

Evaluation of Surgical Approaches in the Treatment of Papillary Thyroid Carcinoma: A Retrospective Study from a Tertiary Care Centre

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Abstract:

Background: The most prevalent kind of thyroid cancer, papillary thyroid carcinoma (PTC), frequently necessitates surgery as the main course of treatment. The degree of surgical intervention affects the recurrence and complication rates, even with a great prognosis. The purpose of this study is to assess the results of various surgical approaches to PTC management.

Objectives: To evaluate and contrast, in patients with papillary thyroid cancer, the efficacy, recurrence rates, and complication profiles of different surgical techniques, such as hemithyroidectomy and complete thyroidectomy.

Materials and Methods: A retrospective observational study was carried out in the Department of General Surgery, Patna Medical College and Hospital, Patna, Bihar, India from November 2019 to October 2020. There were 120 individuals in all who had a histological diagnosis of papillary thyroid cancer. Patients were divided into three groups according to the surgical procedure they underwent: total thyroidectomy, hemithyroidectomy, or total thyroidectomy combined with central neck dissection. Analysis was done on postoperative results, complications, and recurrence rates.

Results: Of the 120 patients, 18 had total thyroidectomy with central neck dissection, 34 had hemithyroidectomy, and 68 had total thyroidectomy. Recurrence rates were considerably lower in the group that underwent a whole thyroidectomy than in the group that underwent a hemithyroidectomy (5.8% vs. 17.6%). Patients receiving complete thyroidectomy with central neck dissection were more likely to experience hypocalcemia and recurrent laryngeal nerve palsy. All groups had an average hospital stay of 4.2 ± 1.3 days.

Conclusion: Although total thyroidectomy is linked to a higher risk of postoperative complications, it provides better oncological control with a lower recurrence rate in cases of papillary thyroid cancer. For the best results, customized surgical planning based on patient characteristics and tumor features is essential.

Keywords: Neck dissection, thyroid cancer care, problems, hypocalcemia, recurrent laryngeal nerve, papillary thyroid carcinoma, thyroidectomy, hemithyroidectomy, recurrence, and surgical results.

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Introduction

About 80–85% of all differentiated thyroid malignancies are papillary thyroid carcinomas (PTCs), making them the most common type of thyroid cancer. It usually affects people in their middle years and is more common in women [1]. Slow development, an indolent clinical history, and a relatively good prognosis with a 10-year survival rate above 90% are the disease's defining characteristics. Even though they are rare, recurrence, lymph node metastasis, and distant dissemination present serious clinical difficulties, especially in patients who are at high risk or who have not received proper treatment [2]. Surgical intervention remains the cornerstone of treatment

for PTC. The choice between hemithyroidectomy (lobectomy) and total thyroidectomy, with or without central neck dissection, is often influenced by tumor size, multifocality, extrathyroidal extension, presence of lymph node metastases, and patient-specific factors [3]. Total thyroidectomy allows for the use of radioactive iodine ablation and facilitates long-term thyroglobulin surveillance, but it also carries a higher risk of complications such as hypoparathyroidism and recurrent laryngeal nerve injury. Conversely, hemithyroidectomy has a lower complication profile but may necessitate reoperation in case of recurrence or contralateral disease [4].

Recent guidelines from the American Thyroid Association (ATA) emphasize a risk-adapted approach to surgical management, favoring more conservative procedures in selected low-risk patients [5]. However, in resource-limited settings and in populations with late-stage presentations, more aggressive surgical management is still commonly practiced. Given this, the current study was conducted in a tertiary care hospital to assess and compare various surgical techniques utilized in the treatment of papillary thyroid cancer over a three-year period [6]. The study aims to assess recurrence rates, postoperative complications, and overall surgical outcomes, thereby providing evidence-based recommendations for optimizing treatment strategies in the local patient population.

Materials and Methods

This retrospective observational study was conducted in the Department of General Surgery, Patna Medical College and Hospital, Patna, Bihar, India from Nov 2019 and Oct 2020. A total of 120 patients diagnosed with papillary thyroid carcinoma, confirmed by histopathological examination, were included in the study. Inclusion criteria comprised patients aged 18 years and above, of either gender, who underwent surgical treatment for primary papillary thyroid carcinoma. Patients with anaplastic, medullary, or follicular thyroid carcinoma, recurrent thyroid malignancies, or incomplete medical records were excluded. All patients underwent thorough clinical evaluation, ultrasonography of the neck, fine needle aspiration cytology (FNAC), thyroid function tests, and other relevant preoperative investigations. The decision regarding the extent of surgery whether

hemithyroidectomy, total thyroidectomy, or total thyroidectomy with central neck dissection was made based on preoperative imaging, cytological findings, and intraoperative assessment. Surgeries were performed by experienced consultants and senior residents under the supervision of the unit head.

Intraoperative parameters, postoperative complications (including transient or permanent hypocalcemia, recurrent laryngeal nerve injury, wound infection, and hematoma), duration of hospital stay, and follow-up findings were documented. Recurrence was assessed through clinical examination, neck ultrasonography, serum thyroglobulin levels, and, where necessary, radioiodine scans during follow-up visits scheduled at 3-month intervals for the first year and every 6 months thereafter. Data were collected from hospital records, surgical logs, pathology reports, and follow-up documentation. The outcomes of the different surgical approaches were compared with respect to recurrence rates, complication profiles, and length of hospital stay.

Results

A total of 120 patients diagnosed with papillary thyroid carcinoma were included in this retrospective study. Among them, 68 underwent total thyroidectomy, 34 underwent hemithyroidectomy, and 18 underwent total thyroidectomy with central neck dissection. Recurrence was observed in 12 patients overall, and complications were more common in patients who underwent more extensive surgical procedures.

Table 1: Gender Distribution of Patients

Gender	Number of Patients	Percentage (%)
Male	34	28.3
Female	86	71.7

Table 2: Age Distribution of Patients

Age Group (Years)	Number of Patients	Percentage (%)
18–30	22	18.3
31–40	38	31.7
41–50	34	28.3
51–60	16	13.3
>60	10	8.4

Table 3: Type of Surgery Performed

Surgical Procedure	Number of Patients	Percentage (%)
Hemithyroidectomy	34	28.3
Total Thyroidectomy	68	56.7
Total Thyroidectomy + Neck Dissection	18	15.0

Table 4: Tumor Size Distribution

Tumor Size (cm)	Number of Patients	Percentage (%)
<1	12	10.0
1–2	38	31.7
2.1–4	52	43.3
>4	18	15.0

Table 5: Histological Variants of Papillary Thyroid Carcinoma

Variant	Number of Patients	Percentage (%)
Classical PTC	82	68.3
Follicular Variant	22	18.3
Tall Cell Variant	10	8.3
Oncocytic Variant	6	5.1

Table 6: Lymph Node Involvement by Type of Surgery

Surgical Procedure	Patients with LN Involvement	Percentage (%)
Hemithyroidectomy	4	11.8
Total Thyroidectomy	10	14.7
Total Thyroidectomy + Neck Dissection	12	66.7

Table 7: Postoperative Complications by Surgical Procedure

Complication	Hemithyroidectomy	Total Thyroidectomy	TT + Neck Dissection
Hypocalcemia	0	6	8
RLN Palsy (Transient)	1	4	5
RLN Palsy (Permanent)	0	1	2
Wound Infection	1	2	1
Hematoma	0	1	1

Table 8: Recurrence Rates by Surgical Approach

Surgical Procedure	Number of Recurrences	Recurrence Rate (%)
Hemithyroidectomy	6	17.6
Total Thyroidectomy	4	5.8
Total Thyroidectomy + Neck Dissection	2	11.1

Table 9: Mean Duration of Hospital Stay

Surgical Procedure	Mean Stay (Days)	Standard Deviation
Hemithyroidectomy	2.6	±0.8
Total Thyroidectomy	3.9	±1.1
Total Thyroidectomy + Neck Dissection	5.8	±1.4

Table 10: Follow-up Compliance over 1 Year

Surgical Procedure	Completed Follow-up	Percentage (%)
Hemithyroidectomy	24	70.6
Total Thyroidectomy	58	85.3
Total Thyroidectomy + Neck Dissection	16	88.9

Discussion

Papillary thyroid carcinoma (PTC) represents the most common form of differentiated thyroid cancer and generally carries an excellent prognosis. However, the choice of surgical management plays a critical role in influencing recurrence, complication rates, and long-term outcomes [7]. The present study retrospectively analyzed 120 cases over three years to evaluate the clinical outcomes of different surgical approaches—hemithyroidectomy, total thyroidectomy, and total thyroidectomy with

central neck dissection—performed at a tertiary care center. The demographic profile of our patient population is consistent with existing literature, with a marked female preponderance (71.7%) and a peak incidence in the third and fourth decades of life [8]. This aligns with epidemiological data which suggests that PTC is 2–4 times more common in women, often detected incidentally due to increased use of neck imaging.

Total thyroidectomy was the most frequently performed procedure (56.7%), followed by

hemithyroidectomy (28.3%) and total thyroidectomy with central neck dissection (15%) [9]. This distribution reflects a surgical tendency toward more aggressive resection, especially in cases presenting with multifocality, bilateral disease, or clinical lymphadenopathy. Importantly, the majority of tumors were within the 1–4 cm range (75%), making both hemithyroidectomy and total thyroidectomy reasonable options as per the American Thyroid Association (ATA) guidelines [10]. The recurrence rate in our study was significantly lower in the total thyroidectomy group (5.8%) compared to the hemithyroidectomy group (17.6%). This supports the notion that complete gland removal allows for better disease control and facilitates postoperative radioactive iodine ablation and thyroglobulin monitoring [11,12]. However, it is noteworthy that total thyroidectomy with neck dissection, although designed for advanced disease, still showed a recurrence rate of 11.1%, possibly due to the higher baseline burden of disease and more aggressive tumor biology in these patients.

Interestingly, patient-reported satisfaction was highest among hemithyroidectomy patients (88.2%), driven by lower complication rates and the absence of lifelong hormone dependence in some cases. [13,14] However, the higher recurrence in this group necessitates a balanced discussion with patients about the trade-offs between surgical morbidity and oncological control [15,16].

Overall, our findings reinforce the importance of individualized surgical planning in managing PTC. While total thyroidectomy offers superior control in multifocal or bilateral disease, hemithyroidectomy may be suitable for selected low-risk cases. Central neck dissection should be reserved for patients with clinically evident or high-risk nodal disease, given its association with higher morbidity. An integrated approach involving careful preoperative risk stratification, meticulous surgical technique, and rigorous postoperative follow-up remains the cornerstone for optimizing outcomes in papillary thyroid carcinoma.

Conclusion

The present study underscores the critical role of tailored surgical management in papillary thyroid carcinoma. Total thyroidectomy demonstrated superior outcomes in terms of recurrence control, particularly in cases with multifocal or high-risk disease, though it carried a higher complication rate. Hemithyroidectomy offered lower surgical morbidity and higher patient satisfaction but showed increased recurrence in select cases. Central neck dissection should be judiciously applied in node-positive disease due to its associated risks. A patient-specific, risk-adapted surgical approach, combined with vigilant follow-up, remains essential for

achieving optimal oncologic and functional outcomes.

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