

THYROID GLAND INVOLVEMENT IN LARYNGEAL AND HYPOPHARYNGEAL CARCINOMA

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ABSTRACT

OBJECTIVES

To assess the thyroid gland involvement and the need for thyroidectomy in advanced laryngeal and hypopharyngeal carcinomas that require total laryngectomy.

METHODS

The study included 47 patients who had undergone total laryngectomy along with ipsilateral hemithyroidectomy or total thyroidectomy for primary squamous cell carcinoma of the larynx and/or hypopharynx. The laryngectomy specimen and thyroid specimen were studied histologically with multiple serial sections.

RESULTS

Two (7.7%) of the laryngeal carcinoma patients had thyroid gland invasion and two (9.5%) hypopharyngeal carcinoma patients had thyroid gland invasion. Four patients (15.4%) had evidence of thyroid cartilage invasion in the laryngeal carcinoma group. There were only three cases (14.3%) with thyroid cartilage invasion among the hypopharyngeal carcinoma patients.

CONCLUSION

To prevent unnecessary excision of the thyroid gland which may lead to important complications such as hypothyroidism, we suggest saving the thyroid gland during laryngectomy except in laryngeal carcinoma cases with subglottic or transglottic extension and advanced hypopharyngeal tumours.

KEYWORDS

Laryngeal Cancer, Thyroid Involvement, Hemithyroidectomy, Laryngectomy.

HOW TO CITE THIS ARTICLE: Rakesh BS, Bharathi MB, Babu AR. Thyroid gland involvement in laryngeal and hypopharyngeal carcinoma. J. Evid. Based Med. Healthc. 2016; 3(17), 693-695. DOI: 10.18410/jebmh/2016/156

INTRODUCTION: Total thyroidectomy or hemithyroidectomy in conjunction with a total laryngectomy or pharyngolaryngectomy for laryngeal and hypopharyngeal cancers has been a controversial issue for many years. Squamous cell carcinoma of the larynx can invade the thyroid gland by direct extension or less frequently can spread indirectly by lymphatic or vascular channels. Several studies have demonstrated that the risk of thyroid gland invasion, although relatively low, is more substantial with transglottic cancers or glottic cancers with subglottic extension.

The postoperative complication of hypothyroidism in patients who have undergone total laryngectomy with hemithyroidectomy has been reported in up to 25% of patients without adjunctive radiotherapy and in up to 70% with adjunctive radiotherapy.^{1,2} The cardiovascular, psychiatric and various other systemic effects along with effects on postoperative wound-healing amplifies the clinical significance of post laryngectomy hypothyroidism. The purpose of this study was to assess the incidence of thyroid

involvement in advanced laryngeal and hypopharyngeal carcinomas, in order to prevent unnecessary excision of thyroid gland and thereby preventing important postoperative complications such as hypothyroidism.

METHODS: A retrospective review was done over 47 patients who had undergone total laryngectomy/laryngopharyngectomy along with ipsilateral hemithyroidectomy or total thyroidectomy for primary carcinoma of the larynx and/or hypopharynx from 2009 to 2013. The laryngectomy specimen along with thyroid were studied histologically with multiple serial sections. The records of 47 patients were reviewed for age, gender, tumor location, thyroid involvement, tumor pathology, tumor stage, and tumor grade. Thyroid involvement was confirmed by the pathologic findings.

RESULTS: Out of 47 patients, 26 were laryngeal (males-24, females-2) and 21 were hypopharyngeal cancers (males-18, females-3). The age group ranged between 45-70yrs for laryngeal and 35-71yrs for hypopharyngeal cancers. 45 patients underwent primary surgical treatment, and 2 patients underwent surgery for recurrence following previous radiotherapy or chemoradiotherapy. Histological evidence of invasion of the thyroid gland was found in 2 of

Submission 02-02-2016, Peer Review 16-02-2016,

Acceptance 24-02-2016, Published 29-02-2016.

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DOI: 10.18410/jebmh/2016/156

26 (7.7%) laryngeal cancers and 2 of 21(9.5%) hypopharyngeal cancers (Fig. 1).

Out of two patients of laryngeal cancer who had thyroid gland invasion, both were males in their 6th decade. Both were moderately differentiated squamous cell carcinoma and were in tumour stage 3 (Fig. 2). One of them showed sub-glottic extension while the other revealed transglottic extension. Out of two patients of hypopharyngeal cancer who had thyroid gland invasion, there was a 70-year-old male and a 35-year-old female, both with moderately differentiated squamous cell carcinoma and with tumour stage 3 (Fig. 2).

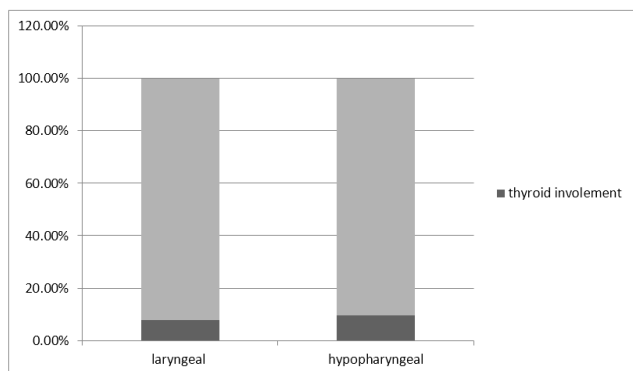


Fig. 1: Thyroid involvement

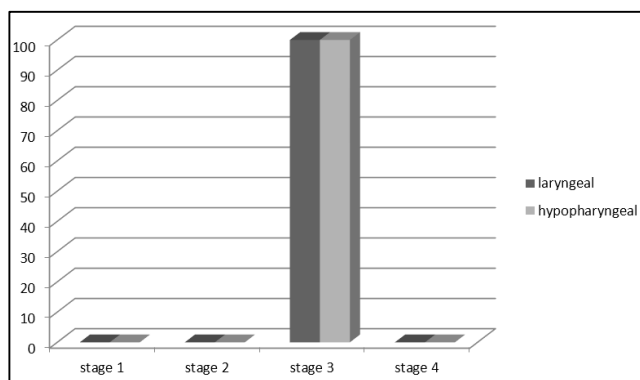


Fig. 2: Thyroid involvement according to tumor stage

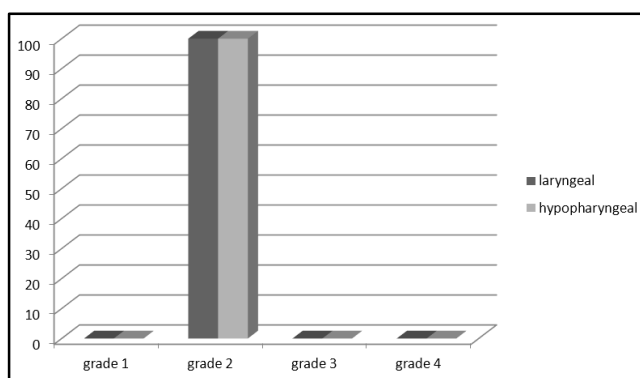


Fig. 3: Thyroid involvement according to tumor grading

DISCUSSION: Hypothyroidism after laryngectomy with hemithyroidectomy is attributed to vascular compromise of the remaining lobe.³ The long term incidence of post irradiation hypothyroidism in patients with head and neck cancer who did not undergo surgical resection has been

reported as 20% and 27% at 5 and 10 year follow up respectively.⁴ Addition of surgery to radiation therapy significantly increases the overall risk of hypothyroidism, and combined laryngectomy and hemithyroidectomy with subsequent radiation therapy has been shown to result in permanent hypothyroidism in as many as 70% of patients.^{1,4,5} Postoperative hypothyroidism can be difficult to treat in few and often exists undetected without routine screening for 2 years postoperatively.⁵

Most laryngeal carcinomas arise in the glottic region and spread via direct extension to invade adjacent laryngeal structures. Extralaryngeal extension into structures such as the thyroid gland occurs relatively late. The incidence of invasion of the thyroid gland by laryngeal carcinomas is reported to be between 0 and 30 percent whereas it is up to 57 percent in hypopharyngeal carcinomas.⁵⁻¹⁰ In patients undergoing surgery for advanced laryngeal and hypopharyngeal carcinomas, majority of authors advocate the standard practice of total laryngectomy or pharyngolaryngectomy with an ipsilateral hemithyroidectomy.^{8,9} Whereas some authors recommend a total thyroidectomy for specific situations⁸ and no thyroidectomy in few selected cases.^{1,2,11} The practice in our institution is to perform a ipsilateral hemithyroidectomy in association with a total laryngectomy or pharyngolaryngectomy in majority of cases of advanced laryngeal and hypopharyngeal carcinoma. Total thyroidectomy was performed in only few selected cases.

Author	Laryngeal carcinoma	Hypopharyngeal carcinoma	No. patients (total)
Fagan et al ⁵	2%		102
Yuen et al ⁶	19%		16
Ceylan et al ⁷	0%	57%	129
Brennan et al ⁸	3%		247
Croce et al ⁹	30%		23
Gilbert et al ¹⁰	14%		173
Dadas et al ¹¹	1%		182
Our study	7.7%	9.5%	47

Table 1: Reported incidence for invasion of the thyroid gland with laryngeal and hypopharyngeal carcinoma

Croce et al. reported 5 cases of thyroid involvement (14.2%) among 35 patients (table 1).⁸ In a study by Gilbert et al., there were 23(14%) cases of thyroid invasion in 173 patients.¹⁰ Croce et al. in another study described 7(30%) cases with thyroid involvement in 23 patients with laryngeal cancer.⁹ Brennan et al. reported 20(8%) cases of thyroid

involvement among 247 patients.⁸ Thyroid involvement was found in 19% of patients in Yuen et al study whereas Biel et al reported thyroid involvement of 5% among 261 patients.^{6,12} In our study thyroid involvement was found in 2 of 26(7.7%) laryngeal cancers and 2 of 21(9.5%) hypopharyngeal cancers.

The glottic cancer with sub-glottic extension was the most common scenario for thyroid involvement in laryngeal cancer. In a study by Gilbert et al 21 cases of invasion to the subglottic area were seen among 23 patients (more than 91%).¹⁰ Yuen et al study showed that thyroid involvement occurred when there was subglottic extension of the laryngeal cancer whereas in Brennan et al study, thyroid involvement was seen in cases with transglottic extension.^{6,8} Brennan et al⁸ reported that all cases with thyroid involvement were in stage IV whereas in Gilbert et al. study, cases with thyroid involvement were in stages III and IV. In this study all 4 cases of thyroid involvement were in stage III. In this study thyroid involvement was seen in grade 2 of laryngeal and hypopharyngeal cancer meaning that thyroid involvement is more prevalent in lower grade. This study also showed a male preponderance for thyroid involvement similar to the Croce et al study.

CONCLUSION: According to the provided statistical analysis and the low rate of thyroid involvement in patients after total laryngectomy or pharyngolaryngectomy, we suggest these indications for hemithyroidectomy during total laryngectomy or pharyngolaryngectomy.

- a) Glottic tumours with subglottic extension.
- b) Subglottic tumours.
- c) Laryngeal tumours with invasion of cartilage.
- d) Tumours of hypopharynx in stage IV.

All other cases should be individualized in suspected cases such as those with abnormal thyroid consistency, the decision should be made during laryngectomy. To prevent unnecessary excision of the thyroid gland which may lead to important complications such as hypothyroidism, we suggest saving the thyroid gland in conditions other than those listed above.

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