Case Report

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Recent Advances in Clinical Trials

Controversies Regarding Total Thyroidectomy in Papillary Thyroid Carcinoma

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ABSTRACT

Background: *In papillary thyroid carcinoma (1–4 cm, low risk, intrathyroidal), hemithyroidectomy is recommended as a less invasive alternative to total thyroidectomy. However, postoperative follow-up is more complex and makes it difficult to detect recurrences, contralateral, or nodal metastases, which may require reoperations.*

Objective: *To evaluate the incidence of multifocality, bilaterality, or lymph node metastases in patients with a preoperative diagnosis of uninodular goiter <4 cm, Bethesda category V or VI, without clinical or ultrasound evidence of contralateral or nodal disease.*

Design and Methods: *Retrospective study (June 2020–June 2025) conducted at two hospitals in Vicente López (one public and one private). Patients who underwent hemithyroidectomy or total thyroidectomy were analyzed, recording clinical data, preoperative studies, type of surgery, and postoperative diagnosis. Cases with lymphocytic thyroiditis or central nodules were excluded.*

Results: *Among the 88 patients included, 25 (28.4%) presented multifocality, bilaterality, or lymph node involvement in the postoperative diagnosis.*

Conclusions: *In Bethesda V and VI cases, total thyroidectomy appears to be the most appropriate strategy, as it reduces the risk of recurrence, facilitates follow-up, and avoids the high cost of additional studies in patients with a remaining thyroid lobe.*

Keywords

Thyroid carcinoma, Papillary carcinoma, Thyroidectomy.

Introduction

Currently, new trends in the management of papillary thyroid carcinoma measuring 1 to 4 cm, low-risk, and intrathyroidal, are based on hemithyroidectomy. This procedure, which is less aggressive than total thyroidectomy, is followed by postoperative monitoring of the remaining lobe. However, it is important to note that this recommendation has generated debate, as follow-up becomes more challenging. This less aggressive approach, known as "active surveillance," makes it more difficult to detect recurrences, contralateral intrathyroidal or nodal metastases, which may require future reoperations, with the associated morbidity of reoperating on a previously operated neck.

Materials and Methods

We conducted a retrospective analysis of patients who underwent scheduled hemithyroidectomy, subtotal thyroidectomy, or total thyroidectomy, with a postoperative diagnosis of bilateral papillary thyroid carcinoma or lymph node metastases. All surgeries were performed under general anesthesia by the same surgical team. Collected data included demographic information, preoperative diagnosis, ultrasound findings, additional preoperative studies (CT

scan, scintigraphy, fiberoptic laryngoscopy), laboratory results (thyroid hormones and antibodies), type of surgery performed, and postoperative pathology. A total of 88 patients were included, of whom 25 had bilateral, multicentric papillary carcinoma or lymph node metastases.

Inclusion Criteria

- Uninodular goiter with a single nodule ≤4 cm, Bethesda V or VI on fine-needle aspiration (FNA), no clinical or ultrasonographic evidence of contralateral nodules or lymph node involvement, and no macroscopic extrathyroidal or distant disease.
- Patients with preoperative benign or indeterminate cytology who met the above criteria based on intraoperative or postoperative findings.

Exclusion Criteria

- Nodules >4 cm
- Contralateral nodules or lymph node involvement
- Macroscopic extrathyroidal extension
- Distant metastases
- Preoperative diagnosis of lymphocytic thyroiditis

Surgical procedures included right or left hemithyroidectomy, subtotal thyroidectomy (hemithyroidectomy + isthmectomy), or total thyroidectomy, all performed via conventional cervicotomy. Prophylactic central neck dissection was performed only in cases with positive lymphadenopathy detected preoperatively or intraoperatively.

Pathological analysis provided tumor size, focality, histological type, lymph node status, lymph node metastases, lymphovascular invasion, perineural invasion, capsular infiltration, surgical margins, and presence of tall cells (associated with aggressive variants).

Recurrence risk was classified according to the 2009 American Thyroid Association (ATA) guidelines:

- Low risk: Intrathyroidal papillary carcinoma <4 cm, classic variant, no vascular invasion, N0, <5 micrometastases (<2 mm), follicular carcinoma with capsular invasion or minimal vascular invasion (<4 vessels)
- Intermediate risk: Papillary carcinoma with vascular invasion, follicular carcinoma with vascular invasion, microscopic extrathyroidal extension, N1 (≥5 nodes, all <3 cm), or aggressive histology (>30% tall cells)
- High risk: Macroscopic extrathyroidal extension, incomplete tumor resection, distant metastases, or lymph node >3 cm

Results

Between June 2020 and June 2025, a total of 88 thyroid surgical procedures were performed (Figure 1), all via conventional cervicotomy. These included: 72 (81.8%) total thyroidectomies, 13 (14.8%) hemithyroidectomies, and 3 (3.4%) subtotal thyroidectomies.

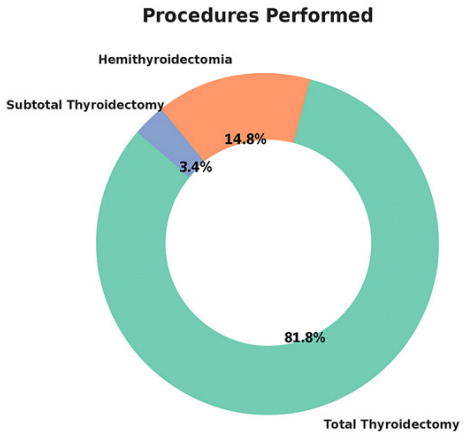


Figure 1: Surgical Procedures Performed.

The mean patient age was 58 years, with 84.1% female (74/88) and 15.9% male (14/88) (Figure 2). Preoperative ultrasonography identified 43.2% (35/88) right-sided nodules and 12.4% (10/88) left-sided nodules (Figure 3). In cases of uninodular goiter, the median maximal nodule size was 2 cm (mean 2.47 cm).

Figure 2: Demographic Data.

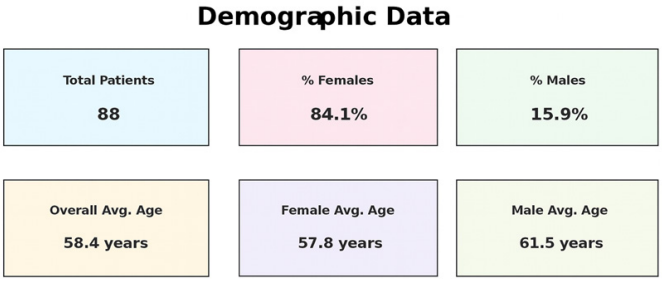
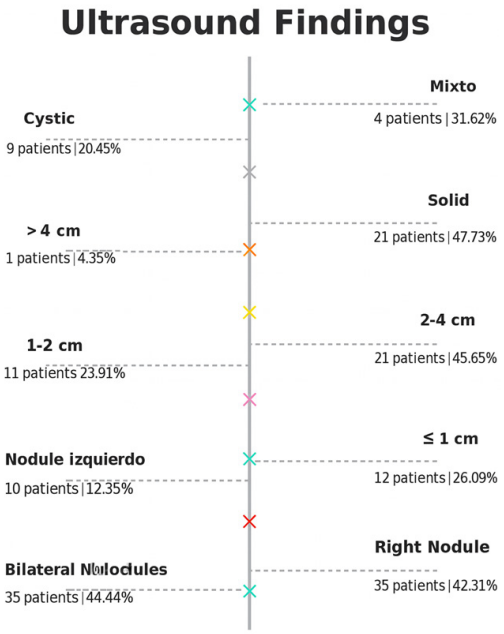


Figure 3: Ultrasound Findings.



Nodule composition on ultrasonography was predominantly solid in 47.7% (21/44), mixed in 31.8% (14/44), and cystic in 20.5%

(9/44). Fine-needle aspiration (FNA) was performed in 63.6% (56/88) of patients, with Bethesda categories distributed as follows (Figure 4): I, 3.6% (2/56); II, 66.1% (37/56); III, 3.6% (2/56); IV, 12.5% (7/56); V, 5.4% (3/56); VI, 8.9% (5/56).

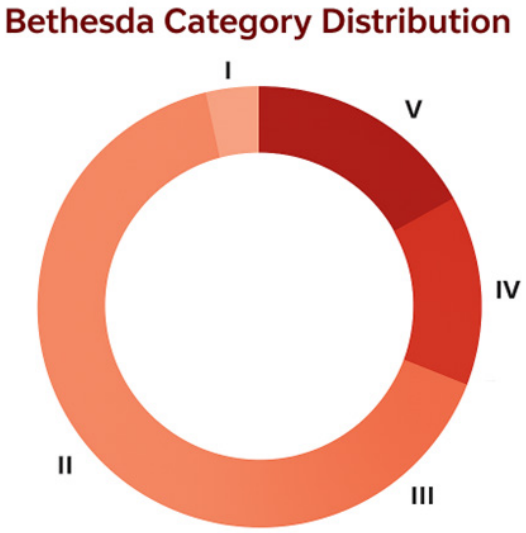


Figure 4: Preoperative Category According to Bethesda Classification.

Postoperative diagnosis revealed multifocal papillary thyroid carcinoma or lymph node metastasis in 25 patients (28.4%). All such patients underwent total thyroidectomy. The mean age at diagnosis was 57.2 years, with 80% female (20/25) and 20% male (5/25) (Figure 5).

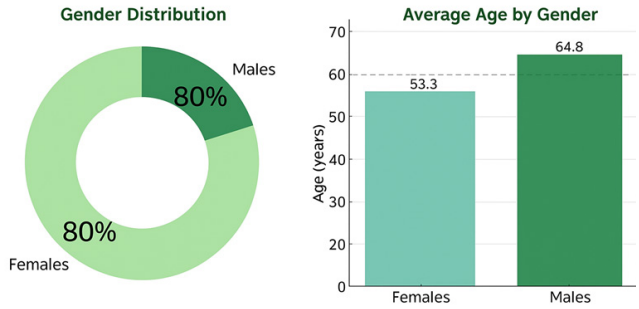


Figure 5: Demographic Data of Patients with Postoperative Diagnosis of Multifocal Papillary Carcinoma or Lymph Node Involvement.

In patients with preoperative uninodular goiter (n=23), the median maximal nodule size was 1 cm (mean 1.67 cm), with 76% located in the right lobe. Nodules ≤1 cm accounted for 52.2% (12/23), and 78.3% (18/23) were predominantly solid (Figures 6,7). A prior history of thyroiditis was reported in 16% (4/25).

TNM staging showed 44% (11/23) T1a and 32% (8/23) T1b tumors. Lymph node involvement was present in 56% (14/23), with 48% (12/23) classified as N1a and 8% (2/23) as N1b; 44% (11/23) had no nodal involvement. No distant metastases were observed. Stage distribution was: stage I, 64% (16/23); stage II, 32% (8/23); stage III, 4% (1/23) (Figure 8). According to the ATA recurrence risk classification, 82.1% (23/28) of patients were at intermediate risk, 10.7% (3/28) at high risk, and 7.1% (2/28) at low risk (Figure 9).

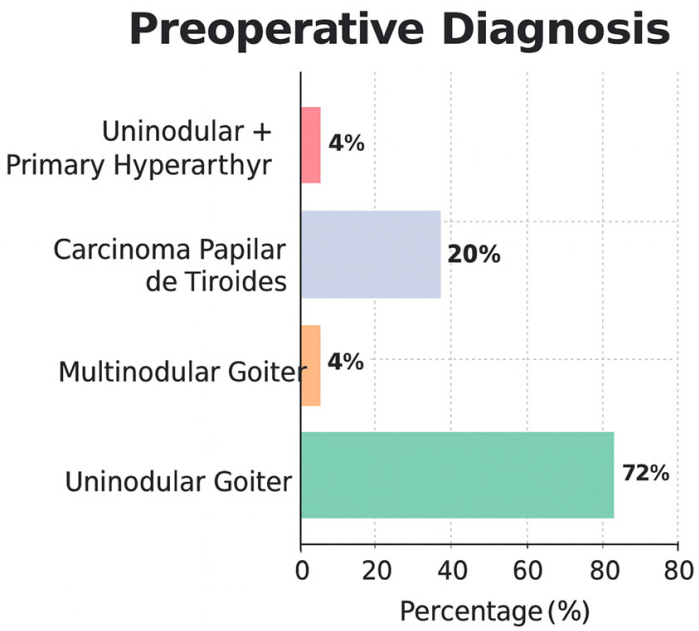


Table 6: Preoperative Diagnosis – Surgical Indication in Patients with Postoperative Diagnosis of Multifocal Papillary Carcinoma or Lymph Node Involvement.

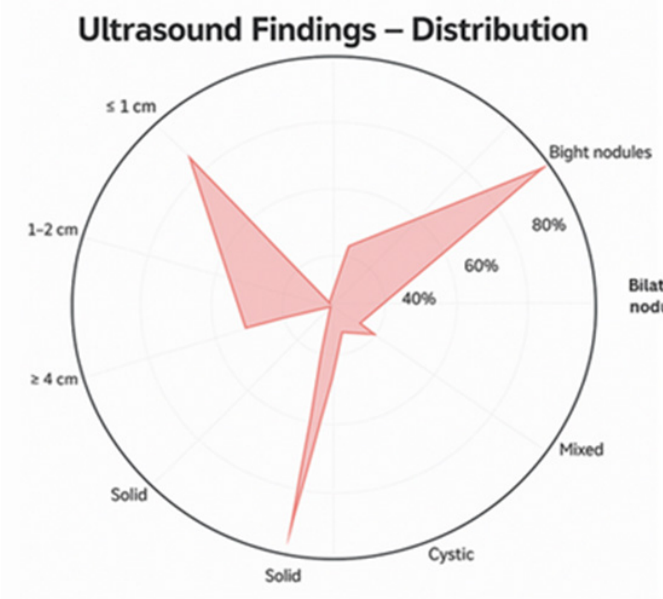


Figure 7: Ultrasound Findings in Patients with Postoperative Diagnosis of Multifocal Papillary Carcinoma or Lymph Node Involvement.

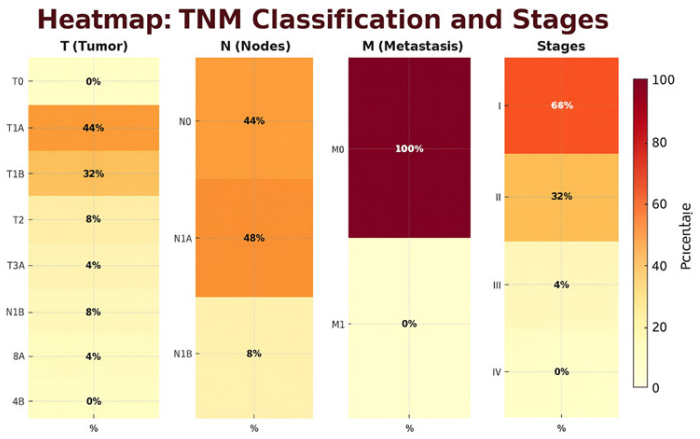


Figure 8: TNM Classification and Staging.

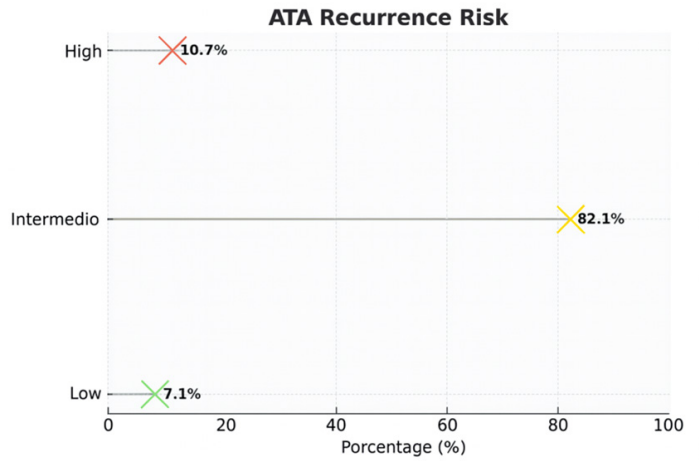


Figure 9: Classification of Patients with Postoperative Diagnosis of Multifocal Papillary Carcinoma or Lymph Node Involvement Based on Recurrence Risk According to the American Thyroid Association.

Discussion

Current management of differentiated thyroid carcinoma recommends hemithyroidectomy as the first-line surgical approach for low-risk tumors measuring 1–4 cm. This procedure is less invasive than total thyroidectomy and is associated with lower morbidity; however, it requires active surveillance of the remaining thyroid lobe. This strategy carries the risk of leaving undetected contralateral lesions or metastases [1].

In our cohort, 28.4% of patients who could have met criteria for hemithyroidectomy based on current guidelines presented with multifocal disease and micrometastases not identified on preoperative imaging, highlighting potential limitations of minimal surgery in real-world practice [2,3]. Although some studies report no significant differences in long-term outcomes between lobectomy and total thyroidectomy [4,5], careful patient selection remains critical. The American Thyroid Association (ATA) provides criteria for defining low-risk tumors suitable for hemithyroidectomy [6].

Evidence suggests that 30–59% of patients initially treated with lobectomy may require completion thyroidectomy based on final pathology, which aligns with our findings. Molecular testing can aid in risk stratification but is often limited by high cost and restricted availability [1,7].

Minimal extrathyroidal extension is considered low risk by the American Joint Committee on Cancer (AJCC, 8th edition). Nevertheless, multifocality has been reported in 13–71% of cases, and it correlates with increased recurrence risk. Total thyroidectomy may be justified in the presence of vascular invasion, involvement of multiple vessels, or a high proportion of tall-cell variant histology. However, these parameters are often not assessable intraoperatively in either public or private settings [8,9].

Differentiated thyroid carcinomas exhibit recurrence rates of 5–20% and regional or distant lymph node metastases in 10–20% of cases [9]. Long-term data indicate 10-year recurrence rates of 4.6% for T1a tumors and 7.1% for T1b tumors, with lymph node metastases observed in 13% and 25%, respectively [10-12].

Successful outcomes with minimally invasive surgery depend on rigorous preoperative patient selection [2]. In our series, 16% of patients had a history of thyroiditis, diagnosed by fine-needle aspiration or laboratory evaluation, which contraindicates hemithyroidectomy due to residual diseased tissue. Hashimoto's thyroiditis is associated with chronic inflammation and a 45% increased risk of malignancy in clinically significant nodules [12-14].

For nodules >1 cm with Bethesda V–VI cytology, total thyroidectomy is the preferred strategy, providing comprehensive disease control and reducing recurrence risk. Active surveillance entails costly diagnostic procedures that may not be universally accessible. Monitoring with suppressed thyroglobulin levels is more practical and widely available than recombinant TSH, PET imaging, or molecular testing. Ultrasound assessment of a residual lobe is operator-dependent and may be confounded by postoperative changes, granulomas, or calcifications, while iodine scintigraphy is non-specific and limited in the presence of a remaining lobe.

The Spanish Society of Endocrinology and Nutrition (SEEN) recommends lobectomy and isthmectomy for low-risk papillary carcinomas (<1 cm, unifocal, no nodal involvement, benign histology, and no aggressive variants). For moderate- or high-risk cases, or when postoperative pathology reveals more extensive disease than initially anticipated, total or near-total thyroidectomy is advised [13-15].

Current guidelines support individualized treatment. In low-risk patients, radioactive iodine therapy may be unnecessary, whereas it remains indicated in persistent or high-risk disease [15-19]. Intraoperative frozen-section pathology is often inconclusive, requiring surgeons to base decisions on experience, patient context,

and lesion characteristics. Final pathology, including capsular invasion, lymphovascular emboli, perineural invasion, or mitotic index, is usually available three weeks postoperatively, which can complicate reoperation decisions. Repeat surgery carries increased morbidity and patient burden, particularly in previously operated necks.

Lenvatinib® has been used neoadjuvantly for advanced or recurrent disease; however, its high cost and the question of whether initial surgery was oncologically sufficient highlight the importance of optimal primary surgical management [20].

Conclusion

While international classifications define carcinoma risk, clinical, anatomical, and socioeconomic factors must be central to decision-making. The pathogenesis of multifocal intrathyroidal lesions in papillary carcinoma remains debated, particularly regarding whether they represent intrathyroidal metastases or independent primary tumors, warranting further study.

In our public and private practice settings, total thyroidectomy remains the gold standard for tumors >1 cm or when nodal involvement or secondary foci are present. This approach allows comprehensive disease management, reduces the risk of recurrence, and provides more reliable follow-up, particularly in contexts where advanced imaging or molecular testing may not be readily accessible.

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