

Frequency and Risk Factors of Tracheomalacia in Patients Undergoing Thyroidectomy

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ABSTRACT

It was a descriptive cross-sectional study to determine the frequency and risk factors of tracheomalacia in patients undergoing thyroidectomy. One hundred and forty-nine patients underwent thyroidectomy at MTI-Khyber Teaching Hospital Peshawar between 1st January 2021 and 1st March 2022. The frequency of post-thyroidectomy tracheomalacia and possible associated factors were determined. The inclusion criteria were patients of either gender, between 18 to 70 years fulfilling criteria of clinically diagnosed cases of thyroid disorders who underwent subtotal, hemi, near or total thyroidectomy for their respective thyroid diseases. Post-thyroidectomy tracheomalacia was recorded in 18 patients (12.1%): Seventeen patients were aged less than 30 (p-value 0.038) and 14 (77.8%) patients had a duration of surgery \geq three hours (p-value <0.001). Young female patients with multinodular goitre who had a longer duration of surgery developed post-thyroidectomy tracheomalacia more frequently. Hence, the incidence of post-thyroidectomy tracheomalacia can be markedly reduced with proper preoperative assessment and postoperative measures.

Key Words: Thyroid gland, Thyroid disorders, Tracheomalacia, Thyroidectomy.

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Tracheomalacia after thyroidectomy is not a well-understood phenomenon. Reports on tracheomalacia are conflicting, with some suggesting a high rate and other large cohorts in which no tracheomalacia is reported.¹ Reported incidence of tracheomalacia ranges from 0–10%. Aetiology of acquired tracheomalacia includes trauma, surgery (for long standing goitre/oesophagectomy/tracheal resection), chronic irritation (prolonged tracheal intubation), infection, changes in mechanics and malignant infiltration.² Historically, it is considered that patients with very large goitres were at risk of developing post-thyroidectomy tracheomalacia (PTTM).³ Respiratory obstruction due to tracheomalacia is most commonly seen in female patients who underwent total thyroidectomy for multinodular goitre.⁴

The purpose of this study was to determine the frequency and risk factors of tracheomalacia in patients undergoing thyroidectomy. As little literature exists with no local evidence found after thorough research, therefore, this study will play a pivotal role in ascertaining not only the frequency of post-thyroidectomy tracheomalacia but also the possible risk factors which will help local clinicians in robustly managing such patients in the local population.

The sample size was calculated as 149 by keeping 95% confidence interval (CI), 4.82% margin of error and 10%³ expected frequency of post-thyroidectomy tracheomalacia. Clinically diagnosed cases of thyroid disorders were defined as having TSH >4.50 mIU/L, T4 >4 ug/L and with enlarged goitre confirmed on physical examination. After thyroid surgery, the presence of a soft, floppy trachea during surgery and blockage to spontaneous breathing upon slow withdrawal of the endotracheal tube were diagnostic criteria for tracheomalacia.

The inclusion criteria were patients of either gender, between 18 to 70 years fulfilling criteria of clinically diagnosed cases of thyroid disorders who underwent subtotal, hemi, near or total thyroidectomy for their respective thyroid diseases. Patients having a history of chronic lung disease were excluded.

Data were entered and analysed using SPSS version 23.0. Numerical variables such as (age, duration of surgery, size, and weight of thyroid glands) were presented as mean \pm standard deviation (SD), and categorical variables (gender and post-thyroidectomy tracheomalacia) were analysed as frequency and percentage. Gender, age, and duration of surgery were stratified. For categorical variables, the chi-square test was applied. Ap-value of ≤ 0.05 was considered statistically significant.

A total of 149 patients were included in this study. The mean age of patients was 40.20 \pm 11.33 years. Post-thyroidectomy, 18 (12.1%) patients were recorded with tracheomalacia out of which, 12 (66.7%) patients with multinodular goitre (p = 0.202), 17 (94.4%) patients with age category >30 years (p = value 0.038), 15 (83.3%) female gender (p = 0.645), and 14 (77.8%) patients with duration of surgery >3 hours (p <0.001) were

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found most susceptible to develop post thyroidectomy tracheomalacia.

Table I demonstrates frequency of tracheomalacia among patients in the post-operative period in terms of average duration of surgery.

Table I: Stratification of Tracheomalacia with Duration of Surgery (n = 149).

| | | Duration of Surgery | | Total | p-value |
|----------------|-----|---------------------|----------|--------|---------|
| | | ≤3 Hours | >3 Hours | | |
| Tracheomalacia | Yes | 4 | 14 | 18 | <0.001 |
| | | 22.2% | 77.8% | 100.0% | |
| | No | 123 | 8 | 131 | |
| | | 93.9% | 6.1% | 100.0% | |
| Total | | 127 | 22 | 149 | |
| | | 85.2% | 14.8% | 100.0% | |

The study depicted that females were most predisposed to have tracheomalacia after surgery as 15 out of 118 female patients developed tracheomalacia ($p = 0.165$) similar to another, where tracheomalacia was found in 27 (5.3%) of the 507 thyroidectomy patients, including 86% females.² Cardillo *et al.* showed a total of 25 patients had postoperative airway complications, 9 (1.5%) were diagnosed with tracheomalacia, 5 intraoperatively, and 4 postoperatively,⁵ while Valizadeh *et al.* found no case of tracheomalacia after thyroidectomy.¹ Minambres also did not observe any case of tracheomalacia or tracheal collapse.⁴

Different thyroid diseases were documented in the study. The diseases which were associated with tracheomalacia after thyroidectomy included multinodular goitre (MNG), papillary thyroid carcinoma and goitre with retrosternal extension. Bennet assessed whether tracheomalacia is common in cases of retrosternal goitre, and concluded with evidence that this problem is uncommon, contrary to popular belief.³ Ayandipo listed retrosternal extension and thyroid malignancy as risk factors for respiratory complications.²

The frequency of post-thyroidectomy tracheomalacia can be markedly reduced with proper pre-operative assessment and postoperative measures as tracheomalacia has low frequency and is one of the rarest of complications related to thyroid disorders. Its occurrence in modern thyroid surgery is minimal. It can

be anticipated and controlled if the risk factors such as age factor, female gender, duration of surgery and multinodular goitre are taken into consideration.

ETHICAL APPROVAL:

This descriptive cross-sectional study was reviewed and approved by the Institutional Review Board of Services MTI-Khyber Teaching Hospital, Peshawar (Ref: 081/DME/KMC).

PATIENTS' CONSENT:

Informed consents were taken from all participants included in the study.

COMPETING INTEREST:

The authors declared no competing interest.

AUTHORS' CONTRIBUTION:

AHM, QM: Substantial contribution to concept, design, and drafting.

UU, IH: Acquisition, analysis of data, and revisiting it critically.

JB, IU: Interpretation of data, and drafting of the work.

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REFERENCES

- Valizadeh N, Mohammadi P, Mahmodlou R, Seyed Mokhtari SA, Ramezani G. "Tracheomalacia after thyroidectomy," Does it truly exist? *Niger J Surg* 2020; **26(1)**:59-62. doi: 10.4103/njs.NJS_31_19.
- Ayandipo OO, Adigun TA, Afuwape OO, Afolabi AO, Daniel A. Airway complications and outcome after thyroidectomy in ibadan: A 15 year review. *Arch Med* 2016; **8**:4. doi:10.21767/1989-5216.1000151.
- Bennett AM, Hashmi SM, Premachandra DJ, Wright MM. The myth of tracheomalacia and difficult intubation in c cases of retrosternal goitre. *J Laryngol Otol* 2004; **118(10)**:778-80. doi: 10.1258/0022215042450751.
- Minambres E, Buron J, Ballesteros M. Tracheal rupture after endotracheal intubation: A literature systematic review. *Eur J Cardiothorac Surg* 2009; **35(6)**:1056-62. doi: 10.1016/j.ejcts.2009.01.053.
- Cardillo G, Carbone L, Carleo F, Batzella S, Jacono RD, Lucantoni G, *et al.* Tracheal lacerations after endotracheal intubation: A proposed morphological classification to guide non-surgical treatment. *Eur J Cardiothorac Surg* 2010; **37(3)**:581-7. doi: 10.1016/j.ejcts.2009.07.034.

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