

Head and Neck Cancer

Safe and Standard Thyroid Cancer Surgery, or Lack Thereof: Patterns and Correlates of Patient Referral to Tertiary Care Centre for Revision Thyroid Surgery in a LMIC

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Abstract



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Keywords

- ▶ differentiated thyroid cancer
- ▶ re-operative surgery
- ▶ LMIC

Background A surgeon's characteristics such as volume and practice setup are essential elements in outcome of thyroid cancer. However, little information is available from the developing world regarding qualities of primary surgeon, such as level of knowledge, skill, and proper documentation while referring to higher center. **Methods** Records of 164 patients of differentiated thyroid cancer (DTC) from January 1990 to December 2018 undergoing revision thyroid surgery following primary surgery elsewhere were retrospectively analyzed.

Results Out of 164 patients with postoperative diagnosis of DTC, referral patterns were as follows: low volume (LV) to high volume (HV) ($n = 120$, 73.2%), followed by HV to HV ($n = 44$, 26.8%). The primary surgery assessed by the extent of residual disease was in agreement with the documentation in only 55%. The type of thyroidectomy performed was not mentioned in 9.8%. The status of the parathyroid glands was mentioned only in 15.8% and recurrent laryngeal nerve in 12.2%. Less than recommended surgery was performed in 52.5% patients. Despite less than recommended surgery, 44.5% patients were directly referred for radioactive iodine ablation (RAIA). Thirty two percent patients were referred for RAIA after hemithyroidectomy. Central or lateral compartment lymphadenectomy, even after indication, was less likely at LV centers (risk ratio [RR], 0.71; 95% confidence interval [CI], 0.64–0.77). Similarly, for

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DTC patients, the relationship between LV center surgery and subsequent referral for RAIA was RR, 0.71 (95% CI, 0.48–1.02).

Conclusions Most patients referred from LV surgeons are less likely to have proper thyroidectomy, have inadequate documentation of the primary surgery, and are referred for RAIA after less than total thyroidectomy. Our study highlights the lacunae in the approach to and understanding of thyroid cancer surgery by secondary care physicians in our country. We believe that there is an urgent necessity of educational reform and training to rectify this problem.

Introduction

Consequences of rising global cancer burden on the individual patient, family, and society are alarmingly evident, and a glimpse of glaring deficits in our capabilities to provide high-quality, equitable and safe surgical care across the world and especially in low and middle income countries (LMICs) was presented by the Lancet oncology commission.¹ Of the 15.2 million new cases of cancer in 2015, over 80% of cases will need surgery, some several times. By 2030, 45 million surgical procedures annually will be needed worldwide. Yet, less than 25% of patients with cancer worldwide actually get safe, affordable, or timely surgery.¹ The rate of incidence of thyroid cancer has increased more than any other cancer worldwide.^{2,3} The United States has seen >300% increase in prevalence of thyroid cancer within the past 30 years,³ leading to increased demand for surgeries. Role of safe and standard surgery in such a scenario cannot be overemphasized.

Inadequate information is available from LMICs regarding qualities of primary surgeon, such as level of knowledge and skill in decision-making, safe surgery practice, and proper documentation while referring a patient to higher center. To address this issue, we analyzed data of reoperative thyroid cancer patients and their primary surgeons in this study.

Methods

This was a retrospective study including patients undergoing reoperative thyroid surgery following primary surgery elsewhere. A total of 164 patients of differentiated thyroid cancer (DTC) from January 1990 to December 2018 were included. Records reviewed included hospital files, in-patient registers, outdoor patient registers, operation room (OR) registers, hospital information system (HIS), and pathology reports. The data was subsequently transferred to SPSS software (v.16.0). The referral records of the patients were analyzed. The primary outcomes assessed included the type of primary surgery performed (as reported); whether the extent of residual disease was in agreement with the documentation; the type of primary surgery performed (as judged after imaging and exploration); and whether or not the primary surgery was appropriate for the disease. Surgeons performing less than 25 thyroid surgeries in a year were considered low-volume (LV) surgeons and those per-

forming more than 25 surgeries in year were considered high-volume (HV) surgeons.

Statistical Analysis

The unpaired student's *t*-test was used for continuous variables and the Chi-square test was used for categorical variables. We constructed multivariable models using modified Poisson regression to generate risk ratios (RRs) of referral pattern and lymphadenectomy. A *p*-value of < 0.05 was considered significant. Data was analyzed using SPSS version 16.0.

Results

A total of 164 patients underwent reoperative thyroid surgery for DTC during the study period at our center. Mean age was 43.8 ± 12 years and male to female ratio was 1:3. Overall, referral patterns were LV to HV ($n = 120$, 73.2%), followed by HV to HV ($n = 44$, 26.8%). As much as 83.5% (137/164) patients underwent fine needle aspiration cytology (FNAC) before primary surgery and 71% (117/164) were preoperatively diagnosed as thyroid cancer. After diagnosis of malignancy, all 164 patients were eligible for total thyroidectomy (TT) because the primary tumor size > 4 cm, there was local infiltration, or cervical lymph node metastasis was viewed on preoperative imaging. However, only 68% (112/164) patients underwent bilateral procedure on thyroid and 32% (52/164) patients were offered hemithyroidectomy (HT). As much as 44% (73) patients had indication of central compartment lymph node (CCLN) or lateral compartment lymph node (LCLN) dissection based on preoperative imaging, but only 25% ($n = 18$) of such patients were offered lymph node dissection. CCLN and LCLN were less likely to be offered at LV centers (RR, 0.71; 95% confidence interval [CI], 0.64–0.77), and these patients were less likely to be referred for RAIA (RR, 0.71; 95% CI, 0.48–1.02).

Documentation

The primary surgery assessed by the extent of residual disease was in agreement with the documentation in only 54.9% ($n = 90$). In 9.8% ($n = 16$), the referral letter/discharge summary only mentioned that the patients had undergone thyroidectomy but the type of thyroidectomy, i.e., TT or HT was not mentioned. The status of the parathyroid glands (identified and preserved) was mentioned only in 15.9%

Table 1 Attributes of surgical notes from referring surgeon

Sl. no.	Description	n (%)
1	Correct surgical procedure mentioned	106 (64.6)
2	Surgical procedure not mentioned	16 (9.75)
3	Status of parathyroid mentioned	26 (16)
4	Status of RLN mentioned	20 (12)
5	Less than recommended surgery	86 (52.43)

Abbreviation: RLN, recurrent laryngeal nerve.

($n=26$) and recurrent laryngeal nerve (RLN) in 12.2% ($n=20$). Seven patients had RLN palsy after primary surgery. Less than recommended surgery was performed in 52.5% ($n=86$) patients (–Table 1). Despite less than recommended surgery, 44.5% ($n=73$) patients were directly referred for radioactive iodine ablation (RAIA). Thirty two percent ($n=52$) patients were referred for RAIA even after HT.

Discussion

To our knowledge, this is first study from any LMIC to find out lacunae in thyroid cancer surgery, proper documentation of operative notes, and referral pattern based on reoperative surgery. Our geographical location within India and vast catchment area for patients through multiple sites of care delivery, for example, primary surgeon, radiotherapist, nuclear medicine physician is unique and lends generalizability to our data to the whole of India. Patients who were operated by a HV surgeon were more likely to undergo proper surgery as per indication. Patients are less likely to undergo evaluation and management as per guidelines in India if not treated in a tertiary care center. There is very poor documentation of operative findings and less than recommended surgery is performed in many.

Thyroid cancer incidence although low is also likely to increase in LMICs.⁴ Few estimates suggest that thyroid cancer could become the third most common cancer to be diagnosed in women by 2019.⁵ Thyroidectomy (either total or hemi) is the cornerstone of any strategy which aims to cure the thyroid cancer. Thyroidectomy is considered a very safe procedure in expert hands; thyroid reoperations are associated with a higher morbidity, although results comparable to primary surgery are reported by specialized thyroid centers.^{6–11} A safe and effective outcome depends on surgeons' capabilities: their diagnostic ability, treatment plan formulation, technical skill performance, and postoperative care.^{12,13} In developed countries, there are guidelines laid down to define a specialist endocrine surgeon or general surgeon with a special interest in endocrine surgery,¹⁴ and a certification and recertification process exists. Workshops and a system of continuing medical education (CME) keep surgeons up to date in their knowledge and skills.¹⁵ Providing evidence-based thyroid cancer care to patients is unfortunately less likely in LMICs, which will bear the brunt of increasing cancer burden. The minimum surgical procedure to be performed upon the thyroid ought to be a HT; compli-

cations of secondary surgery increases when a scarred thyroid bed needs to be entered.¹⁶

Our results have important implications for cancer care and policy in LMICs. Surgery is often not given importance as a component of global health in government policies. As growing number of studies have shown that surgery is cost-effective and there is a large unmet burden of surgical disease, policymakers are beginning to recognize the importance of safe and standardized surgery. Thyroid cancer is especially important as surgeons are the only physicians patients with a thyroid nodule will meet in most LMICs. If safe and standard thyroid cancer surgery is to be provided, training more qualified surgeons must be one of the priorities. In low-resource countries, a partial solution for training is the apprenticeship system,¹⁷ whereby a trainee works with a specialized surgeon. Another option could be telemonitoring of general surgeons.¹⁸

There are several limitations in this study. Thyroid surgery volume was determined by surgeon self-report of the thyroidectomy. It may lack some accuracy. Details preoperative of FNAC and imaging studies, as reported by the patient, may not be always true and may have introduced unmeasured confounding. The study is over a 28-year period during which time standard of care and surgical techniques have progressed dramatically. However, our unit was established in the late 80s, and during the first decade, surgical workload was not very high. So most patients included in the analysis were operated after 2000s. Finally, the sample size was small.

Conclusion

Most patients referred for revision surgery or RAIA are from LV surgeons, less likely to undergo recommended initial procedure, and have inadequate documentation of the primary surgery and status of parathyroids or RLN. Our study highlights the lacunae in the approach to and understanding of thyroid cancer surgery in our country.

Author Contributions

S.B. and S.K.Y. have contributed equally and are joint first authors.

S.B., S.K.Y., S.K.M., A.M.—literature search, figures, study design, data collection, data analysis, data interpretation, writing.

V.A., G.C., G.A., A.A.—revision and editing of manuscript.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed written consent was obtained from the patient.

Funding Source

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Conflict of Interest

Authors declare no conflict of interest.

Acknowledgment

This is to declare that all authors have contributed to the study.

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