

Laryngotracheal invasive thyroid cancer management

Abstract

Thyroid cancer incidences have drastically risen over the past few decades, probably due to early diagnostic facilities. However, Invasive thyroid cancers are rare the criticality of neighbouring structures sometimes may limit the extent of surgery. But, adjunct treatments with radio iodine therapy and in some instances, external beam radiotherapy tend to improve overall survival there is no match to, the scenario when proper disease clearance is attained surgically. Hence, this case report is being presented along with available review of literature.

Keywords: thyroid malignancy, larynx infiltration, laryngectomy, invasive cancers

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Abbreviations: TSH, thyroid-stimulating hormone; RLN, recurrent laryngeal nerve; CECT, contrast enhanced computed tomography; MRI, magnetic resonance imaging; CT, computed tomography

Introduction

Invasive thyroid cancers, though not uncommon, have a reported incidence of around 6-13%. Invasion into the neighbouring critical structures, either directly or extranodally, indicates the aggressive nature of the tumour. Adequate awareness regarding the same, aids in planning optimal diagnostic strategies for adequate surgical clearance. This case report is published in view of the rarity of laryngotracheal invasion of thyroid cancers (0.7 to 1.56% as per literature).

Case report

A 56year old male, with no co-morbidities, was diagnosed with papillary carcinoma thyroid. He underwent total thyroidectomy with modified radical neck dissection followed by radio iodine ablation in 2008. Since then, he was on regular follow up, was on thyroid medications and calcium supplementation for permanent hypocalcaemia. He had a disease free period of 8years. In 2015, his Thyroglobulin values had risen to 259. Further evaluation revealed a heterogeneous nodule, anterior to the larynx with central compartment nodes (Figure 1). In view of partial infiltration into the larynx, he was advised total laryngectomy with central compartmental nodal mass clearance in June 2016 with a small possibility of shaving off the tumour and preserving larynx. The patient deferred surgery for alternate treatment options and presented 8months later with progression of disease. On examination, a 4x3cms hard swelling in the anterior neck, fixed to the thyroid cartilage was noted. Left level 3 node of 2 x 1cms was palpable. Nasopharyngolaryngoscopy revealed left vocal cord palsy and no mucosal lesions in larynx or trachea. CT revealed enhancing solid mass anterior to larynx, infiltrating the thyroid cartilage, measuring 32x24mm (Figure 2) and irregular calcified nodal mass in the right upper paratracheal region of size - 24x18mm, along with few well defined rounded nodular opacities noted in both lungs of size 3-6 mm, possibly metastasis. Treatment options were discussed and he was taken up for Total laryngectomy with central compartment neck dissection with bilateral posterolateral selective neck dissection. Intra operatively, mucosal bulge was noted in the anterior subglottic wedge (Figure 3). His post op period was uneventful and was he initiated on nasogastric tube feeds on

POD-01 and normal oral feeds on POD-7. His final histopathology report confirmed papillary carcinoma of thyroid, infiltrating thyroid cartilage of larynx. He has been initiated on thyroid suppression and is scheduled for radio iodine scan and thyroglobin assessment with a possible need for Radio iodine ablation.

Discussion

The worldwide incidence of thyroid malignancies has shown rising trends, over the few past decades. This is perhaps due to increased patient awareness of and easy availability and accessibility of diagnostic facilities. The excellent prognosis associated with well differentiated thyroid cancers, is further rewarding for both the treating surgeon and the patient alike. However, age, extra thyroidal extension, histology and distant metastasis are prognosticative,¹ dropping 10 year survival rates from 91 to 45%.² The incidence of invasive thyroid cancers range from 6-13%.¹⁻⁴ The common sites in the order of decreasing frequency are strap muscles (53%), Recurrent laryngeal nerve (RLN) (47%), trachea (37%), carotid sheath structures (30%), esophagus (21%) and rarely larynx (12%). This is either by the tumour per say or by extra nodal extension.⁵ Thyroid malignancies with laryngotracheoesophageal infiltration can present with hoarseness, stridor, hemoptysis or dysphagia. Fiberoptic laryngoscopy can reveal vocal cord palsy, which alerts the surgeon regarding the invasive nature of the disease. Direct pressure or infiltration of the RLN can be the cause.⁶ The ultrasonological identification of tracheal invasion has a sensitivity of 42-91%.⁷⁻⁹ Contrast enhanced CT continues to remain as the ideal investigation of choice to plan surgery, except for the contrast interfering with radio Iodine therapy. In such cases, MRI gives better information with regard to tracheal, esophageal and recurrent laryngeal invasion. Other cardinal diagnostic tools in the armamentarium include barium swallow followed by esophagoscopy and bronchoscopy. The importance of identifying invasiveness of thyroid malignancies lies in their correlation with aggressiveness of the tumour, poorer histology, doubtful radio iodine avidity and higher possibility of distant metastasis.

Shin et al.,¹⁰ classified tracheal involvement in invasive thyroid cancers into 4 groups: Type-1: abutment, II-invades cartilage, IIIinvolves lamina propria and IV-when visualized intralaryngotracheally even as small as a mucosal bulge.¹⁰ Recurrence rates advance from 8% to 79%, in type II – IV cancers, following just shaving off procedures, with a corresponding precipitous fall of survival rates from 8.7 to 1.5years.¹¹ Lack of expertise in conservation

laryngeal surgeries or underestimation of disease aggressiveness, might perhaps result in such compromising treatment decisions perioperatively.

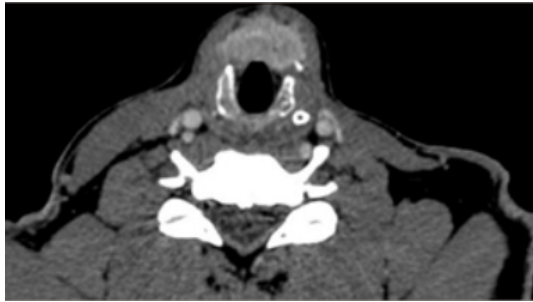


Figure 1 Heterogeneously enhancing nodular lesion anterior to the cricothyroid membrane with partial laryngeal infiltration on a contrast enhanced computed tomography

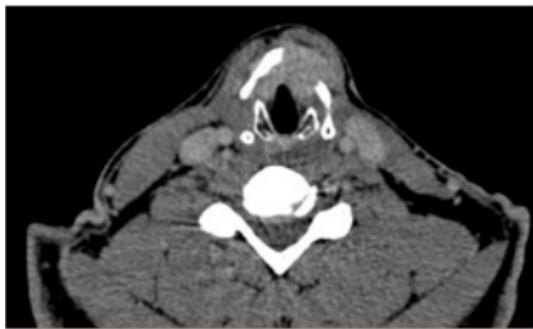


Figure 2 Contrast enhanced Computed tomography showing solid mass anterior to larynx infiltrating thyroid cartilage of size 32x24mm.



Figure 3 Laryngectomy specimen showing submucosal bulge in anterior subglottic wedge.

Surgical clearance of all gross disease in the neck remains the main stay of treatment. Critical structures like RLN, esophagus, trachea and carotid space structures often hinder aggressive approaches. Every attempt to preserve a functional RLN, by shaving off the tumour is advocated because, no survival difference has been reported after adjuvant RAI therapy in such patients when compared with nerve transaction.¹²⁻¹⁵ Esophageal infiltration worsens prognosis and though usually limited at muscularis layer,^{6,15} often warrants stent insertion for palliation. When laryngotracheal infiltration is noted, shaving the tumour off the critical structures is still widely practiced with the belief that radioiodine will melt the residual disease. EBRT offers some hope

for non radio iodine avid tumours, although survival rates still remain poor. Proponents of aggressive approach with simultaneous partial or total laryngectomy and/or pharyngoesophageal resection and reconstruction with pedicled or free flaps, preach definitive survival difference. Conflicting reports on survival in such scenarios, are due to the varying definition of invasion, extent of resection, wide range of histology and different adjuvant therapies. Moreover, invasive nature with aggressive histology tends to leave behind micro residues. Hence, though morbid, the reported survival differences in literature warrants aggressive approach in appropriately selected patients for better DFS and OS.¹⁶⁻²² In the best interest of the patient, and the high chance of pulmonary metastasis, good local control is attained with comparatively lesser morbid total laryngectomy than partial procedures as in our case.

Adjuvant treatment with TSH suppression (<0.1mU/L), in view of locoregional recurrence and metastasis, has improved local control with doubtful disease related survival advantage. Chemotherapy especially Doxorubicin has shown only 30-40% partial response with poor long term results. Molecular targets like RET kinase inhibitors, B raf mutation targeting drugs and drugs restoring RAI uptake like retinoids and histone deacetylase etc are still in their infancy but may offer promising hope in the near future.

Conclusion

Invasive thyroid cancers, warrant aggressive treatment approach. But patient factors with distant metastasis burden should be taken into consideration prior to undertaking extensive and morbid resections followed by adjuvant treatment, for the best survival benefits. Laryngotracheal infiltration of thyroid cancers is definitely a rare entity. But when need arises, surgical team trained to simultaneously address the situation with either partial or total laryngectomy has to be in place. In our case, however, we opted for total laryngectomy in view of the progressive lung metastatic lesion which would further diminish the lung functions in the near future creating further morbidity.

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Conflicts of interest

Author declares there are no conflicts of interest.

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