on, not only by reinforcing the operative steps, but also by appropriately gauging when conversion to an open approach is required. If at all possible, a second co-surgeon experienced with thyroid and parathyroid surgery should be present and available for the initial cases. We encourage a

team-based approach during this portion of skill acquisition, as two experienced surgeons will anecdotally complement each other and lead to enhanced patient safety and decreased surgeon fatigue. If this is not feasible, the assistant should be a medical professional with knowledge of central neck anatomy, the planned operative steps, and instrumentation, and one with prior familiarity and rapport with the primary surgeon [30].

Notably, preliminary data suggests the learning curve for the robotic-assisted techniques may be longer than that of their endoscopic counterparts [10]. As such, this should be taken into account when considering which technique a surgeon wishes to utilize primarily, and when it is safe to take on cases of greater complexity via these approaches. Ultimately, the surgeon should utilize the technique that he/she is most comfortable with and believes can provide the patient with the best outcome. This may vary from surgeon to surgeon based on factors such as prior robotic experience.

Prior to the initial case, the surgeon should review and confirm that all necessary instrumentation is available and functional. Some recommend that OR personnel who will participate in the initial case, including the anesthesia and nursing teams, surgical technologist, and assistant should participate in a “dry run.” This should include simulated execution of all operative steps, as well as tasks that may seem menial such as room setup and bed positioning [30]. Ideally, this same operative team would be used for the first several cases to optimize safety, case flow, and operative time.

Conclusions

Transoral vestibular approaches to the central neck have been demonstrated to be safe and feasible. However, the early positive results do not obviate the need for careful thought, and deliberate steps to ensure the outcomes described in the literature translate into practice for new adopters. Here, we have provided an overview of the necessary actions to successfully build a transoral thyroid and parathyroid surgery practice. We believe these to fall under the following headings: securing institutional support, choosing the appropriate candidate (surgeon and patient), observation and instruction, and understanding the learning curve. These recommendations should be considered a foundation of which to build on, and not a mechanism for accreditation. Ultimately, surgical education is a continuous process and the principle of nonmaleficence should be strictly adhered to.

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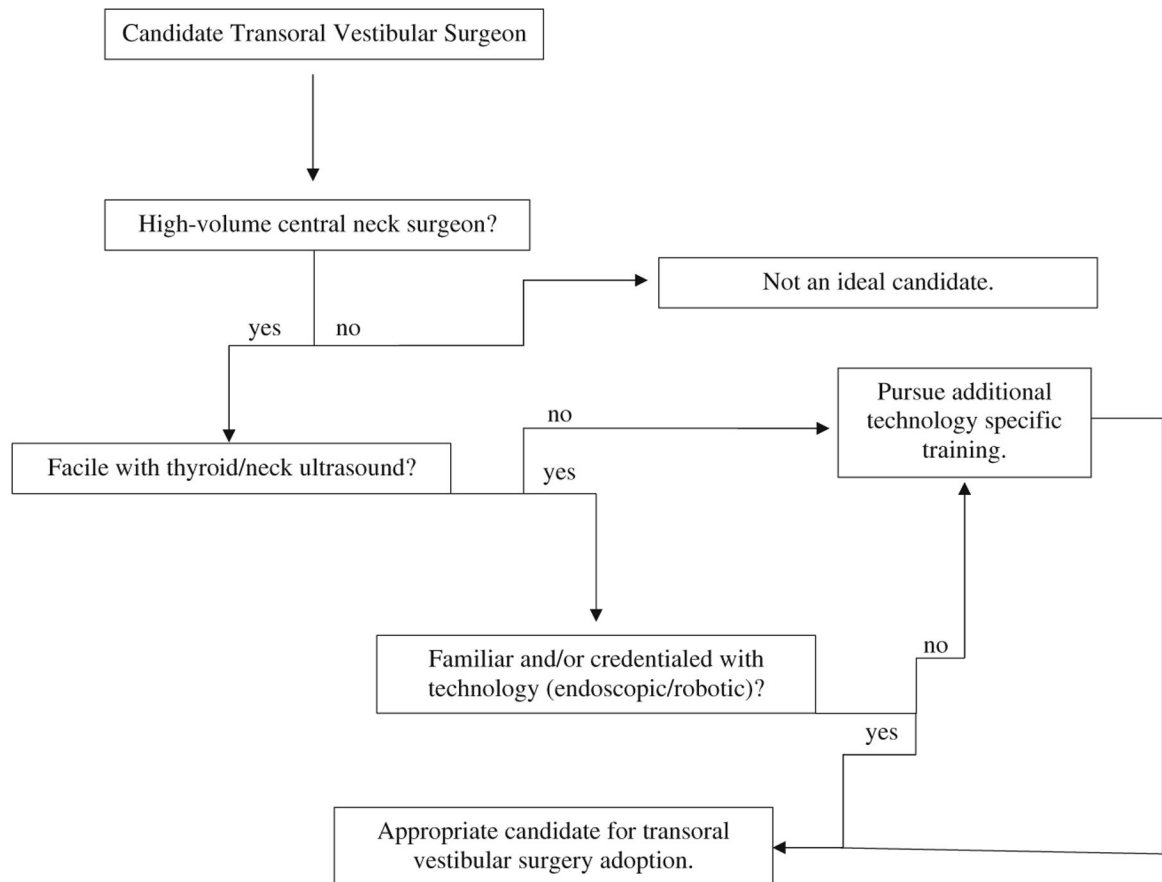


Fig. 1.
Identifying the appropriate surgeon candidate for transoral vestibular surgery adoption

Table 1

Ideal initial patient candidate; thyroidectomy

Motivated to avoid a cervical neck incision with recommendation for thyroid lobectomy as per ATA guidelines
Thyroid lobe maximum dimension 7 cm
Benign nodule/tumor maximum dimension 4 cm
Nodule/tumor located away from RLN
Disease laterality ipsilateral to surgeon's dominant hand

ATA American Thyroid Association

RLN recurrent laryngeal nerve