



A clinical study on the role of surgery in the management of papillary thyroid carcinoma at a Tertiary Care Center

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Abstract

Background: Papillary thyroid carcinoma (PTC) is the most common histological subtype of thyroid malignancy, accounting for the majority of differentiated thyroid cancers. Surgical intervention remains the cornerstone of treatment, with the extent of surgery determined by tumor characteristics, risk stratification, and presence of nodal involvement.

Objective: To analyze the clinical presentation, diagnostic modalities, surgical approaches, and outcomes in patients undergoing surgery for papillary thyroid carcinoma at a tertiary care surgical center.

Methods: This retrospective observational study was conducted in the Department of General Surgery, Major S. D. Singh Medical College, Farrukhabad, Uttar Pradesh, India, over a one year period from November 2016 to October 2017. Fifty patients diagnosed with PTC based on clinical, radiological, and histopathological criteria were included. Data regarding age, gender, presenting symptoms, thyroid function tests, ultrasound findings, fine needle aspiration cytology (FNAC), surgical procedures performed, histopathology, lymph node involvement, and postoperative outcomes were analyzed.

Results: The majority of patients were female (80 percent), and most were in the age group of 21–40 years. The most common presentation was a painless anterior neck swelling. All patients underwent thyroid ultrasonography and FNAC prior to surgery. Total thyroidectomy was performed in 76 percent of cases, while hemithyroidectomy was done in selected low-risk cases. Central neck dissection was performed in 28 percent of patients with clinically positive nodes. Postoperative histopathology confirmed PTC in all cases. Surgical complications were minimal, with transient hypocalcemia and recurrent laryngeal nerve paresis observed in a small percentage. No mortality was reported.

Conclusion: Surgery remains the definitive primary treatment for papillary thyroid carcinoma. Total thyroidectomy offers excellent outcomes in most patients, with lymph node dissection indicated in selected cases. Early diagnosis, accurate risk stratification, and meticulous surgical technique contribute significantly to favorable postoperative results.

Keywords: Papillary thyroid carcinoma, thyroid surgery, total thyroidectomy, neck dissection, FNAC, thyroid malignancy, surgical outcome

Introduction

Thyroid cancer is the most common endocrine malignancy, and among its various histological subtypes, papillary thyroid carcinoma (PTC) accounts for approximately 80 to 85 percent of all cases [1]. It is generally associated with an excellent prognosis, particularly when detected early and treated appropriately. Despite its relatively indolent nature, PTC has the potential for local recurrence and regional lymph node metastasis, necessitating a well-structured surgical and follow-up strategy [2].

The rising global incidence of papillary thyroid carcinoma over the past few decades has been attributed largely to improved diagnostic tools, particularly widespread use of high-resolution ultrasonography and fine needle aspiration cytology (FNAC) [3]. These advances have facilitated early detection of small, often asymptomatic thyroid nodules that were previously undiagnosed. In India, a significant number of thyroid cancer cases continue to present at tertiary centers, with neck swelling being the most common initial symptom [4].

Surgery remains the cornerstone of management for differentiated thyroid carcinomas, including PTC. The extent of thyroidectomy, whether hemithyroidectomy or total thyroidectomy, is guided by tumor size, multifocality, capsular invasion, extrathyroidal extension, and presence of

lymph node metastases. In cases with clinically positive lymphadenopathy, neck dissection may be indicated. Postoperative histopathological evaluation plays a key role in risk stratification and planning of further therapy, including radioactive iodine ablation [5].

In low-resource settings and non-endocrine specialist centers, general surgeons often manage thyroid cancers, making it essential to understand practical patterns in presentation, operative decision-making, and outcomes. Complications such as recurrent laryngeal nerve injury, hypoparathyroidism, and postoperative bleeding are concerns in thyroid surgery and must be addressed through skilled surgical technique and careful patient selection [6].

This study was conducted in the Department of General Surgery, Major S. D. Singh Medical College, Farrukhabad, Uttar Pradesh, India, to evaluate the clinical presentation, diagnostic approach, surgical management, and short-term outcomes in patients undergoing surgical treatment for papillary thyroid carcinoma from November 2016 to October 2017, a total of 50 patients diagnosed with PTC were reviewed. The study seeks to contribute institution-specific data to the growing body of literature on thyroid cancer management and assess the effectiveness of surgical strategies in this setting.

Materials and Methods

This retrospective observational study was conducted in the Department of General Surgery at Major S. D. Singh Medical College, Farrukhabad, Uttar Pradesh, India. The study aimed to evaluate the demographic characteristics, clinical features, diagnostic tools, surgical approaches, and immediate postoperative outcomes in patients with papillary thyroid carcinoma (PTC) managed surgically over a defined period.

The study included all patients who underwent surgery for histologically confirmed papillary thyroid carcinoma between November 2016 to October 2017. A total of 50 patients were identified from hospital surgical records, operation theatre logs, and pathology department archives. Patients with incomplete records, recurrent thyroid carcinoma, or other histological variants such as medullary or anaplastic carcinoma were excluded.

Data were extracted from case files, including age, sex, presenting complaints, duration of symptoms, thyroid function tests, neck ultrasonography findings, and FNAC reports. All patients underwent preoperative evaluation including serum TSH, triiodothyronine (T3), thyroxine (T4), and imaging as needed to assess local invasion or nodal disease. FNAC was used as the primary preoperative diagnostic modality to confirm the cytological diagnosis of PTC.

Based on tumor size, lobe involvement, and preoperative risk assessment, the decision regarding the extent of surgery was individualized. Patients underwent either hemithyroidectomy or total thyroidectomy. Central compartment lymph node dissection was performed in patients with clinically or radiologically suspected nodal metastasis. Intraoperative nerve monitoring was not routinely used; however, meticulous dissection was carried out to preserve the recurrent laryngeal nerve and parathyroid glands.

All surgeries were performed under general anesthesia by experienced surgeons in the department. Intraoperative and postoperative complications were noted, including recurrent laryngeal nerve injury, hypocalcemia, bleeding, and wound infection. Final histopathological reports were reviewed for tumor size, multifocality, capsular invasion, lymphovascular invasion, and lymph node metastasis.

Patients were monitored during hospital stay for clinical recovery and postoperative complications. Follow-up was done in the outpatient department to assess wound healing, thyroid hormone replacement, and any delayed complications. Data were entered in a structured format and analyzed using descriptive statistics. Categorical data were summarized as frequencies and percentages, while continuous variables were expressed as means. Associations between surgical extent and complications were analyzed descriptively without inferential statistics due to the modest sample size.

Results

The following tables present the clinical and surgical profiles of 50 patients with papillary thyroid carcinoma who underwent operative management, showing distributions across demographics, diagnostic findings, treatment modalities, and outcomes.

Table 1 demonstrates the age distribution of patients, with the majority between 21–40 years.

Table 1: Age Distribution of Patients with Papillary Thyroid Carcinoma

Age Group (years)	Number of Patients (n)	Percentage (%)
<20	3	6.0
21–30	11	22.0
31–40	15	30.0
41–50	13	26.0
>50	8	16.0
Total	50	100.0

Table 2 presents the gender distribution, revealing a predominant female involvement.

Table 2: Gender Distribution of Patients

Gender	Number of Patients (n)	Percentage (%)
Female	40	80.0
Male	10	20.0
Total	50	100.0

Table 3 outlines the clinical presentation, with anterior neck swelling as the most common symptom.

Table 3: Presenting Symptoms in Patients with Papillary Thyroid Carcinoma

Presenting Symptom	Number of Patients (n)	Percentage (%)
Neck swelling	42	84.0
Dysphagia	6	12.0
Hoarseness	3	6.0
Pain in swelling	4	8.0
Incidental finding	5	10.0

Table 4 illustrates FNAC results prior to surgery.

Table 4: FNAC Diagnosis in Study Population

FNAC Result	Number of Patients (n)	Percentage (%)
Papillary carcinoma confirmed	46	92.0
Suspicious for papillary neoplasm	4	8.0
Total	50	100.0

Table 5 summarizes the type of surgical procedure performed.

Table 5: Type of Surgical Procedure Performed

Procedure	Number of Patients (n)	Percentage (%)
Total thyroidectomy	38	76.0
Hemithyroidectomy	12	24.0
Total	50	100.0

Table 6 displays the use of central neck dissection based on nodal assessment.

Table 6: Central Neck Dissection Status

Neck Dissection Performed	Number of Patients (n)	Percentage (%)
Yes	14	28.0
No	36	72.0
Total	50	100.0

Table 7 highlights key histopathological findings observed postoperatively.

Table 7: Histopathological Features in Resected Specimens

Feature	Number of Patients (n)	Percentage (%)
Tumor size <2 cm	22	44.0
Tumor size ≥2 cm	28	56.0
Capsular invasion	11	22.0
Multifocal disease	9	18.0
Lymphovascular invasion	6	12.0

Table 8 presents postoperative complications observed during hospital stay.

Table 8: Postoperative Complications

Complication	Number of Patients (n)	Percentage (%)
Transient hypocalcemia	4	8.0
Transient recurrent nerve palsy	2	4.0
Wound infection	1	2.0
No complications	43	86.0

Table 9 provides final in-hospital outcomes following surgery.

Table 9: Outcome at Discharge

Outcome	Number of Patients (n)	Percentage (%)
Recovered without complications	43	86.0
Minor manageable complications	7	14.0
Mortality	0	0.0

Table 10 shows the follow-up status after 3 months of surgery.

Table 10: Follow-Up Status at 3 Months

Follow-Up Finding	Number of Patients (n)	Percentage (%)
No recurrence or residual mass	47	94.0
Residual cervical lymph node	2	4.0
Lost to follow-up	1	2.0

Discussion

Papillary thyroid carcinoma is the most common variant of differentiated thyroid cancer, and its management continues to evolve based on risk stratification, tumor biology, and surgical expertise. In the present study, conducted at a tertiary care center a total of 50 patients with histologically confirmed PTC underwent operative treatment. The results provide insights into demographic patterns, presentation, operative trends, histopathological features, and outcomes in this population [7, 8].

The majority of patients were female (80 percent), consistent with the well-established gender predilection of PTC. Estrogen receptor involvement in thyroid cells and hormonal influences have been suggested to contribute to the higher incidence in women. Most patients were in the third and fourth decades of life, which aligns with global and Indian data showing PTC as a malignancy commonly affecting young to middle-aged adults [9, 10]. Neck swelling was the predominant presenting symptom in 84 percent of

patients, and 10 percent were diagnosed incidentally, highlighting the growing role of routine imaging and FNAC in early detection. FNAC was diagnostic in 92 percent of cases, reflecting its high sensitivity and utility as the first-line investigation. However, in a small percentage, it remained indeterminate or suspicious, necessitating diagnostic surgery [11].

Total thyroidectomy was performed in 76 percent of cases, while hemithyroidectomy was considered appropriate in selected patients with low-risk features. This reflects adherence to guidelines recommending total thyroidectomy in multifocal, bilateral, or higher-risk tumors. Central neck dissection was performed in 28 percent of cases where nodal metastasis was suspected, which is important given the high propensity of PTC for regional lymph node involvement [12]. Histopathological analysis revealed that over half the tumors were larger than 2 cm, and 22 percent showed capsular invasion. Multifocality was noted in 18 percent, and lymphovascular invasion in 12 percent of patients. These features are known indicators of aggressive behavior and are considered when planning adjuvant therapy [13].

The surgical outcomes in this series were favorable, with no perioperative mortality and a low complication rate. Transient hypocalcemia and transient recurrent laryngeal nerve paresis were observed in 8 percent and 4 percent of patients, respectively. These complications are well-recognized in thyroid surgery, particularly when central neck dissection is performed [14]. No cases of permanent hypoparathyroidism or nerve injury were documented, indicating the adequacy of surgical technique.

At three-month follow-up, 94 percent of patients remained disease-free clinically and radiologically, while two patients had residual cervical lymphadenopathy. One patient was lost to follow-up. These findings reflect the effectiveness of surgical treatment when applied with proper case selection and technical precision [15].

This study reaffirms the central role of surgery in the management of papillary thyroid carcinoma. The decision regarding extent of surgery must balance oncologic safety with potential complications. In resource-limited settings, even general surgery departments can achieve good outcomes with sound clinical judgment, appropriate preoperative evaluation, and meticulous technique.

Conclusion

Surgical intervention remains the mainstay of treatment for papillary thyroid carcinoma, offering excellent prognosis when combined with early diagnosis and appropriate case selection. Total thyroidectomy is effective in the majority of patients, while hemithyroidectomy may be appropriate in selected low-risk cases. Central neck dissection should be considered in the presence of clinical or radiological lymph node involvement. In this study, surgical outcomes were favorable with minimal complications and no mortality. Careful surgical technique, accurate preoperative evaluation, and individualized treatment planning contribute significantly to the success of thyroid cancer management, even in general surgery settings.

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