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Transoral Thyroidectomy (TOETVA) – Experience of the First 6 Months

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Rezumat

Tiroidectomia transorală (TOETVA) - experiența primelor 6 luni

Tehnica TOETVA (TransOral Endoscopic Thyroidectomy Vestibular Approach) reprezintă o variantă minim invazivă ce permite efectuarea tiroidectomiei fără cicatrice cervicală vizibilă, cu disecție tisulară redusă şi manipularea minimă a nervilor laringieni recurenți. Acest articol prezintă o descriere în detaliu al tehnicii şi cuprinde primii 23 de pacienți incluşi într-un studiu desfăşurat în România în perioada decembrie 2024 - iunie 2025, care au fost operați prin TOETVA. Toate intervențiile chirurgicale au fost realizate de aceeaşi echipă, utilizând echipamente laparoscopice standard. Este necesară experiență chirurgicală atât în chirurgia endocrină, cât şi în laparoscopie. Pentru un grup selectat de pacienți, această tehnică s-a dovedit a fi sigură, fără leziuni ale nervilor laringieni sau mentonieri, cu câteva cazuri de hipocalcemie tranzitorie şi rezultate estetice bune, cele mai frecvente complicații fiind echimozele cervicale anterioare. Rezultatele până în acest moment susțin TOETVA ca o alternativă reală la tiroidectomia clasică, în special pentru pacienții care îşi doresc un rezultat fără cicatrici vizibile.

Cuvinte cheie: tiroidectomie transorală, TOETVA, chirurgie minim invazivă, tiroidectomie endoscopică

Abstract

Transoral Endoscopic Thyroidectomy Vestibular Approach (TOETVA) is an emerging minimally invasive technique of performing thyroidectomy with no scarring, less dissection and less laryngeal nerve manipulation. This article presents in detail the TOETVA technique and includes the first Romanian series of 23 patients enrolled in a study between December 2024 and June 2025 who underwent TOETVA. All procedures were carried out by a single surgical team using standard laparoscopic equipment. Surgeon experience in both endocrine surgery and laparoscopy is necessary. For a selected group of patients, this technique proved to be safe, with no laryngeal or mental nerve

injury, few cases of transient hypocalcaemia and good aesthetic results, the most common complication being anterior cervical ecchymosis. These preliminary results support TOETVA as an effective alternative to the conventional open thyroidectomy, especially for patients seeking scarless outcomes.

Keywors: transoral thyroidectomy, TOETVA, minimally invasive surgery, endoscopic thyroidectomy

Introduction

Thyroidectomy is a surgical procedure refined at the beginning of the 20th century by Theodore Kocher. Total thyroidectomy or hemithyroidectomy is currently considered the gold standard for treating both benign and malignant thyroid conditions. The conventional approach performed via an anterior cervical incision, although effective, results in a visible neck scar that can negatively impact the patient's quality of life (1-3).

To overcome the esthetic drawbacks of the traditional approach, several endoscopic techniques have been developed, such as the axillo-bilateral breast, transaxillary, retroauricular and transoral approaches. These techniques can be performed using either endoscopic instruments or robotic assistance.

The TOETVA technique (TransOral Endoscopic Thyroidectomy Vestibular Approach) was first described by Anuwong in 2016 (4). Its primary objective is to prevent the cervical scar, providing a more esthetically pleasing outcome with no visible cutaneous scar. Additional advantages include reduced tissue dissection and less manipulation of the recurrent laryngeal nerves compared to other minimally invasive approaches (5-7). This article does not aim to be a comparative study, but rather a presentation of the surgical technique performed on a limited number of patients.

Materials and Methods

This article includes the first 23 patients who underwent TransOral Thyroidectomy in Romania and were enrolled in a retrospective study aimed to assess the initial 6-month experience with this technique. All the procedures were performed consecutively between December 2024 and June 2025 at Elias University Emergency Hospital and Hyperclinica MedLife Medical Park. Patients were informed about the available surgical options, including the conventional open technique and the TOETVA procedure.

Clinical characteristics of all patients were recorded, including thyroid lobe and nodule dimensions, the type of surgery performed (thyroid lobectomy or total thyroidectomy), operative time, length of hospital stay, histopathological results, drainage usage, postoperative calcium levels and postoperative complications.

Surgical Protocol and Technique

The benefits and risks of each surgical approach were thoroughly discussed with all patients, who provided informed consent. All procedures were performed by the same surgical team.

Preoperatively, all patients underwent endocrinological evaluation and thyroid ultrasound, along with measurement of thyroid hormones, serum calcium, and PTH levels. Additionally, all patients underwent nasopharyngolaryngoscopy. All patients were considered fit for surgery.

Indications: thyroid gland length < 10 cm or volume < 45 mL, benign nodules < 6 cm.

Relative contraindications: short neck, obesity.

Contraindications: ineligibility for surgery, large thyroid gland size, history of cervical surgery or radiotherapy.

The surgical procedures were performed using conventional laparoscopic instruments, a 30-degree endoscopic camera (5 mm or 10 mm) and a vascular sealing device. All surgeries were performed under general anesthesia with naso-tracheal intubation to ensure optimal working space for instrument manipulation.

As part of the preoperative antiseptic protocol, all patients performed oral rinse with chlorhexidine-based mouthwash 24 hours before surgery in order to reduce the oral bacterial load. After intubation, the oral cavity was further disinfected with sterile sponges soaked in chlorhexidine-based solution. The operative field was then prepared using povidone-iodine solution.

Subcutaneous infiltration with diluted adrenaline (1 ampoule in 500 mL saline) was performed

prior to the incision to achieve vasoconstriction and better define tissue planes. A 10 mm horizontal incision was made at the level of the lower lip mucosa (*Fig. 1*). Cervical hydrodissection was then performed using a Veress needle and the adrenaline solution (*Fig. 2*). A tunneler was then introduced to gradually and safely create the working space (*Fig. 3*).

Trocar placement involves the insertion of three trocars in the oral vestibule - a 10 mm optical trocar placed prementally and two 5 mm trocars positioned at the 33-34 and 43-44 interdental spaces, minimizing the risk of mental nerves injury.

A working space was created in the subplatysmal plane with CO_2 insufflation at a constant pressure of 6 mmHg. The midline raphe was divided using a vascular sealing device (LigaSure, Lotus, or Harmonic), allowing access to the thyroid bed between the thyroid capsule and infrahyoid muscles. The infrahyoid muscles were retracted laterally and anchored with transcutaneous monofilament suture threads for better exposure.

The thyroid isthmus was sealed and divided, followed by superior pole dissection to expose the superior pedicle branches of the right thyroid lobe. These were then sealed and divided. The middle thyroid vessels were identified, sealed and divided as well. Dissection continues with the sectioning of the thyrotracheal ligaments after identifying and preserving the recurrent laryngeal nerve and parathyroid glands. The procedure continues with dissection, sealing and division of the inferior pedicle branches of the right thyroid lobe, enabling its complete mobilization. For total thyroidectomy, the same steps were repeated for the left thyroid lobe. After meticulous hemostasis, the specimen was extracted using an endobag through the premental port. All trocars were removed under videoscopic control and the vestibular mucosa

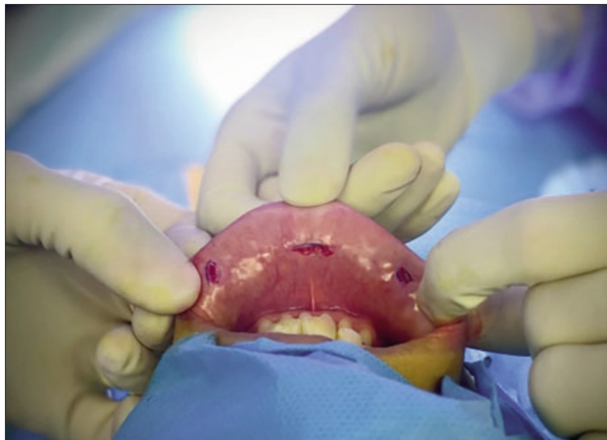

Figure 1. Incisions

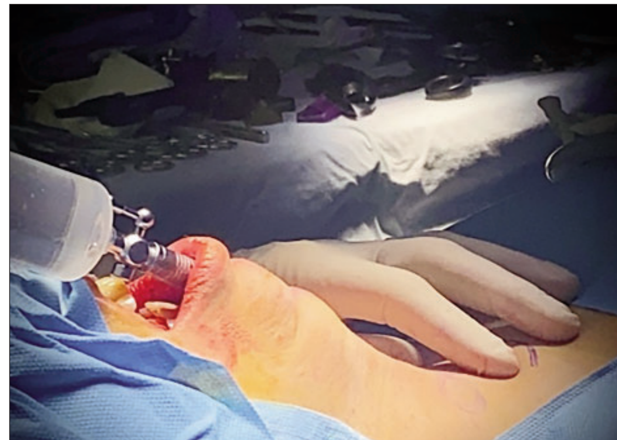

Figure 2. Hydrodissection

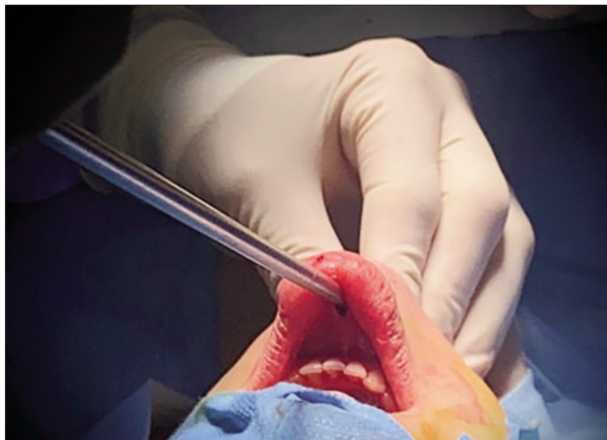

Figure 3. Premental dissection

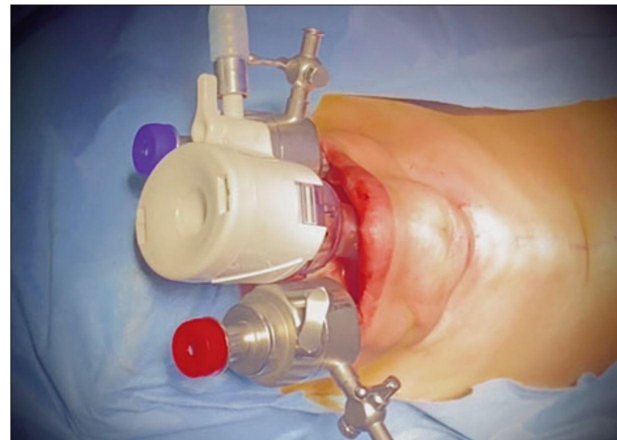

Figure 4. Trocar positioning

incisions were closed with 4-0 absorbable multifilament sutures.

Postoperative Care

Postoperative antibiotic prophylaxis was administered using amoxicillin/clavulanic acid 875 mg /125 mg, one tablet every 12 hours, combined with chlorhexidine mouthwash at least three times daily. Oral intake was resumed on the day of surgery, starting with semi-liquid food, followed by a gradual return to normal diet.

Results

Between December 2024 and June 2025, 23 patients underwent surgical intervention: 19

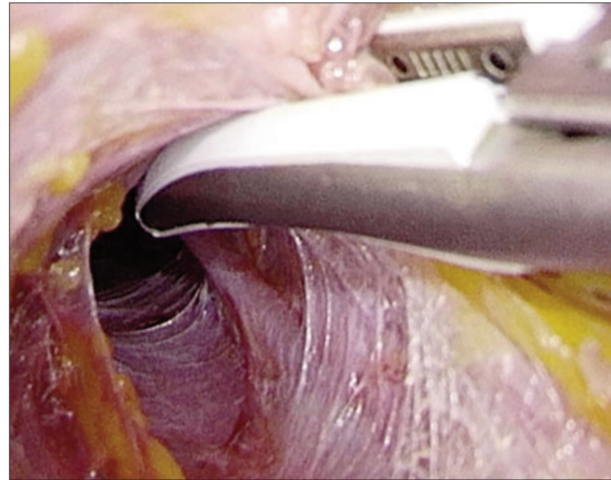

Figure 5. Flap preparation

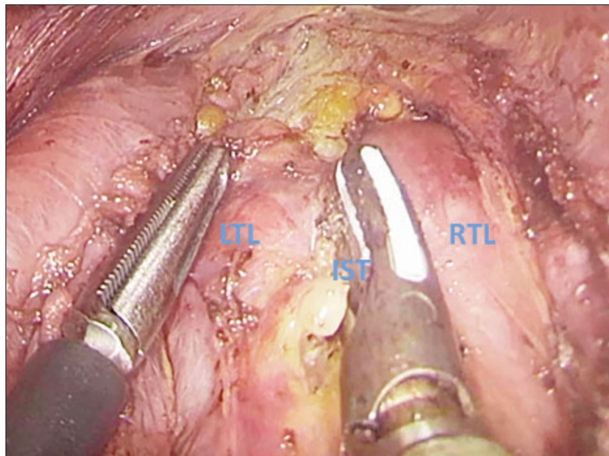

Figure 6. Division of the isthmus
LTL – left thyroid lobe, IST – isthmus, RTL – right thyroid lobe

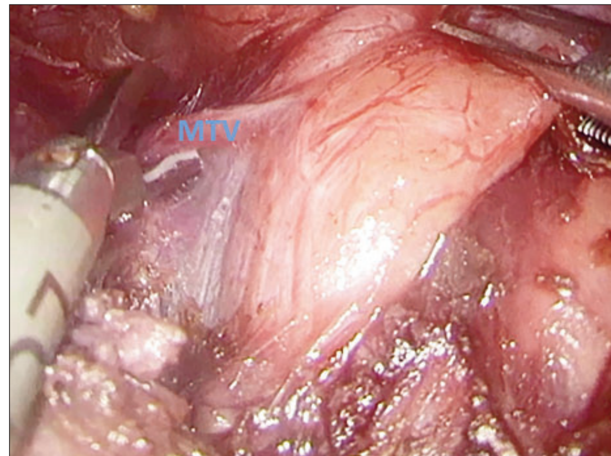

Figure 7. Middle vein dissection and sealing
MTV – middle thyroid vein

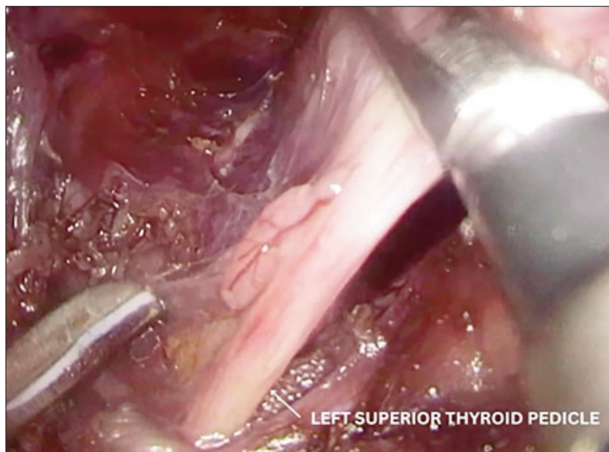

Figure 8. Superior pole dissection and sealing

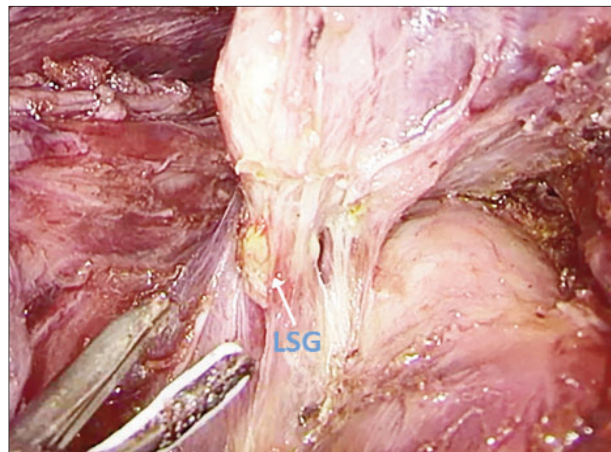

Figure 9. Parathyroid identification
LSG – left superior parathyroid gland

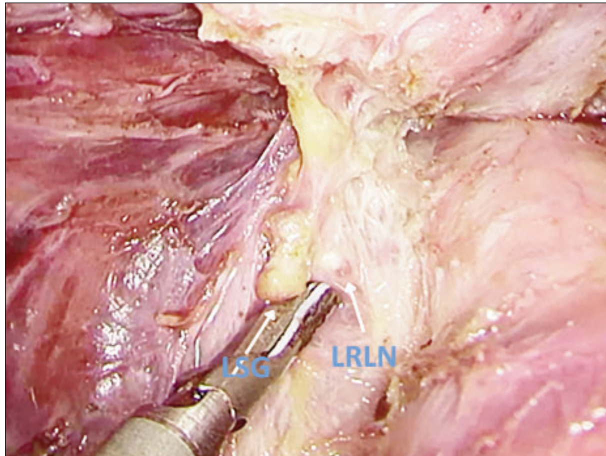

Figure 10. Recurrent laryngeal nerve exposure
LSG – left superior parathyroid gland
LRLN – left recurrent laryngeal nerve

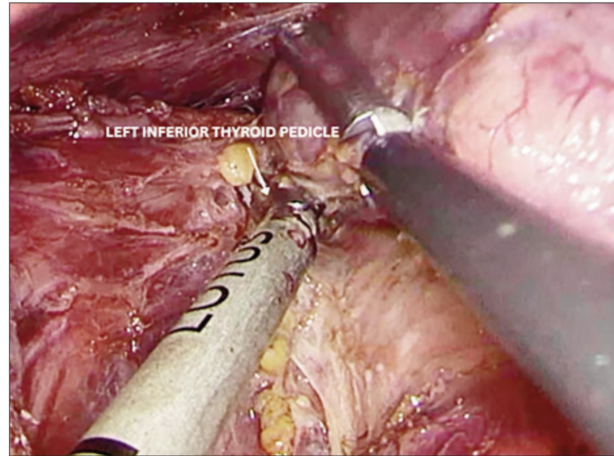

Figure 11. Inferior pole dissection and sealing

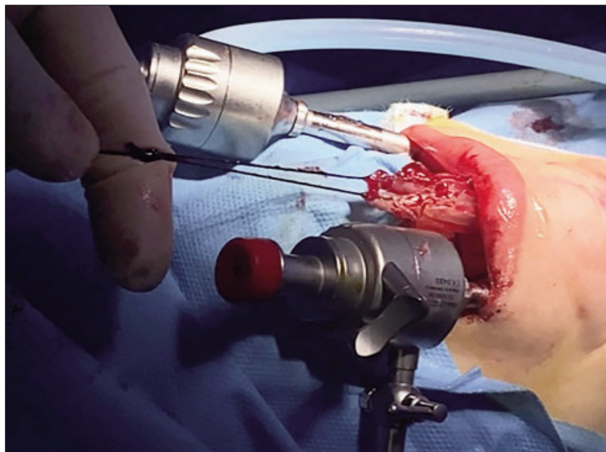

Figure 12. Specimen retrieval

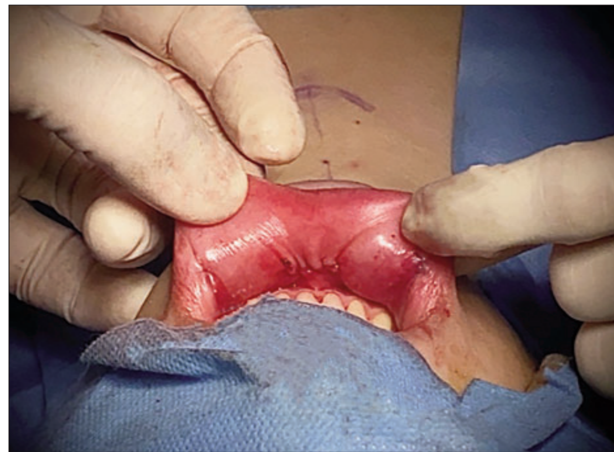

Figure 13. Closure

women and 4 men. The procedures included 7 right lobectomies, 5 left lobectomies, 1 isthmectomy, and 10 total thyroidectomies.

The average surgical times were 161.85 minutes for right lobectomy, 119 minutes for left lobectomy, 194 minutes for total thyroidectomy, and 40 minutes for isthmectomy.

Regarding hospitalization, 6 patients were discharged on postoperative day 2 due to administrative reasons, while the remaining were discharged on day 1, resulting in an average hospital stay of 1.27 days.

Transient postoperative hypocalcemia was detected in 4 cases, only biochemically, without clinical manifestations. Parathyroid hormone was measured in 12 patients, with low values in 3 cases.

No recurrent laryngeal nerve injuries were recorded. No mental nerve injuries were observed - there were no facial asymmetries, speech or swallowing difficulties.

Five patients experienced transient mental nerve paresthesia, with symptomatic relief within 1 to 4 weeks.

Two cases reported anterior cervical paresthesia.

The most common postoperative complication was anterior cervical ecchymosis, observed in 15 patients.

Routine drainage was not used; serohematomas were aspirated percutaneously in 3 cases.

No subcutaneous emphysema or pneumomediastinum was observed.

Despite a theoretically higher infectious risk, no postoperative infections were recorded.

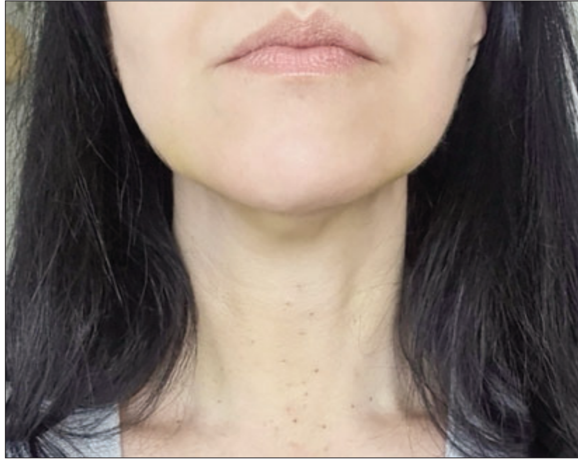

Figure 14. Postoperative appearance at 7 days

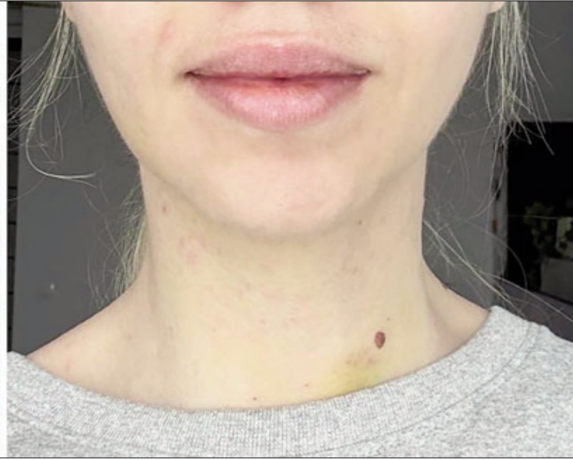

Figure 15. Postoperative appearance at 7 days

Discussion

This article presents the first Romanian patients who underwent thyroid surgery via TOETVA, as part of a study aimed at reflecting the initial 6-month experience with transoral thyroidectomy. Patient anxiety related to visible cervical scarring, along with the desire for improved esthetic outcomes, has driven the development of surgical techniques capable of addressing these concerns.

Compared to robotic-assisted thyroidectomy, TOETVA offers the major advantage of being performed using standard laparoscopic equipment already available in general surgery, while avoiding any visible cutaneous scar. However, the surgeon must be experienced in both thyroid surgery (as a high-volume thyroid surgeon) and laparoscopy.

Patient selection is crucial, especially during the initial learning curve. The dimensions of the thyroid glands removed via TOETVA are generally smaller than those in open surgery. Current recommendations suggest a thyroid gland with a length up to 10 cm, with a volume < 45 mL and nodules <4 cm for Bethesda II–IV or < 2 cm for Bethesda V–VI (7). Lobectomies are preferred in the early learning phase due to their shorter duration and lower complexity compared to total thyroidectomy.

Our surgical times were consistent with those in the literature (8,9).

Right-sided nodules were easier to approach for right-handed surgeons, while left-sided ones for left-handed surgeons.

Longer operative times for right lobectomies in our study reflect the early learning curve.

Female patients had more suitable local anatomy than males, making dissection and manipulation easier. Initially, we selected patients with a solitary right-sided nodule <4 cm, with benign FNAB characteristics. Later, we expanded our selection to include larger nodules, multinodular glands, and carcinomas < 2 cm.

Large thyroid glands are more difficult to maneuver within the restricted working space, making dissection significantly more challenging.

We found the 5 mm laparoscopic camera superior to the 10 mm one, as it allows lateral port insertion, better visual control during trocar withdrawal, and concurrent use of the midline port for vascular sealing. The smaller diameter also provides more space for instrument maneuvering.

In addition to the transoral approach, the technique is characterized by the dissection from cranial to caudal, with the recurrent laryngeal nerve visualized from a novel angle. It is recommended to practice this perspective during open surgery by positioning the surgeon at the head of the patient. Once accustomed, the visualization of the recurrent laryngeal nerve is clearer and safer than in the open approach.

Three cases of transient postoperative hypocalcemia were noted in our series, suggesting safe dissection of the parathyroid glands.

The most frequent local complication was anterior cervical ecchymosis, which resolved within a few days.

Although a high BMI is not a contraindication,

it may contribute to increased technical difficulty, prolonged operative times, and a higher risk of postoperative complications.

Patients did not report postoperative pain and recovery was rapid, with most being discharged on postoperative day 1.

Conclusion

The results of this initial series of patients that underwent surgery using the TOETVA technique are encouraging, with no major intraoperative or postoperative complications. This technique requires experience in both endocrine and laparoscopic surgery. For a well-selected group of patients, TOETVA represents an effective surgical alternative. Larger studies may provide additional data.

Conflicts of Interest

The authors declared no potential conflicts of interest.

Ethical Statement

Any aspect of the work covered in this article has been conducted with the ethical approval of all relevant bodies. Informed consent has been obtained from all subjects.

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