



Feasibility, Perceived Aesthetic Outcomes and Patients' Interest in Transoral Endoscopic Thyroidectomy (TOETVA) in a Cohort of Patients in the Thames Valley United Kingdom

Brooke P^{1*}, Cyra A², William Y¹, Billy D¹, James E¹ and Radu M²

¹Stoke Mandeville Hospital Buckinghamshire Healthcare Trust, UK

²Churchill Cancer Centre, Oxford University Hospitals NHS Foundation Trust, UK

Abstract

Introduction: Thyroid surgery techniques without visible scar have grown internationally with little traction in the UK. The aim was to assess the perception of neck scar after thyroid surgery, estimate the feasibility for Transoral Endoscopic Thyroidectomy (TOETVA) and define the public demand for scarless thyroidectomy.

Methods: A mixed cohort study approved by national ethics committee assessed retrospectively the feasibility of TOETVA based on current guidelines. A standardized questionnaire used Manchester Scar Scale (MSS) and explored patient-centered outcomes and views.

Results: Out of 265 patients (75% women, median age 56 years) who underwent thyroid lobectomy for indeterminate nodules (n=160) or proven low-risk thyroid cancer (n=105), 64% would have been suitable for TOETVA, including 49% of cancers.

Of 92 respondents, MSS was excellent (25%), good (56%; MSS <7) or poor (15%; MSS >10). Negative scar perception preoperatively resulted in poor MSS scores postoperatively (p<0.0001). Poor MSS impacted all individuals regardless of preoperative neck scar concerns (p<0.001). Worse MSS scores were significant in patients with complications or cancer recurrence concerns (p<0.002) independent of age (p=0.065) and gender (p=0.7118). Need for thyroid hormone replacement in 34% of patients didn't correlate with to MSS.

Patients' interest in scarless technique didn't correlate with MSS and appeared to be attributable to personal values, geographic accessibility, and intensity of aversion to complication (p<0.05). Overall, 29% of patients would consider a scarless technique and 31% opposed the idea.

Conclusion: This study population showed comparable interest and feasibility for scarless thyroid surgery as international populations. How to respond to this need will become apparent in the coming years.

Keywords: Scar perception; Thyroidectomy; TOETVA; Patient related outcomes in thyroid surgery; Thyroid scar

Introduction

Transoral Endoscopic Thyroidectomy through Vestibular Approach (TOETVA) provides safe thyroid surgery without visible scar and is becoming increasingly popular after initial innovation in South-East Asia in 2016 [1] and adoption in large centers in USA and Europe [2]. To date, its introduction in the UK is limited by lack of technical experience and exposure to this new operative technique [1]. Currently, transcervical thyroidectomy remains the gold standard procedure and it has a low complication rate with easily transferrable skills. In this context, the motivation to deliver a scarless procedure is allegedly influenced by cultural perception of neck scar, but some expect it to evolve to be a better procedure [1-5].

There is limited data on patient perception of scar following transcervical thyroid surgery in the UK with current literature commentary concluding that trans cervical scars are well tolerated, particularly after 12 months post-surgery however pre-existing body dysmorphia has a negative

OPEN ACCESS

*Correspondence:

Brooke Puttergill, Stoke Mandeville Hospital, Aylesbury Road Buckinghamshire, HP218AL, UK, Tel: +447379200187

Received Date: 08 Jan 2024

Accepted Date: 20 Jan 2024

Published Date: 25 Jan 2024

Citation:

Brooke P, Cyra A, William Y, Billy D, James E, Radu M. Feasibility, Perceived Aesthetic Outcomes and Patients' Interest in Transoral Endoscopic Thyroidectomy (TOETVA) in a Cohort of Patients in the Thames Valley United Kingdom. *Clin Surg*. 2024; 9: 3684.

Copyright © 2024 Brooke P. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

impact on scar perception [6,7].

Using accepted guidelines, it was estimated that 55% of patients undergoing thyroid and parathyroid surgery in the US [4] and 42% of patients in Turkey [5] could be eligible for transoral endocrine surgery. Whether similar high percentage could be observed in UK patients has not been explored [8]. The primary indication for TOETVA is improved cosmesis but this 'soft' primary outcome should not deter practitioners from developing skills which offer better cosmetic outcomes [1,4,5]. As part of this process, emphasis will be placed on understanding the impact of the new procedure on the incidence of complications usually associated with traditional thyroid surgery such as recurrent laryngeal nerve injury, permanent hypoparathyroidism and postoperative hemorrhage. In addition, efforts are made to mitigate the incidence of specific complications, such as infection, mental nerve injury and mentalis dysfunction and rate of conversion [2]. As for other procedures, there will be a learning curve, additional costs and operative time [5,9-12]. Reassuringly, a recent meta-analysis of six eligible nonrandomized studies involving 1,151 patients revealed that TOETVA group had a significantly longer operative time but there were no significant differences in terms of postoperative outcomes [2].

Safety of an alternative technique is paramount, and this has been already established. Angkoon et al. described these parameters in 200 consecutive patients: operative time 97 ± 40 min (range 45-300 min), no permanent hoarseness or hypoparathyroidism occurred, mental nerve injury occurred in 3 patients (1.5%). One patient (0.5%) developed a postoperative hematoma [9]. These outcomes compare fairly to large volume endocrine centers performing open, TOETVA techniques and Transoral Robotic Thyroidectomy (TORT) [10,11,13,14]. Most importantly, bleeding leading to emergency cervical incision to evacuate a hematoma was reported to have occurred in only 3 patients out of 422 in one large series [9].

Once safety is established, local application needs to be considered by the population characteristics: Pathology, cultural beliefs and ethical distribution of healthcare costs [4]. Even if TOETVA could be offered only to a subgroup of patients, it remains unclear how many eligible patients would agree to this new surgical technique. Patients previously operated or irradiated are contraindicated and those with a lobe weight of greater than 30 g is a relative contraindication dependent on removal techniques. Ozgun reported 513 (42%) of 1,197 patients feasible for TOETVA in 3 years with only 29 operated as TOETVA (5.6%) [5]. Others reported a wide range from 2% to 20% for feasibility, even after expanding its indication to include small low-risk differentiated thyroid carcinomas [1,11,14,15].

The aim of this study was to assess in a large cohort of patients within the UK the feasibility of TOETVA and the factors that impact on patients' interest in thyroid surgery without visible scar. This may better define the evolving role of this procedural innovation.

Methods

Patient population

A mixed cohort study was used for retrospective analysis to identify the proportion of eligible patients for TOETVA in consecutive unselected patients who underwent transcervical thyroid surgery for cytological atypia in two hospitals (Oxford University Hospitals Trust and Buckinghamshire Healthcare Trust). All cases were discussed within the Thames Valley thyroid multidisciplinary meeting.

Demographic data including year of surgery, histopathological diagnosis, ethnicity, gender, age and deprivation status based on national disposable income annually published by county in order to determine pathological and social homogeneity of cohort.

Patients were determined eligible for TOETVA by following predetermined published criteria: Thyroid nodule size ≤ 30 mm, total thyroid volume ≤ 45 ml, thyroid cancer <20 mm, excluding previous neck surgery and neck irradiation.

Patients' perception of scar after thyroidectomy

A standardized questionnaire was constructed as 24 Likert scale questions to investigate the subjective perception scar after transcervical thyroid surgery and the opinion of thyroid surgery without cervical scar. The validated Manchester Scar Scale (MSS) was used to quantify cosmetic outcomes of scar [16]. This is a categorical visual analogue scale with a score range 5 to 18 reflecting excellent to poor outcome, respectively. A score ≥ 7 is indicative of poorer scar with respect to color, appearance, contour (compared with surrounding skin), distortion and texture.

Sample size was estimated as proportionate analysis. The proportion estimate is at 50% as literature ranges from 20% to 55% with an acceptable margin of error of 5% (45-55%) and a Confidence Interval (CI) of 90%. If a sample of 265 people from the cohort is taken, then sample size needed is 158 responses. The median time from previous literature was >24 months therefore this study cohort will be in at minimum 36 months after surgery. Previous local literature has explored patient interest in scarless thyroid surgery but has not compared this with criteria of the local population feasible for TOETVA, therefore the pathologic parameters of the 265 patients will be defined to estimate feasibility.

Data analysis

The demographic characteristics are reported as categorical percentage, continuous with mean and SD for descriptive statistics. Comparison was made between two groups based on whether or not patients were eligible for TOETVA. Spearman's rank correlation and Kruskal Wallis were used for analysis of group categorical and degree of importance variables with $p \leq 0.05$ for statistically significant. ANOVA regression was used for the defined scar perception scores against the binary variables of 'yes' or 'no' in following categories: Postoperative complications, anxiety of residual lobe thyroid cancer, loss of thyroid function and protracted monitoring.

Results

Feasibility of TOETVA

Between 2016-2018, 265 patients underwent thyroid lobectomy for cytological atypia (THY3-4, $n=229$), proven malignancy (THY5, $n=15$), radiological suspicion ($n=21$). The majority were female in the 5th decade and regionally defined as reasonable economic stature (Table 1). Of 265 operated patients with transcervical thyroid surgery, 64% benign cases and 49% of cancer cases were eligible for TOETVA. No cases were excluded as they were all index neck surgeries and no patient in this cohort had undergone neck irradiation (Figure 1).

Patients' views

There were 92 respondents to the postal questionnaire, with comparable demographic data compared with the non-responders (Table 1). None of the respondents raised queries of ambiguity related to the questionnaire. 98% of the 2,665 data points were completed

Table 1: Cohort demographics.

Descriptor	Entire Cohort (n=265)	Respondents (n=92)
Age	56 ± 16 years	52 ±14 years
Gender	F 75%	F 62%
Cancer diagnosis	39% (104)	30% (28)
Ethnicity	Non-White 17% (34) White 83% (161)	Not specified
Average Disposable annual income (national average £28400)	£24289 ± £2048	Not specified

Table 2: MSS correlation to post operative complications and operative outcomes.

MSS correlation to post operative outcomes	P-value correlation to poor MSS
Recurrent laryngeal nerve injury	0.0174
Post operative haemorrhage	N/A
Hormone replacement therapy (30%)	0.2857
Recurrence risk	<0.002
Ongoing monitoring with residual thyroid	0.1261
Age	0.065
Gender	0.7118

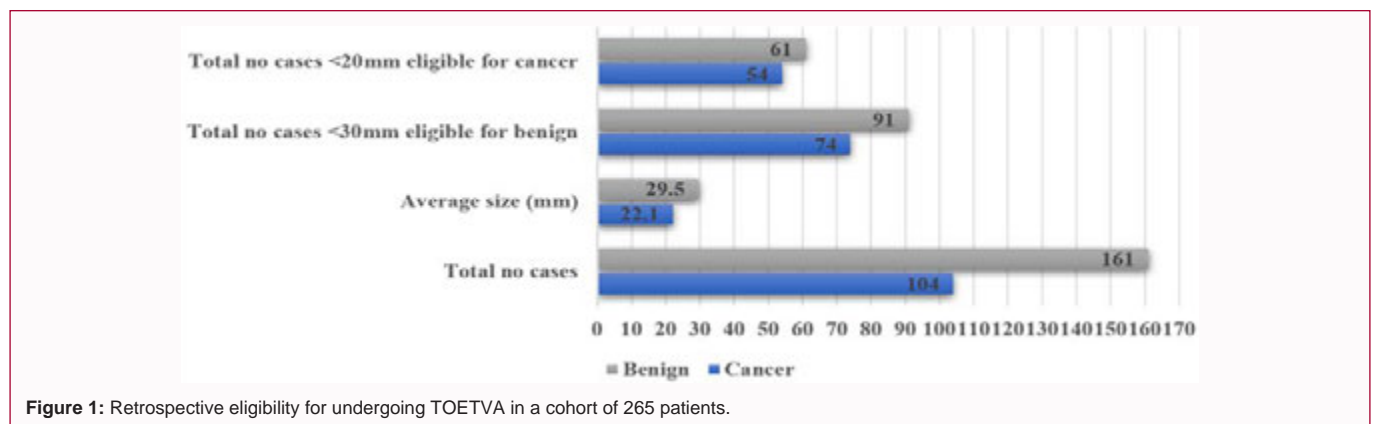


Figure 1: Retrospective eligibility for undergoing TOETVA in a cohort of 265 patients.

and 79% of missing fields related to demographics.

Vast majority of respondents (95%) reported that they healed without complication following transcervical thyroid surgery. 23/92 (25%) respondents score MSS as perfect scar. MSS >10 was expressed in 15% of the patients with thick and distorted scars reported by 7%. MSS scores that scored enough to suggest non-perfect scar were compared to near perfect MSS group in concepts and parameters. When an MSS was scored as >7 (inferring poorer scar appearance) it significantly correlated to the patient having a preoperative scar aversion (p=0.0000), a poor subjective perception of scar post operative (p=0.00001) and the willingness to consider a technique without visible scar (p=0.051) (Figure 2). Age was not predictive of impact of scar (p=0.065) but poor scar perception was associated with concern of thyroid cancer recurrence (p<0.002) when perioperative events were assessed against the MSS (Table 2).

When exploring the delivery and access of a new surgical technique patients who were more willing to have longer admissions that showed preference to consider surgery without scar (p=0.0027) (Table 3). In addition, the questionnaire explored the degrees of tolerance for surgical complication to surgical technique without a scar. Patients considering thyroid surgery without scar are more tolerant of facial asymmetry as complication (p=0.0017) and potential for swallowing difficulty (p=0.0013) (Table 4).

Limitations

The study had a 35% response rate to distributed questionnaire, however the study was powered for 156 responses therefore type 2 error may be considered for statistical significances. Secondly, patients were interviewed based on subjective scar perception with no measure of objective scar perception.

Discussion

Practice of remote access techniques for thyroidectomy without visible scar is currently being assessed in long term studies with over 1,880 published cases to date [16]. This study aimed to define a patient cohort in the UK to advance the understanding of eligibility and interest in thyroid surgery without scar. As the body of international literature on this topic increases, so have the parameters of eligibility and benefits in outcome. Recent data demonstrates applicable technique in re-operative surgery, lymph node dissection, reduced pain, day case surgery and potentially improved swallow outcomes [8].

The cohort of respondents in our study had fair demographic representative of patients. All patients live in one of the least deprived regions of the UK; socioeconomic status is known to impact psychological wellbeing and subsequent surgical scar perception. Similarly, poor scar outcomes may impact psychology health [17].

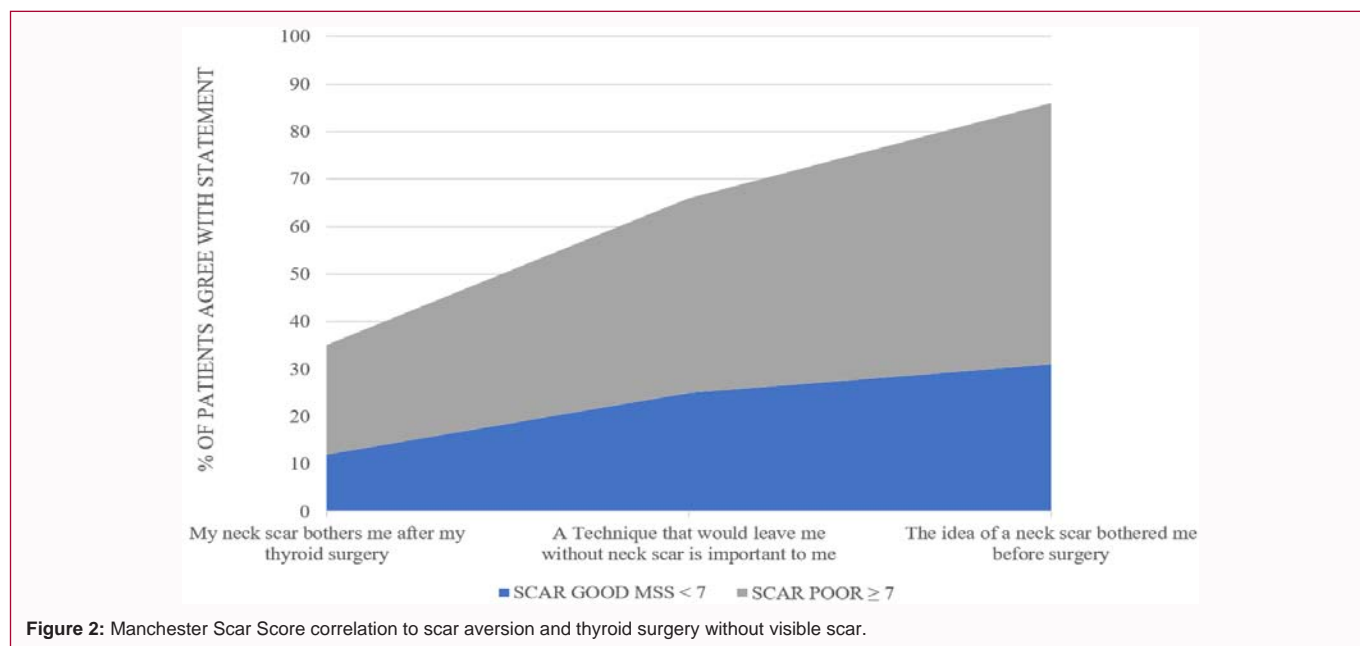


Table 3: Regression analysis of volunteered interest in surgical technique without scar to service delivery parameters.

Delivery of Care	P-value against interest in thyroid surgery without scar
If the new technique was safe but meant I had to stay in hospital for two nights I would still consider this new scarless technique	0.0027
I would feel nervous undergoing a new technique even if it was safe and had the same health outcomes as the current technique	0.1748
Need to travel to another centre in the region where the procedure is available	0.1808

Table 4: Patient interest in technique without visible scar and tolerance for surgical complication.

Surgical complication	P-value for relative importance against interest in thyroid surgery without scar
Voice change - volume	0.760583
Voice change- pitch	0.834413
Numbness	0.1652
Bruising	0.4982
Postoperative neck haemorrhage	0.435445
Swallowing difficulties	0.000137
Facial asymmetry	0.001723

As our work showed that preoperative scar aversion leads to poor postoperative scar cosmesis, but this study has not further explored how poor scar cosmesis impacts quality of life in this cohort. Scar perception was worse in cancer patients, suggestive that there may be certain pathology that carries psychological morbidity following surgical scar. The study has shown that even at 5 years after the operation, surgical scar can still impact patients.

The proportion of patients in this study considered to be eligible for TOETVA was 59% and matches data reported in other large populations [4,5,8]. In this context, the data presented suggests wide applicability of this new technique in the UK. A third of the respondent group (29%) would consider TOETVA and another third (31%) were opposed to it. This variable interest is attributable to personal values and aversion to perceived complication but not to unfamiliarity/newness of technique.

TOETVA is a surgical innovation that the UK market has yet to grow compared to international counterparts. We acknowledge

that surgical innovation is dependent on surgical enthusiasm and enthusiasm of surgeons is dependent on an evidenced advantage of technique. Lee et al. aptly described how introduction of surgical innovation occurs in a clinical setting [18]. TOETVA is in the development phase in the UK; practitioners are determining feasibility and developing new technical skill whilst international platforms have reached the exploration and assessment phase [18]. The latter is providing evidence of benefit against the current standard of open thyroidectomy [18].

In summary, remote access thyroid surgery allows practitioners to deliver personalized care without compromising outcomes however this may be challenging under current NHS circumstances of cost constraint, access to care and surgical wait times. However, TOETVA may deliver more than avoiding a visible scar - a metric valued by some patients.

References

1. Anuwong A, Sasanakietkul T, Jitratoom P, Ketwong K, Kim HY,

- Dionigi G, et al. Transoral Endoscopic Thyroidectomy Vestibular Approach (TOETVA): Indications, techniques and results. *Surg Endosc.* 2018;32(1):456-65.
2. Wang Y, Zhou S, Liu X, Rui S, Li Z, Zhu J, et al. Transoral endoscopic thyroidectomy vestibular approach vs conventional open thyroidectomy: Meta-analysis. *Head Neck.* 2021;43:345-53.
 3. Razzaq Z, O'Leary P, Majeed M, Hanrahan M, Mustafa H, Abdalla M, et al. AB002. 76. First experience of Trans Oral Endoscopic Thyroidectomy—Vestibular Approach (TOETVA) in Ireland & UK at Cork University Hospital. *Mesentery Peritoneum.* 2019;3:AB002.
 4. Grogan RH. Individual patient and population-level eligibility for transoral endocrine surgery. *Ann Thyroid.* 2020;5:10.
 5. Kose OC. Patient eligibility for Transoral Endoscopic Thyroidectomy Vestibular Approach (TOETVA) in an endemic region. *SiSli Etfal Hastan Tip Bul.* 2021;55:304-9.
 6. Sethukumar P, Ly D, Awad Z, Tolley NS. Scar satisfaction and body image in thyroidectomy patients: Prospective study in a tertiary referral centre. *J Laryngol Otol.* 2018;132(1):60-67.
 7. Arora A, Swords C, Garas G, Chaidas K, Prichard A, Budge J, et al. The perception of scar cosmesis following thyroid and parathyroid surgery: A prospective cohort study. *Int J Surg.* 2016;25:38-43.
 8. Grogan RH, Suh I, Chomsky-Higgins K, Alsafran S, Vasiliou E, Razavi CR, et al. Patient eligibility for transoral endocrine surgery procedures in the United States. *JAMA Netw Open.* 2019;2(5):e194829.
 9. Anuwong A, Ketwong K, Jitpratoom P, Sasanakietkul T, Duh QY. Safety and outcomes of the transoral endoscopic thyroidectomy vestibular approach. *JAMA Surg.* 2018;153:21-7.
 10. Lorenz K, Raffaeli M, Barczyński M, Lorente-Poch L, Sancho J. Volume, outcomes, and quality standards in thyroid surgery: An evidence-based analysis—European Society of Endocrine Surgeons (ESES) positional statement. *Langenbecks Arch Surg.* 2020;407:3913.
 11. Lira RB, de Cicco R, Rangel LG, Bertelli AA, Duque Silva G, de Medeiros Vanderlei JP, et al. Transoral endoscopic thyroidectomy vestibular approach: Experience from a multicenter national group with 412 patients. *Head Neck.* 2021;43(11):3468-75.
 12. Duek I, Duek OS, Fliss DM. Minimally invasive approaches for thyroid surgery—pitfalls and promises. *Curr Oncol Rep.* 2020;22:77.
 13. Razavi CR, Khadem MGA, Fondong A, Clark JH, Richmon JD, Tufano RP, et al. Early outcomes in transoral vestibular thyroidectomy: Robotic versus endoscopic techniques. *Head Neck.* 2018;40(10):2246-53.
 14. Hong YT, Ahn JH, Kim JH, Yi JW, Hong KH. Bi-institutional experience of transoral endoscopic thyroidectomy: Challenges and outcomes. *Head Neck.* 2020;42(8):2115-22.
 15. Jitpratoom P, Ketwong K, Sasanakietkul T, Anuwong A. Transoral Endoscopic Thyroidectomy Vestibular Approach (TOETVA) for Graves' disease: A comparison of surgical results with open thyroidectomy. *Gland Surg.* 2016;5(6):546-52.
 16. Téot L, Mustoe TA, Middelkoop E, Gauglitz GG, editors. *State of the Art Management and Emerging Technologies: Textbook on Scar Management.* 2020.
 17. Navarro-Carrillo G, Alonso-Ferres M, Moya M, Valor-Segura I. Socioeconomic status and psychological well-being: Revisiting the role of subjective socioeconomic status. *Front Psychol.* 2020;11:1303.
 18. Lee SH, Moorthy R, Nagala S. Evolution of transoral endoscopic thyroidectomy vestibular approach according to the IDEAL framework. *Br J Surg.* 2022;109:497-502.