e-ISSN: 0975-9506, p-ISSN: 2961-6093

Available online on www.ijpqa.com doi: 10.25258/ijpqa.16.8.1

International Journal of Pharmaceutical Quality Assurance 2025; 16(8); 01-04

Original Research Article

Clinical Utility of Zuckerkandl's Tubercle as a Predictive Landmark for Recurrent Laryngeal Nerve Identification in Thyroid Surgeries: A Prospective Surgical Audit

Pristy Mol Biju[1], Achsah Jesintha Dhas[2], Bestine Varghese[3]

[1]Assistant Professor, Department of Surgery, Sree Narayana Institute of Medical Sciences
[2]Associate professor, Department of Surgery, Dr SMCSI Medical College Hospital, Karakonam
[3]Assistant Professor, Department of General Surgery, Sree Narayana Institute of Medical Sciences

Received: 25-04-2025 / Revised: 23-05-2025 / Accepted: 26-06-2025
Conflict of interest: Nil

Abstract:

Introduction: The Zuckerkandl tubercle (ZT) is an anatomic landmark that can be used for the identification of the RLN intra –operatively. The ZT is a lateral or posterior projection from the lateral thyroid lobe. Adequate recognition and dissection of the ZT is essential for successful thyroid surgery.

Objectives: To estimate the proportion of Zuckerkandl tubercle in individuals. To determine the association between Identification of Zuckerkandl tubercle and tracing of recurrent laryngeal nerve in individuals who underwent thyroidectomy.

Methods: Hospital based cross sectional study design. This study is conducted in the Department of General Surgery, Dr. SMCSI Medical College, and Karakonam. November2020–October2022 (2 years). A period of 18 months from the date of institutional ethical committee clearance.

Result: In this study the mean age was 44.76 +/- 6.131 in the study population. The minimum was 32 maximum was 57 in the study population. Majority of the study population, 65.5 percent were females and 34.5 percent were males. RLN was found posterior to ZT in 56.4 percent of the individuals. RLN was found anterior to ZT in 9.1 percent of the individuals. After identifying ZT in 38 out of the 55 individuals RLN was identified in 35 out of 38 individuals and in the remaining 3, RLN was not identified with the help of ZT. Size of ZT was assessed and ZT less than 10mm was found in 37.5percent of the study population, ZT More than 10mm in 34.5 percent of the study population and ZT not visualized in 30.9 percent.

Conclusion: In this study in 69% of individuals, ZT was visualized during thyroidectomy. Also ZT was visualized more on the right side (38.2%).Among 38 patients in whom ZT was visualized, in 35 patients it was helpful to identify RLN. Thus this study concludes that ZT is an important pointer which helps in identifying RLN during thyroidectomy.

Keywords: Zuckerkandl Tubercle (ZT)**,** Recurrent Laryngeal Nerve (RLN)**,** Thyroidectomy**,** Anatomical Landmark**,** Surgical Identification**.**

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0) and the Budapest Open Access Initiative (http://www.budapestopenaccessinitiative.org/read), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

The Zuckerkandl tubercle (ZT) is an anatomic landmark that can be used for the identification of the RLN intra –operatively [1]. It is located between the superior and inferior pole, pointing towards the trachea-esophageal groove The ZT is a lateral or posterior projection from the lateral thyroid lobe.

Thyroid gland develops as the mid line descent of the thyroid tissue from the foramen cacecum to the level of larynx along the thyroglossal tract [2]. There is a lateral thyroid gland component which arises from the 4thbranchial cleft and ultimobranchial body of the lateral lobes of the thyroid gland to form a tubercle known as Zuckerkandle tubercle [3]. This tubercle is the most posterior pyramidal extension of pure. Thyroid tissues of the lateral lobes of the thyroid gland. Superior parathyroid gland is also derived from the 4th brachial clefts is commonly found in close association with that tubercle usually cephalad to that tubercle.

This tubercle is usually found in the cleft between trachea and esophagus which is a common pathway of recurrent laryngeal nerve. It may be mistaken for a thyroid nodule, mass or lymph node. [4] It is a projection of normal thyroid tissue from the posterior lateral lobes of the thyroid gland. It has been used as an anatomica landmark for location of the recurrent laryngeal nerve, which can be easily and safely encountered even though it is not initially visible. [5] The rationale behind the study is identifying Zuckerkandl tubercle will make the identification of recurrent laryngeal nerve easier. In south-

ern part of India less studies have been done on this topic.

Materials and Methods

It was a Hospital based cross sectional study design. Conducted in the Department of General Surgery, Dr. SMCSI Medical College, and Karakonam between November 2020–October 2022 (2 years). Data is collected for a period of 18 months from the date of institutional ethical committee clearance.

Those Individuals admitted for undergoing thyroidectomy in surgical ward at Dr .SMCSI Medical College and Hospital, Karakonam were included in the study.

Inclusion criteria

FNAC proven benign thyroid condition who are going to undergo thyroidectomy.

Exclusion criteria

- Unfit for surgery. Refusal for surgery.
- Malignancy with any expected infiltration. Prior surgery to the neck
- Prior radiation exposure to the head and neck area.

Sample size:

The reference study is a study published in international journal of surgery conducted by Dr. Priyanka Bagadia and Dr. Kamlesh Damor in Rajasthan, India. The study title is A Prospective study: - Zuckerkandl tubercle - an important landmark in identification of recurrent laryngeal nerve in thyroid surgery [6]. Non-probability sampling technique was used.

Q Sample Size ^{4PQ}

d2

P=87.86(as in reference study)

Q=100–P

D=10% of Prevalence

= (1.96)2x87.86x12.1 4/ .1x(87.86)2

~ 55

Study Variables

- Socio-demographic variables. Presence of ZT
- ZT found on right or left Relationship of RLN to ZT
- Whether it helped the surgeon to identify RLN Size of ZT
- Postoperative vocal cord palsy/paresis after identification of ZT

Operational Definition

The Zuckerkandl tubercle (ZT) is an anatomic landmark that can be used for the identification of the RLN intra-operatively. It is located between the superior and inferior pole, pointing towards the trachea-esophageal groove. The ZT is a lateral or posterior projection from the lateral thyroid lobe, which indicate the point of embryologic fusion of ultimo-branchial body and the principal median thyroid process.

Data Collection Method: Every case admitted in General surgery department for thyroidectomy which comes in included. Information recorded in the operative notes was considered as the documentary evidence supporting the findings.

Data Entry and analysis

Data entered into Microsoft excel sheet and analyzed using SPSS software. Quantitative variables expressed as mean and standard deviation. Qualitative variables expressed as frequency and percentage. Chi Square test used to find out any association between categorical variables. P value<0 .05 is considered as statistically significant.

Ethical consideration: -

Proper informed consent was taken from the study participants, and their privacy was protected throughout the study and its publication. Permission from unit chiefs was taken to collect and record the data. The above-mentioned study was conducted in this institution after obtaining due clearance from the Scientific Committee and Ethical Committee of Dr SM CSI Medical college, Karakonam. No financial burden was imposed on the patients.

Results

Table 1: Descriptive Analysis of Age

Variable	Mean	Sd	Minimum	Maximum
Age	44.76	6.131	32	57

The mean age in my study was found to be 44.76. Minimum age was 32 and maximum age was 57.

Table 2: Gender Distribution of the Study

Gender	Frequency(N)	Percent (%)
Male	19	34.5%
Female	36	65.5%
Total	55	100.0%

In my study, females were found to be 65.50%. Males were found to be 34.50%.

Table 3: Zuckerkandl Tubercle Distribution

Presence Of Zuckerkandl Tubercle	Frequency(N)	Percent (%)
Yes	38	69.1%
No	17	30.9%
Total	55	100.0%

ZT was found in 69.1 of individuals and not found in 30.9% of individuals in my study.

Table 4: Distribution of Relationship of RLN to ZT

Relationship Of RLN to ZT	Frequency(N)	Percent (%)
POSTERIOR TO ZT	31	56.4%
ANTERIOR TO ZT	5	9.1%
LATERAL FROM APEX OF ZT	2	3.6%
NIL	17	30.9%
TOTAL	55	100.0%

In my study in terms of relationship of RLN to ZT, in 56.4% of individuals RLN was found posterior to ZT. In 9.1% of individuals, RLN was found anterior to ZT, in 3.6% individuals RLN found lateral from apex of ZT.

Table 5: Distribution of Identification of RLN

Identify RLN	Frequency(N)	Percent (%)
Yes	35	63.6%
No	3	5.5%
Nil	17	30.9%
Total	55	100.0%

In my study out of 38 identified ZT, in 35 cases RLN was easily identified.

Table 6: Association between Identification of Zuckerkandl Tubercle and Relationship of RLN to ZT

Relationship Of RLN TO ZT	Zuckerkandl Tubercle				X^2	DF	P
	Yes		No				
	Count	Percent	Count	Percent			
POSTERIOR TO ZT	30	78.9%	1	5.9%			
ANTERIOR TO ZT	5	13.2%	0	0.0%			
LATERAL FROM APEX OF ZT	2	5.3%	0	0.0%			**<0.001**
NIL	1	2.6%	16	94.1%			
TOTAL	38	100.0%	17	100.0%	46.061	3	

Table 7: Association between Identification of Zuckerkandl Tubercle and Identification of RLN

Identify RLN	Zuckerkandl Tubercle				X^2	DF	P
	Yes		No				
	Count	Percent	Count	Percent			
YES	35	92.1%	0	0.0%			
NO	3	7.9%	0	0.0%			
NIL	0	0.0%	17	100.0%			
TOTAL	38	100.0%	17	100.0%	55.000	2	**<0.001**

Discussion

A hospital based cross sectional study was done among 55 patients to estimate the proportion of ZT visualised in individuals during thyroidectomy and whether it helped the operating surgeon to identify RLN and on which side the ZT was more visualised. In this study the mean age was 44.76 +/- 6.131 in the study population. The minimum was 32 maximum was 57 in the study population. This result was comparable with a study done in Rajasthan, India in which mean age was 42.24 +/- 11.38 [6].

In this study majority of the study population, 65.5 percent were females and 34.5 percent were males. Another study done in Rajasthan, India 18 percent were males and 82 percent were females in the study population [6]. In this study, RLN was

found posterior to ZT in 56.4 percent of the individuals. RLN was found anterior to ZT in 9.1 percent of the individuals. In 3.6 percent of the individuals, RLN was found lateral from apex of ZT. In another study done in Rajasthan India, 35 out of 50 cases ZT was found. Out of 35 cases,25 cases of RLN posterior to ZT,1 case of RLN anterior to ZT and 9 cases of RLN posteromedial to ZT [7]. In this study, after identifying ZT in 38 out of the 55 individuals RLN was identified in 35 out of 38 individuals and in the remaining 3, RLN was not identified with the help of ZT. In another study published in 2012 in ISRN Surgery Journal, after identifying ZT, RLN has been successfully identified in all cases [8]. The association between identification of ZT and ZT found on right or left among study subjects was found to be less than 0.001. In this study the association between identification of ZT and relationship of RLN to ZT among study subjects was found to be less than 0.001.

The association between identification of ZT and identification of RLN among study subjects was found to be less than 0.001. Our study has limitation as the study results are based on a small sample from a single hospital, it might have affected the results.

Conclusion

The hospital based cross sectional study was done among 55 patients to estimate the proportion of presence of ZT in individuals undergoing thyroidectomy and whether the presence of ZT helps in identification of RLN or not. In this study in 69% of individuals, ZT was visualised during thyroidectomy. Also, ZT was visualised more on the right side (38.2%). Among 38 patients in whom ZT was visualised, in 35 patients it was helpful to identify RLN. Thus, this study concludes that ZT is an important pointer which helps in identifying RLN during thyroidectomy.

References

1. Irkorucu O. Zuckerkandl tubercle in thyroid surgery: Is it a reality or a myth? Ann Med Surg. 2016 May; 7:92.
2. Sheahan P, Murphy MS. Thyroid Tubercle of Zuckerkandl: importance in thyroid surgery. The Laryngoscope. 2011 Nov; 121(11):2335–7.
3. Hussain A, Sajjad H. Anatomy, Head and Neck, Thyroid Thyroglossal Duct. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 [cited 2023 Jan 5]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK554494/
4. Rajapaksha A, Fernando R, Ranasinghe N, Iddagoda S. Morphology of the tubercle of Zuckerkandl and its importance in thyroid surgery. Ceylon Med J. 2015 Mar; 60(1):23–4.
5. Studley JGN, Lynn J. 19 - Surgical Anatomy of the Thyroid Gland and the Technique of Thyroidectomy. In: Lynn J, Bloom SR, editors. Surgical Endocrinology [Internet]. Butterworth-Heinemann; 1993 [cited 2023 Jan 5]. p. 231–9. Available from:https:// www.sciencedirect.com/science/article/pii/B9780750613903500246
6. Bagadiya DrP, Damor DrK. A prospective study: Zuckerkandl tubercle an important anatomical landmark in identification of recurrent laryngeal nerve in thyroid surgery. Int J Surg Sci. 2020 Jul 1; 4(3):130–3.
7. Irkorucu O. Zuckerkandl tubercle in thyroid surgery: Is it a reality or a myth? Ann Med Surg. 2016 May; 7:92.
8. Gurleyik E, Gurleyik G. Incidence and Surgical Importance of Zuckerkandl‟s Tubercle of the Thyroid and Its Relations with Recurrent Laryngeal Nerve. ISRN Surg [Internet]. 2012 [cited 2023 Jan 6]; 2012. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3431128/