

Original Research Article

5-year analysis of thyroidectomies; a retrospective clinicopathological assessment of papillary carcinoma of thyroid in a coastal urban area

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ABSTRACT

Background: The aim of our study was to analyse thyroidectomies done past 5 years on a clinico pathological basis. Additionally, we also wanted to study the presence and characteristics of papillary carcinoma of thyroid.

Methods: Retrospective analysis of 57 patients who underwent thyroidectomy from 2012 to 2017 performed by Department of General Surgery of Sri Ramachandra Medical College (Chennai, India) was done and checked for statistical significance.

Results: In this 5-year study of 57 thyroidectomies, 17 patients had papillary carcinoma of thyroid, 1 patient had anaplastic carcinoma and another patient had a thyroid metastasis with unknown primary. The nonmalignant 38 patients were studied separately. Regarding malignancy, 29.4% had micro carcinoma. 35.3% were in Stage I. 94.1% were in Grade I, 94.1% had no angioinvasion. 15 patients (88.2%) had negative capsule invasion and negative lympho vascular invasion. 4 patients (23.5%) had extra thyroid extension. The observed difference in the characteristics were statistically not significant ($p>0.05$). The odds ratio for micro carcinoma of thyroid was 0.364. Most common clinical diagnosis among patients with benign disease was multinodular goiter and 16 (40%) patients had total thyroidectomy. 82.5% of patients had microscopic nodules on histopathology. The association between the surgery type and clinical diagnosis was statistically significant ($p<0.001$).

Conclusions: Statistical significance was noted between surgery type and clinical diagnosis. Papillary carcinoma of thyroid is not rare even in non endemic areas. The odds ratio for micro carcinoma thyroid is not significant but it does exist and post surgery, regular follow up is important.

Keywords: Clinicopathological Analysis, Papillary Carcinoma, Thyroidectomy

INTRODUCTION

Thyroid surgery was pioneered by surgeons such as Billroth, Kocher, Crile, Lahey and Dunhill.¹ Kocher performed 5,000 operations with a mortality rate of 0.5%.²

The main complications associated with thyroidectomy are hypoparathyroidism and recurrent laryngeal nerve. The prevalence of thyroid nodules varies from 4-8% in adults by palpation. Autopsy studies have shown a

prevalence of thyroid nodules in 50%.^{3,4} The prevalence increases in endemic areas, women and with increase of age. Only five percent of thyroid nodules will have cancer.⁵ The risk of malignancy does not differ either in solitary nodule or multinodular goiter. The prevalence of thyroid cancer (TC) is rising.⁶ Papillary thyroid carcinoma (PTC) is the most common thyroid cancer, it presents relatively as a low-grade malignancy with good prognosis, and a 10-year survival rate of over 90%. However, the clinical behaviors of this cancer are complex.

One specific type of this malignancy is thyroid microcarcinoma (TMC). According to the World Health Organization, TMC is defined as TC measuring ≤ 10 mm at its greatest dimension.⁶ The clinical and pathological significance of TMC is widely debated. This supports the hypothesis that the incidence of TC depends on the geographical region.⁷ It is common for TMC to be diagnosed upon histopathological examination after surgery that has been performed for presumed benign thyroid disease.⁸

In multinodular goiter (MNG), incidental TMC has been observed in 2-15.2% of cases.⁹ This specific type of thyroid tumor has been distinguished; these tumors are not evident clinically, are < 1 cm in diameter and are found after lymph node biopsy or as an incidental finding upon autopsy examinations.¹⁰ The tumors are described as occult TMC. The high incidence of TMC found upon autopsy studies (up to 35%) may suggest that the majority of these tumors exhibit benign behavior.¹¹ PTC is easily spreads via lymphatic ducts which results in recurrence, metastases, and even death.¹² The results of some studies show that the pathological type, staging, degree of extrathyroid invasion, lymph node metastatic rate, age, and initial surgery approach are related to thyroid cancer recurrence.^{13,14}

In this study we would like to share our experience in thyroid surgery at our institute, analyzing the various histopathologies of thyroidectomies including assessment of papillary carcinoma of thyroid with a search for micro carcinoma of thyroid.

The aim of the study was to perform a clinic-pathological analysis of thyroidectomies in a multi-specialty tertiary care centre in Chennai, India over a period of 5 years and to compare the HPE characteristics of benign and malignant pathologies of thyroid. The analysis includes throwing light specifically on papillary thyroid cancer with a sub-analysis of micro carcinoma of thyroid. It also aims at statistical correlation between clinical diagnosis of thyroid conditions and thyroid surgery performed.

METHODS

A retrospective study was performed analyzing patients who underwent thyroid surgeries for palpable goiters between 2012 and 2017. All patients had a thorough history analysis with complete physical examination including that of the neck also done. A clinical working diagnosis of malignancy or benign pathology was formulated on the case sheet.

Investigations included thyroid function tests with ultrasound neck followed by fine needle aspiration cytology (FNAC) and vocal cord assessment. After obtaining anesthesia fitness, patients underwent appropriate thyroid surgery. Benign pathology on FNAC underwent total or subtotal thyroidectomy. Cases confirmed as malignancy on FNAC or suspected so on

clinical grounds underwent total thyroidectomy with central compartment lymph node dissection. Solitary nodules underwent respective side lobectomy. Postoperative biopsy reports were reviewed, and the findings tabulated under two broad categories namely benign and malignant. Separate pathological assessment of each case under these two categories was done with comparison to clinical characteristics. The findings were tabulated, and statistical significance was assessed for each parameter.

Eligibility: Any patient with clinically palpable goitre within the study period presenting to the General Surgery Outpatient clinic.

Surgery performed: Total Thyroidectomy, Subtotal Thyroidectomy, Total Thyroidectomy with Central Lymph Node Dissection, Hemi thyroidectomy and Hartley-Dunhill Procedure.

RESULTS

Table 1: Demographic and HPE characteristics of papillary carcinoma of thyroid.

Characteristics	Frequency N=17	Percentage (%)
Age (years)		
≥ 45	11	64.7
< 45	6	35.3
Sex		
Male	10	58.8
Female	7	41.2
HPE		
Papillary	15	88.2
Follicular	2	11.8
HPE stages		
Stage I	6	35.3
Stage II	5	29.4
Stage III	1	5.9
Stage T4a	2	11.8
Stage IVB	2	11.8
Stage IVC	1	5.9
Grade		
Grade I	16	94.1
Grade II	1	5.9
Angio invasion		
Positive	1	5.9
Negative	16	94.1
Capsule invasion		
Positive	2	11.8
Negative	15	88.2
Lymphovascular invasion		
Positive	2	11.8
Negative	15	88.2
Lymph node status		
Not available(NA)	10	58.8
Involved	5	29.4
Free/ not involved	2	11.8

A total of 57 patients who underwent thyroid surgeries in stipulated study period were analysed. They were subdivided into 2 groups. Those with papillary carcinoma of thyroid and those without papillary thyroid carcinoma. Both groups were separately analysed for statistical significance.

5-year thyroidectomy analysis for papillary carcinoma and micro carcinoma of thyroid

In this 5-year study, 17 patients with papillary carcinoma of thyroid were identified. 11 (64.7%) patients were above 45 years of age and 6 (35.3%) were under 45 years. 10 patients (58.8%) were male and 7 (41.2%) were female. 15 patients (88.2%) were reported with pure papillary carcinoma and 2 (11.8%) were with follicular variant of papillary carcinoma. 6 patients (35.3%) were in Stage I and 5 (29.4%) were in Stage II as per HPE. Among 17 patients 16 (94.1%) were in Grade I, 16 (94.1%) had negative angio invasion, 15 (88.2%) had negative capsule invasion and 15 (88.2%) had negative lympho vascular invasion. Details are given in Table 1.

The details regarding further HPE characterisation of carcinoma of thyroid are given in Table 2. In this study out of 17 patients 5 (29.4%) had micro carcinoma. Among 17 patients in 11 (64.7%) the cancer was unifocal and in 6 (35.3%) it was multifocal. In this study out of 17 patients 4 (23.5%) had Extra Thyroid Extension (ETE).

Table 2: Particulars regarding the cancer characteristics.

Parameters	Frequency N=17	Percentage (%)
Micro carcinoma		
Positive	5	29.4
Negative	12	70.6
Focality		
Unifocal	11	64.7
Multifocal	6	35.3
Extrathyroid extension (ETE)		
Positive	4	23.5
Negative	13	76.5

The association between HPE findings and demographic characteristics of papillary carcinoma patients is given in Table 3. In comparison of HPE with demographic parameters, 10 patients above 45 years of age were found with papillary cancer. About nine male patients and six female patients were reported with papillary cancer.

About 14 patients of grade I were reported with papillary cancer. Among patients with papillary cancer 14 patients were reported with negative angio invasion, 13 patients were reported with negative capsule invasion and 13 patients were reported with negative LV invasion. However, the observed difference in the characteristics were statistically not significant (p>0.05).

Table 3: Comparison of HPE and tumour characteristics.

Demographic parameters	HPE		N= 17 (%)	ODDS ratio	P – value
	Papillary	Follicular variant of papillary carcinoma			
Age (years)					
≥ 45	10	1	11 (64.7)	2.00	0.643
<45	5	1	6 (35.3)		
Sex					
Male	9	1	10 (58.8)	1.50	0.787
Female	6	1	7 (41.2)		
Grade					
Grade I	14	2	16 (94.1)	0.933	0.707
Grade II	1	0	1 (5.9)		
Angio invasion					
Positive	1	0	1 (5.9)	0.933	0.707
Negative	14	2	16 (94.1)		
Capsule invasion					
Positive	2	0	2 (11.8)	0.867	0.585
Negative	13	2	15 (88.2)		
Lymphovascular invasion					
Positive	2	0	2 (11.8)	0.867	0.585
Negative	13	2	15 (88.2)		

The association between the HPE findings and tumour characteristics is given in Table 4. In this study out of 17 patients 5 of the HPE reports were positive for papillary micro carcinoma. Among papillary carcinoma patients 9

were unifocal and 2 were multifocal. 3 patients were positive for extra thyroid extension. However, the difference was statistically not significant.

Table 4: Comparison of HPE and tumour characteristics.

Demographic parameters	HPE		N= 17 (%)	ODDS ratio	P - value
	Papillary carcinoma	Follicular variant of papillary carcinoma			
Micro carcinoma					
Positive	4	1	29.4	0.364	0.496
Negative	11	1	70.6		
Focality					
Unifocal	9	6	88.2	0.606	0.266
Multifocal	2	0	11.8		
Extrathyroid extension					
Positive	3	1	23.5	0.250	0.347
Negative	12	1	76.5		

5-year Thyroidectomy analysis of non-papillary carcinoma thyroid pathologies

This study reports findings among 57 patients. The 17 cases of papillary carcinoma of thyroid were analysed separately in previous tables. The remaining non papillary carcinoma patients numbering 40 were studied separately below. The demographic characteristics of the

study is given in Table 5. In this study of 40 patients, 20 patients were above 45 years of age and 20 patients were below 45 years of age. 38 (95%) patients were female and 28 (70%) patients were found to have Multinodular goitre, the most common clinical diagnosis was MNG and 16 (40%) patients had total thyroidectomy. In this study 33 (82.5%) patients were microscopic nodules on HPE.

Table 5: Demographic characteristics of thyroidectomy patients.

Characteristics	Frequency N= 40	Percentage (%)
Age (years)		
≥45	20	50
< 45	20	50
Sex		
Male	2	5
Female	38	95
Clinical diagnosis		
Malignancy (other than papillary carcinoma thyroid)	3	7.5
Multinodular goitre	28	70.0
Solitary nodule of thyroid	9	22.5
Thyroidectomy type		
Total thyroidectomy	16	40
Subtotal thyroidectomy	12	30
Total + central neck lymph node dissection	1	2.5
Hemi thyroidectomy	9	22.5
Hartley dunhill surgery	2	5.0
HPE microscopic presentation		
Nodules	33	82.5
Calcification	4	10.0
Collagen tissue	1	2.5
Malignancy	2	5.0

The comparison of clinical diagnosis and type of surgery is given in Table 6. A significant difference was observed between the surgery type and clinical diagnosis. It was observed that a majority of multinodular goitre cases

underwent total and subtotal thyroidectomy, while only two underwent hemi thyroidectomy and Hartley Dunhill procedure. The association was statistically significant ($p < 0.001$).

Table 6: Comparison of surgery type and Clinical Diagnosis.

Surgery type	Clinical diagnosis			Total N =40(%)	P value
	Malignancy	Multi Nodular goitre	Solitary nodule thyroid		
Total thyroidectomy	2	12	2	16 (40)	0.0005
Subtotal	0	12	0	12 (30)	
Total +CLND	1	0	0	1 (2.5)	
Hemi Thyroidectomy	0	2	7	9 (22.5)	
Hartley dunhill procedure	0	2	0	2 (5)	

The comparison between the HPE microscopic findings and type of surgery is given in Table 7. It was observed that total thyroidectomy was the most preferred surgery for management of thyroid pathologies. However, a total

thyroidectomy with Central Neck Lymph Node Dissection (CLND) is the management choice for malignancies. The observed association was statistically significant ($p < 0.005$).

Table 7: Comparison of surgery type and HPE microscopic appearance.

Surgery type	HPE microscope				Total N =40 (%)	P value
	Nodules	Calcification	Collageno tissue	Cancer		
Total thyroidectomy	12	3	1	0	16 (40)	0.001
Subtotal thyroidectomy	11	1	0	0	12 (30)	
Total thyroidectomy + CLND	0	0	0	1	1 (2.5)	
Hemithyroidectomy	9	0	0	0	9 (22.5)	
Hartley dunhill procedure	1	0	0	1	2 (5)	

DISCUSSION

In our study of 57 thyroidectomies from 2012 to 2017, 17 were for papillary carcinoma of thyroid including papillary micro carcinoma and rest for non papillary carcinoma pathologies.

In patients with papillary carcinoma of thyroid, 11 (64.7%) patients were above 45 years of age. Majority of patients (58.8%) were male. 15 patients (88.2%) were reported with pure papillary carcinoma and 2 (11.8%) were with follicular variant of papillary carcinoma. 6 patients (35.3%) were in stage I. Among papillary carcinoma patients 94.1% were in Grade I, 94.1% had negative angio invasion, 88.2% had negative capsule invasion and negative lympho vascular invasion. Lymph node involvement was present in 5 patients. None of the micro carcinoma patients had lymph node involvement.

In the study of 40 patients without papillary carcinoma of thyroid, 20 patients were above 45 years of age. 38 (95%) patients were female and 28 (70%) patients were found to have Multinodular goiter. The most common clinical diagnosis was multinodular goitre and 16(40%) patients had total thyroidectomy.

In this study 33 (82.5%) patients had microscopic nodules on HPE. A significant difference was observed between the surgery type and clinical diagnosis. It was statistically significant ($p < 0.001$). It was observed that total thyroidectomy was the most preferred surgery for management of thyroid pathologies. However, a total thyroidectomy with Central Neck Lymph Node Dissection (CLND) is the management choice for malignancies. The observed association was statistically significant ($p < 0.005$).^{15,16}

CONCLUSION

To conclude, the initial surgery approach along with tumor size, extrathyroid invasion, lymph node metastases, angio and lymphovascular invasion may be related to PTC recurrence. However, opinions on the resection scope of PTC differ. Surgical indications and methods vary on a case-to-case basis. According to Untch et al, lobectomy for patients with low risk is suitable. Nixon et al demonstrated no difference in the 10-year survival rate of patients with low-risk highly differentiated thyroid carcinoma and those receiving lobectomy and total thyroidectomy. Enhanced follow-up and postoperative reexamination must be carried out in patients with papillary carcinomas.

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REFERENCES

1. Alam Hannan S. The magnificent seven: a history of modern thyroid surgery. *Int J Surg.* 2006;4:187-91.
2. McGreevy PS, Miller FA. Biography of Theodor Kocher. *Surgery.* 1969;65:990.
3. Wang C, Crapo LM. The epidemiology of thyroid disease and implications for screening. *Endocrinol Metab Clin N Am.* 1997;26:189-218.
4. Burguera B, Gharib H. Thyroid incidentalomas: prevalence, diagnosis, significance, and management. *Endocrinol Metab Clin N Am.* 2000;29:187-203.
5. Yeung MJ, Serpell JW. Management of solitary thyroid nodule. *Oncologist* 2008;13:105-12.
6. Elliott MS, Gao K, Gupta R, Chua EL, Gargya A, Clark J. Management of incidental and non-incidental papillary thyroid microcarcinoma. *J Laryngol Otol.* 2013;127(Suppl 2):S17-S23.
7. Solares CA, Penalonzo MA, Xu M, Orellana E. Occult papillary thyroid carcinoma in postmortem species: prevalence at autopsy. *Am J Otolaryngol.* 2005;26:87-90.
8. Yassa L, Cibas ES, Benson CB, Frates MC, Doubilet PM, Gawande AA, et al. Long-term assessment of a multidisciplinary approach to thyroid nodule diagnostic evaluation. *Cancer Cytopathology.* 2007;111(6):508-16.
9. Abdulmughni YA, Al-Hureibi MA, Al-Hureibi KA, Ghafoor MA, Al-Wadan AH, Al-Hureibi YA. Thyroid cancer in Yemen. *Saudi Med J.* 2004;25:55-59.
10. Pellegriti G, Scollo C, Lumera G, Regalbuto C, Vigneri R, Belfiore A. Clinical behavior and outcome of papillary thyroid cancers smaller than 1.5 cm in diameter: Study of 299 cases. *J Clin Endo Meta.* 2004;89:3713-20.
11. Küçük NO, Tari P, Tokmak E, Aras G. Treatment for microcarcinoma of the thyroid-clinical experience. *Clin Nucl Med.* 2007;32:279-81.
12. Giordano D, Frasoldati A, Kasperbauer JL, Gabrielli E, Pernice C, Zini M, et al. Lateral neck recurrence from papillary thyroid carcinoma: predictive factors and prognostic significance. *Laryngoscope.* 2014.
13. Londero SC, Krogdahl A, Bastholt L, Overgaard J, Trolle W, Pedersen HB, et al. Papillary thyroid microcarcinoma in Denmark 1996-2008: a national study of epidemiology and clinical significance. *Thyroid.* 2013;23(9):1159-64.
14. Ardito G, Revelli L, Giustozzi E, Salvatori M, Fadda G, Ardito F, et al. Aggressive papillary thyroid microcarcinoma: prognostic factors and therapeutic strategy. *Clin Nucl Med.* 2013;38(1):25-8.
15. Untch BR, Palmer FL, Ganly I, Patel SG, Michael Tuttle R, Shah JP, et al. Oncologic outcomes after completion thyroidectomy for patients with well-differentiated thyroid carcinoma. *Ann Surg Oncol.* 2014;21(4):1374-8.
16. Nixon IJ, Ganly I, Patel SG, Palmer FL, Whitcher MM, Tuttle RM, et al. Thyroid lobectomy for treatment of well differentiated intrathyroid malignancy *Surg.* 2012;151(4):571-9.

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