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Chapter

Surgery for Primary Hyperparathyroidism without Leaving a Visible Scar

Elias Karakas and Stefan Schopf

Abstract

Surgery for primary hyperparathyroidism changed significantly during the past decades, since localization procedures have been developed and became more and more reliable. Like in thyroid surgery, minimally invasive techniques are widely used. Furthermore, remote access techniques have evolved in thyroid surgery with the aim of optimizing cosmetic results by avoiding a visible scar on the neck. Transoral Endoscopic access via the vestibular approach (TOEPVA) is the newest remote access technique, also feasible and safe in parathyroid surgery with optimum cosmetic results.

Keywords: transoral, parathyroid, surgery, feasibility, safety, cosmesis

1. Introduction

Since the first operation for primary hyperparathyroidism (pHPT) surgery has been safely performed via an anterior neck incision. A better understanding of the underlying causes for pHPT in combination with evolving and improving localization procedures surgical approaches changed from the bilateral cervical exploration via a cervical skin incision to more and more focused and minimally invasive approaches [1]. These focused approaches are nowadays considered as the new gold standard in localized pHPT [2].

In most patients, wound healing is without any problems, especially after a skin incision of less than 2 cm (Figure 1). However, a worldwide consideration of potential wound healing problems may lead to a more differentiated appraisal (Figure 2). In African countries, for example, the incidence of keloid development after skin incision is up to 15% and in some countries, a scar on the neck is historically related to a negative standing.

Also, in western countries, nearly 20% of patients will experience some feelings of self-consciousness years after open neck surgery. More than 10% will consider further treatments such as plastic surgery to their cervical scars [3]. The impact of a the cervical incision on the health-related quality of life (HRQOL) was found to be like the impact of vitiligo, psoriasis, or severe atopic dermatitis in one series [4, 5]. Foremost in the thyroid but also in parathyroid surgery remote access surgery has evolved with the aim to optimize cosmesis [6].
Remote access surgery includes the areolar or axillary or combined areolar/axillary (ABBA) incisions and the retroauricular approach, which can effectively minimize the cosmetic burden on some patients. Improved cosmesis on one hand but unfamiliar dissection planes, longer routes to the central neck, and novel complications, on the other hand lead to further investigations focusing on the so-called natural orifice approaches. The emerging transoral thyroid and parathyroid vestibular approach—TOETVA in thyroid and TOEPVA in parathyroid surgery—was inspired by the idea to follow the embryologic thyroglossal duct. While feasibility was proven in substantial experimental and preclinical investigations by different study groups since 2006 and the first transoral parathyroid resection was done in 2010 [7], the clinical proof of concept was given by Anuwong, who published the
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first case series of 60 patients who underwent scarless thyroidectomy via the lower vestibule of the mouth with excellent outcomes [8]. This was followed by the first series of transoral transvestibular parathyroid operations with also promising results by Sasankietkul et al. [9].

TOEPVA can be performed for select patients with localized primary hyperparathyroidism (HPT). Those without parathyroid adenoma localization, recurrent or persistent primary HPT, suspected multigland disease, secondary or tertiary HPT, family history of MEN, suspected parathyroid carcinoma, or previous central neck surgery or neck irradiation therapy should be excluded from consideration. Similar to TOETVA, the patient should also be highly motivated for a “scarless” approach.

2. TOEPVA: parathyroid surgery without leaving a visible scar

2.1 History of parathyroid surgery

Over more than 50 years bilateral cervical exploration (BCE) was the gold standard in parathyroid surgery. All parathyroids are visualized to resect the macroscopically enlarged gland [10]. BCE is associated with a more than 95% cure rate and minimal morbidity in experienced hands. In these times “the only localization that a patient needs who has primary hyperparathyroidism is the localization of an experienced surgeon!” [11]. Because primary HPT is a single gland disease in more than 80% and preoperative localization procedures have emerged and improved during the past decades minimally invasive procedures have been developed to minimize cervical skin incisions. These less invasive operations offer similar cure rates and result in equal complications compared to open surgery [12–14]. Minimally invasive parathyroidectomy leads to lower hospital costs, shorter length of stay, and equally high cure rates with low complication rates [15, 16].

2.2 Prerequisites, patients, and surgical technique

Surgeons interested in performing transoral parathyroid surgery should be well-experienced in parathyroid surgery. In addition, experience with laparoscopic instrumentation is beneficial. The transoral technique should be trained within cadaver courses meanwhile frequently offered in specialized centers. Subsequently, the first transoral operations in the clinical setting should ideally performed with the assistance of an experienced transoral surgeon. The suspected parathyroid gland should be safely detected in one, better two preoperative localization procedures.

The transoral procedure should safely be implemented in patients with small thyroid specimens and benign thyroid nodules <20 mm in diameter.

2.3 Postoperative recommendations

In case of recurrent laryngeal nerve palsy (RLNP), patients should be reevaluated 1 week and/or 4 weeks after surgery and, if necessary, logopedics should be initiated with reevaluation 3 and 6 months after surgery.

Potential paresthesia in the chin area and lower lip due to mental nerve injury should carefully be documented postoperatively during a hospital stay. In case of
persistent paresthesia, patients should be reevaluated 3, 6, and 12 months after surgery. In addition, patients should be introduced to grimace and repeatedly activate their mimic muscles directly after surgery.

Serum Calcium (Ca) as well as parathyroid hormone (PTH) levels should be measured pre- and postoperatively on day one to prove the success of the operation. To exclude persistence Ca levels should be monitored for 6 months. In case of low vitamin D levels and potential bone involvement Ca and vitamin D should be provided.

3. TOEPVA technique step by step

3.1 Surgical technique

Patients are placed in a supine position with a slight neck extension (Figure 3a). The use of intraoperative nerve monitoring (IONM) is strongly recommended. The endotracheal tube provided with an electrode for IONM can easily be placed transorally. A transnasal tube placement is not necessary (Figure 3b).

The mucosa of the oral cavity should be cleansed with chlorhexidine solution. Afterward, three small incisions, 1–1.5 cm in the midline and 5 mm lateral right and left are made in the lower lip as close to the lip vermilion and as far away from the branches of the mental nerve as possible (Figures 4a and b).

Afterward, a subplatysmal space is created by hydro-dissection using an epinephrine-enriched saline solution injected with a Verress needle. The subplatysmal space is widened using a blunt dissector (Figures 5a, b and c).

Three trocars (originally one 10 mm and two 5 mm in diameter) are inserted through the midline and lateral incisions, followed by high-flow CO2 gas insufflation at a maximum pressure of 8 mmHg (Figure 6).

Figure 3a.
Patient’s positioning with eye protection.
Figure 3b. Transoral tube placement and disinfection of the mucosa.

Figure 4a. Midline incision close to the lip vermilion to avoid mental nerve injury.
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Figure 4b.
Cadaver study regarding trocar placement and mental nerve branches.

Figure 5a.
Application of epinephrine enriched saline solution with Verres needle to create an artificial subplatysmal space.
Either a 5 mm or a 10 mm 30° full HD camera is used as well as conventional laparoscopic instruments. The subplatysmal working space reaches from the thyroid cartilage to the sternal notch and the medial border of both sternocleidomastoid muscles.
The strap muscles are divided in the midline and the lateral space of the assumed side will be dissected (Figure 7). In addition to gas insufflation two stitches are placed from outside to retract the strap muscles ventrally and laterally to optimize the working space (Figure 8).

Vessels should be selectively sealed with a thermal device. As in minimally invasive open surgery, the RLN does not routinely be visualized in case of a lower
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parathyroid adenoma. In addition, parathyroid glands can be visualized using fluorescent agents (Figure 9).

The resected parathyroid specimen is extracted through the midline trocar access. Strap muscles are not adapted routinely at the end of the operation. Oral mucosa as well as retroauricular skin incision are closed using a 4/0 absorbable suture.
4. Conclusion

Transoral parathyroid surgery is feasible and safe. As in conventional open minimal invasive surgery experience of the surgeon in parathyroid surgery and positive preoperative localization is essential.

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Conflict of interest

The authors declare no conflict of interest.

Author details

Elias Karakas¹ and Stefan Schopf²*

¹ Hospital Maria Hilf, Alexianer GmbH, Krefeld, Germany
² RoMed Hospital Bad Aibling, Germany

*Address all correspondence to: stefan.schopf@ro-med.de
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