



MANAGEMENT OF PAPILLARY THYROID CANCER: TOTAL VERSUS HEMI-THYROIDECTOMY

Dr. Jaspreet Singh Badwal*

Head and Neck Surgeon, Hyderabad India.

***Corresponding Author:** Dr. Jaspreet Singh Badwal

Head and Neck Surgeon, No. 4 Phulkian Enclave, Jail Road, Patiala – 147001, Punjab.

Article Received on 12/10/2016

Article Revised on 01/11/2016

Article Accepted on 21/11/2016

ABSTRACT

Until recently, many issues regarding the treatment of recurrent or persistent PTC remained unresolved and controversial. One of the most important dilemma was effect of the extent of surgery for papillary thyroid cancer, in relation to survival and morbidity. The aim of this review is to clarify this enigma, in the light of scientific evidence and latest guidelines.

KEYWORDS: papillary thyroid cancer, total versus hemi-thyroidectomy.

Differentiated thyroid cancer (DTC) has emerged as the fastest growing malignancy in the world,^[1] over the past 20 years. This rise in incidence of thyroid cancer (3.01%) was reported to be the highest in United States with over 48,000 cases annually.^[2] Differentiated thyroid cancers arise from follicular cells and include papillary (PTC), follicular (FTC) and Hurthle Cell Carcinoma (HCC). Surgical excision remains the gold standard for the treatment of differentiated thyroid cancer.

The most common type of differentiated thyroid cancer is papillary thyroid carcinoma (PTC). For most patients with PTC, the survival is generally considered excellent, but this depends on histologic type and on well-defined prognostic factors such as age, sex, soft-tissue extension, lymph node metastasis and distant metastasis.^[3-6] Persistence of disease after definitive surgical resection for early stage I and II PTC has been reported to be as high as 11-30%.^[7] A prospective study involving patients reported in national thyroid cancer registry (United States of America) revealed that recurrence of disease occurred in 10-30% of patients with stage I-III PTC.^[8] The presence of local and regional recurrences within the central compartment may add considerable risk to long-term morbidity, including change or loss of quality of voice and deglutition. Recurrences in local site or central compartment may also carry considerable risk for tumour related death among patients above the age of 45.

Until recently, many issues regarding the treatment of recurrent or persistent PTC remained unresolved and controversial. One of the most important dilemma was effect of the extent of surgery for papillary thyroid cancer, in relation to survival and morbidity. The aim of

this review is to clarify this enigma, in the light of scientific evidence and latest guidelines.

The discussion over extent of surgery for papillary thyroid cancer, would be most easily perceivable, when this topic is evaluated in relation to the Bilimoria study,^[9] which changed the course of surgical treatment of papillary thyroid cancer.

THE RISE AND ACCEPTANCE OF THE BILIMORIA STUDY

Bilimoria et al^[9] (2007) conducted a study involving 52,173 patients who had undergone surgery for PTC. The details of these patients were registered in National Cancer Data Base, over a period of almost 13 years, from 1985 to 1998. The objective of this study was to examine whether the extent of surgery affects outcomes for PTC and to determine whether a size threshold could be identified, above which total thyroidectomy is associated with an improvement in recurrence and long-term survival rates.

Of the 52,173 patients included in the study, 43,227 (82.9%) had undergone total thyroidectomy, while 8946 patients (17.1%) underwent surgical lobectomy. The results showed that for PTC < 1 cm, extent of surgery did not impact recurrence or survival. For tumours ≥ 1 cm, lobectomy resulted in higher risk of recurrence and death. To minimize the influence of larger tumours, 1 to 2 cm lesions were examined separately. Lobectomy was found to result in higher risk of recurrence and death.

The authors concluded that total thyroidectomy results in lower recurrence rates and improved survival for PTC ≥ 1.0 cm compared with lobectomy. This was the first

study to demonstrate that total thyroidectomy for PTC \geq 1.0 cm improves outcomes.

The Bilimoria study had such an enormous influence over the management of PTC, that the ATA (American Thyroid Association) guidelines of 2009,^[10] adopted the results of this study as the very basis for recommendations regarding treatment. The ATA guidelines very clearly stated (Recommendation 26) that for patients with thyroid cancer $> 1\text{cm}$, the initial surgical procedure should be a near-total or total thyroidectomy, unless there are contraindications to this surgery. Thyroid lobectomy alone may be sufficient treatment for small ($< 1\text{cm}$), low-risk, unifocal, intrathyroidal papillary carcinomas in the absence of prior head and neck irradiation or radiologically or clinically involved cervical nodal metastasis.

THE FALL AND REJECTION OF THE BILIMORIA STUDY

Over the years, many authors showed rejection towards the Bilimoria study. Legendary surgeons such as Shah JP^[11] (2008) and Shaha AR^[12] (2010) pointed out concerns with Bilimoria et al's multivariable analysis, as it did not account for potentially important factors such as comorbidities, multifocality, extrathyroidal extension, and completeness of resection. In another very important study, Mendelsohn et al^[13] (2010) reported a subsequent analysis of 22,724 patients suffering from papillary thyroid cancer, registered with the SEER database (Surveillance, Epidemiology and End Results) over a period of 1998 to 2001. The results showed no survival difference between thyroid lobectomy versus total thyroidectomy. Such conflicting findings reopened the debate regarding the issue of extent of surgery for papillary thyroid cancer.

The final blow to the Bilimoria study was delivered by the publishing of Adam et al's research paper in 2014.^[14] The study involved 61,775 patients with PTC tumours 1.0 cm to 4.0 cm undergoing thyroidectomy, from 1998 to 2006, registered with the National Cancer Database (United States of America). Cox proportional hazards models were applied to measure the association between extent of surgery and overall survival while adjusting for patient demographic and clinical factors, including comorbidities, extrathyroidal extension, multifocality, nodal and distant metastases, and radioiodine treatment. Among 61,775 PTC patients, 54,926 had undergone total thyroidectomy, while 6,849 underwent lobectomy.

When compared to lobectomy, patients of total thyroidectomy had more nodal (7% vs. 27%), extrathyroidal (5% vs. 16%), and multifocal disease (29% vs. 44%). Median follow-up period was 82 months. After multivariable adjustment, overall survival was similar for total thyroidectomy vs. lobectomy in patients with tumours 1.0 – 4.0 cm in size. Older age, male gender, black race, lower income, tumour size, and

presence of nodal and distant metastases were independently associated with compromised survival.

This landmark study by Adam et al, changed the way papillary thyroid cancer was treated over the world. The effects were so profound that American Thyroid Association had to change its guidelines in lieu of the implications imposed by this study on the way papillary thyroid cancer was treated.

The ATA in 2015 came up with revised guidelines^[15] in relation to treatment of differentiated thyroid cancer. The guidelines stated that for patients with thyroid cancer $> 4\text{ cm}$ (Recommendation 35A), or with gross extrathyroidal extension (clinical T4), or clinically apparent metastatic disease to nodes (clinical N₁) or distant sites (clinical M₁), the initial surgical procedure should include a near-total thyroidectomy and gross removal of all primary tumour unless there are contraindications to this procedure. For patients with thyroid cancer $> 1\text{ cm}$ and $< 4\text{ cm}$ (Recommendation 35B) without extrathyroidal extension, and without clinical evidence of any lymph node metastases (cN₀), the initial surgical procedure can be either a bilateral procedure (near-total or total thyroidectomy) or a unilateral procedure (lobectomy). Thyroid lobectomy alone may be sufficient initial treatment for low-risk papillary and follicular carcinomas; however, the treatment team may choose total thyroidectomy to enable radioiodine (RAI) therapy or to enhance follow-up based upon disease features and/or patient preferences. If surgery is chosen for patients with thyroid cancer $< 1\text{cm}$ (Recommendation 35C) without extrathyroidal extension and cN₀, the initial surgical procedure should be thyroid lobectomy, unless there are clear indications to remove the contralateral lobe. Thyroid lobectomy alone is sufficient treatment for small, unifocal, intrathyroidal carcinomas in the absence of prior head and neck radiation, familial thyroid carcinoma, or clinically detectable cervical nodal metastases.

CONCLUSION

There are now clear guidelines available to resolve the controversy of total versus hemi-thyroidectomy for the management of papillary thyroid cancer. The present review has brought to attention the landmark studies which led to the formulation of these treatment guidelines.

Conflict of interests

The author declares that there is no conflict of interests that could influence this work.

Funding Acknowledgements

The author declares that there was no financial aid obtained from any source for the preparation of this manuscript.

REFERENCES

1. Kebebew K, Clark OH. Differentiated thyroid cancer: “complete” rational approach. *World Journal of Surgery.*, 2000; 24(8): 942-951.
2. Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. *CA Cancer Journal for Clinicians.*, 2011; 61(2): 69-90.
3. American Joint Committee on Cancer 2009 AJCC Cancer Staging Manual. Seventh Edition. Springer Press, New York.
4. Cady B, Rossi R. An expanded view of risk-group definition in differentiated thyroid carcinoma of the thyroid. *Surgery.*, 1988; 104: 947-953.
5. Shaha AR, Loree TR, Shah JP. Intermediate-risk group for differentiated carcinoma of the thyroid. *Surgery.*, 1994; 116: 1036-1041.
6. Hay ID, Bergstrahl EJ, Goellner JR, Ebersold JR, Grant CS. Predicting outcome in papillary thyroid carcinoma: development of a reliable prognostic scoring system in a cohort of 1779 patients surgically treated at one institution during 1940 through 1989. *Surgery.*, 1993; 114: 1050-1058.
7. Hundahl SA, Cady B, Cunningham MP, Mazzaferri E, McKee RF, Rosai J, Shah JP, Fremgen AM, Stewart AK, Holzer S. Initial results from a prospective cohort study of 5583 cases of thyroid carcinoma treated in the United States during 1996. U.S. and German Thyroid Cancer Study Group. An American College of Surgeons Commission on Cancer Patient Care Evaluation study. *Cancer.*, 2000; 89: 202-217.
8. Sherman SI, Angelos P, Ball DW, Beenken SW, Byrd D, Clark OH, Daniels GH, Dilawari RA, Ehya H, Farrar WB, Gagel RF, Kandeel F, Kloos RT, Kopp P, Lamonica DM, Loree TR, Lydiatt WM, McCaffrey J, Olson JA Jr., Ridge JA, Robbins R, Shah JP, Sisson JC, Thompson NW, National Comprehensive Cancer Network. Thyroid Carcinoma. *J Natl Compr Cancer Netw.*, 2005; 3: 404-457.
9. Bilimoria KY, Bentrem DJ, Ko CY, Stewart AK, Winchester DP, Talamonti MS, Sturgeon C. Extent of surgery affects survival for papillary thyroid cancer. *Ann Surg.*, 2007; 246: 375-384.
10. American Thyroid Association (ATA) Guidelines Taskforce on Thyroid Nodules and Differentiated Thyroid Cancer, Cooper DS, Doherty GM, Haugen BR, Kloos RT, Lee SL, Mandel SJ, Mazzaferri EL, McIver B, Pacini F, Schlumberger M, Sherman SI, Steward DL, Tuttle RM. Revised American Thyroid Association management guidelines for patients with thyroid nodules and differentiated thyroid cancer. *Thyroid.*, 2009; 19(11): 1167-214.
11. Shah JP. Re: Extent of surgery affects papillary thyroid cancer. *Ann Surg.*, 2008; 247: 1082-1083.
12. Shaha AR. Extent of surgery for papillary thyroid carcinoma: the debate continues: comment on “surgery for papillary thyroid carcinoma”. *Arch Otolaryngol Head Neck Surg.*, 2010; 136: 1061-1063.
13. Mendelsohn AH, Elashoff DA, Abemayor E, et al. Surgery for papillary thyroid carcinoma: is lobectomy enough? *Arch Otolaryngol Head Neck Surg.*, 2010; 136: 1055-1061.
14. Adam MA, Pura J, Gu L, Dinan MA, Tyler DS, Reed SD, Roman SA, Sosa JA. Extent of surgery for papillary thyroid cancer is not associated with survival: an analysis of 61,775 patients. *Ann Surg.*, 2014; 260(4): 601-607.
15. Haugen BR, Alexander EK, Bible KC, Doherty GM, Mandel SJ, Nikiforov YE, Pacini F, Randolph GW, Sawka AM, Schlumberger M, Schuff KG, Sherman SI, Sosa JA, Steward DL, Tuttle RM, Wartofsky L. 2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer: The American Thyroid Association Guidelines Task Force on Thyroid Nodules and Differentiated Thyroid Cancer. *Thyroid.*, 2016; 26(1): 1-133.