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Total Thyroidectomy Versus Hemi-Thyroidectomy in Management of Follicular Lesion Thyroid Nodule

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Abstract

Background: Thyroid nodules are common condition. It is estimated that 3% to 7% of world population have palpable thyroid nodules, and this prevalence might reach 76% when US is used as a screening tool. When a thyroid nodule is detected, the most important step in the assessment is to determine if it is malignant or not, which is determined via fine needle aspiration biopsy (FNAC). It is accepted that approximately 5% of all nodules are malignant.

Aim of Study: To determine the optimal surgical strategy for individuals undergoing surgery for follicular lesion thyroid nodule on preoperative fine needle aspiration biopsy (FNA).

Patients and Methods: This was a comparative prospective randomized study conducted on a total of 52 patients diagnosed with follicular lesion thyroid nodule. They will be chosen form Ain Shams University Hospital, El-Demerdash and Damietta Cancer Institute (DCI) after obtaining the approval from ethical committee of the department of surgery, Faculty of Medicine, Ain Shams University.

Results: Overall rate of malignancy in follicular lesion thyroid nodule is 34.6% of the studied cases. The higher rate of malignancy was among patients older than 45 years. Clinical and demographic data are not significant in expecting malignant nodules. Only TIDADS 5 category in radiological assessment is the item of statistical significance in expecting malignant pathology. Nodule size has no benefit in detecting malignancy and, consequently, deciding the proper procedure for management. Hemithyroidectomy is significantly shorter in time and lesser in pain than total thyroidectomy. No permanent complications were reported in the studied cases. In total thyroidectomy group, tracheostomy and hypocalcemia were detected in two patients, one for each, and two patients were presented with hoarseness of voice and all of them were completely resolved within three months postoperatively. Period of hospital stay, post-operative wound infection and time of drain removal had no additive advantage for either groups. 55.6% of the malignant cases underwent hemithyroidectomy and so, second operation was necessary to complete the surgical management while 52.5% of benign cases underwent total thyroidectomy which was considered on overtreatment.

Conclusion: In our study, we concluded that hemithyroidectomy was an adequate management option in the majority of the studied cases. TIRADS 5 category of ultrasound assessment is the only significant factor that could be relied on to suspect malignancy in a follicular lesion thyroid nodule on FNAC and so total thyroidectomy could be considered in such patients. Hemithyroidectomy was significantly lesser in operative time and pain than total thyroidectomy. In our study, no clinical or demographic data are significant in suspecting malignancy in follicular lesion thyroid nodule. The major challenge in the management of a follicular lesion thyroid nodule remains the assessment as to which nodule requires surgical intervention and which can be followed conservatively. New diagnostic tools are needed to decrease the number of operations performed for benign pathology in patients with a needle biopsy diagnosis of follicular lesion. Finally, the management of follicular lesion thyroid nodule still an area of debate.

Key Words: *Fine needle aspiration biopsy – Follicular lesion thyroid nodule – Hemithyroidectomy – Total thyroidectom.*

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Introduction

THYROID nodules are common condition. It is estimated that 3% to 7% of world population have palpable thyroid nodules, and this prevalence might reach 76% when US is used as a screening tool **[1,2]**.

When a thyroid nodule is detected, the most important step in the assessment is to determine if it is malignant or not, which is determined via fine needle aspiration biopsy (FNAC). It is accepted that approximately 5% of all nodules are malignant **[3]**.

However, in 15-20% of nodules assessed with FNAC, it is too difficult to determine the true condition of the malignancy or benignity until the histologic diagnosis is performed after surgical excision **[4]**. So, they are categorized as follicular pattern, lesion or undetermined nodule **[1]**.

Thyroid cancer is the most common endocrine malignancy, accounting for ~2.1% of all cancer diagnoses worldwide, with ~77% of these diagnoses occurring in women [5]. Approximately 90% of all thyroid cancers are differentiated. Papillary thyroid carcinoma (PTC) is the most common histological type of differentiated thyroid cancer (accounts for approximately 80%), followed by follicular thyroid carcinoma which accounts for approximately 10% of thyroid carcinomas [6,7].

The distinction between follicular adenoma (FA) and FTC is based on traditional criteria of malignancy, namely a presence of capsular or vascular invasion [6,8]. The ratio of follicular adenoma to follicular carcinoma in surgical specimen is approximately 5 to 1. Follicular carcinoma has microscopic features that are similar to a follicular adenoma, so FNAC cannot distinguish follicular adenoma from follicular carcinoma on the bases of cytological analysis as it cannot detect capsular and vascular invasion [6]. It is suggested that vascular invasion may be a better indicator of more aggressive malignancy than capsular invasion alone [6,8,9].

Lobectomy with isthmectomy is the minimal accepted therapeutic procedure for patients with follicular lesion [4]. However, it has some disadvantages, such as the need to reoperate if the postoperative pathology confirms a malignancy, the obligation to perform a U/S follow-up of the remnant lobe and the later risk of reoperation if another suspicious nodule appears in this lobe, which could reach 50% at 10 years. As a result, some authors have suggested the performance of a total thyroidectomy based on the elimination of possibility of reoperation and US follow-up [1].

Aim of the work:

To determine the optimal surgical strategy for individuals undergoing surgery for follicular lesion thyroid nodule on preoperative fine needle aspiration biopsy (FNA).

Patients and Methods

Study design: This was a comparative prospective randomized study conducted between September 2021 and August 2022 on a total of 52 patients diagnosed with follicular lesion thyroid nodule who had undergone hemithyroidectomy or total thyroidectomy. They were chosen form Ain Shams University Hospital, El-Demerdash and Damietta Cancer Institute (DCI) after obtaining the approval from ethical committee of the Department of Surgery, Faculty of Medicine, Ain Shams University.

Inclusion criteria: Patients with thyroid nodule who have a reported follicular lesion in the FNAC.

Exclusion criteria: Patients with previous thyroid surgery. Patients with multiple suspicious thyroid nodules. Patients with thyroid lesions proved radiologically to invade surrounding structures. Patients with retrosternal extension of both thyroid lobes. Pregnant cases.

Study population: Entire cases were subdivided randomly into two groups: Group (A): Patients who will be subjected to total thyroidectomy. Group (B): Patients who will be subjected to hemithyroidectomy.

Methodology: The study will be conducted after approval from ethical committee of the Department of General Surgery, Faculty of Medicine, Ain Shams University. After enrollment in the study, an informed written consent will be taken from all participants after explaining the purpose, possible risks and complications.

History: A detailed patient history should evaluate for symptoms of hyper- and hypothyroidism, risk factors for thyroid cancer, family history of thyroid disease or other abnormalities of the adrenal, pancreas, pituitary, and parathyroid glands, and symptoms of local compression in the anterior neck [10].

Examination: Physical examination should include a focused exam of the neck, including the thyroid and cervical lymph nodes. The thyroid gland is best palpated by standing behind the patient and asking the patient to swallow from a glass of water. The thyroid moves with swallowing, facilitating palpation of subtle thyroid nodules. Substernal extension of a goiter should be suspected if the inferior aspect of the thyroid gland cannot be defined, or there is a positive Pemberton's sign (facial congestion and respiratory distress with elevation of both arms above the head). Firm nodules and those with irregular borders are concerning for malignancy. Fixed nodules are concerning for a locally advanced malignancy, and enlarged lymph nodes are suspicious for metastases. The patient should also be evaluated for signs of hyper- and hypothyroidism. Signs of hyperthyroidism include tachycardia, tremor/tremulousness, muscle weakness, orbital edema, and exophthalmos. Signs of hypothyroidism include dry skin, coarse hair, and nonpitting edema [10].

Investigations:

Including serum TSH, FT3 and FT4, preoperative and postoperative ionized calcium level, neck

ultrasound will be done for each patient, laryngoscopy will be done preoperatively for each patient for vocal cords assessment and Patients with solitary thyroid nodule or dominant nodule of multinodular goiter will be submitted to (FNAC) fine-needle aspiration cytology.

Surgical management: Patients who meet the criteria of the study will be introduced to surgery (either hemi or total thyroidectomy).

General considerations: Most preoperative evaluations of patient take place on an ambulatory basis. Those preoperative evaluations are required to be checked before admission by the surgeon at the outpatient clinic. Patients with significant comorbidity should be evaluated by referring an anesthesiologist before the operation. Most patients are admitted 1 or 2 days before the operation. After admission, preoperative examinations of patient are reexamined by the surgeon **[11]**.

Pre-operative assessment: Pre-operative assessment for thyroid surgery focuses on two main aspects: Metabolic: The specific purpose here is to assess whether the patient is euthyroid, hypothyroid, or hyperthyroid because thyroid dysfunction has a variable clinical presentation depending on the age of the patient, the degree of dysfunction, concomitant disease, and duration of disease. Airway assessment is the second most important aspect in pre-operative assessment for thyroid surgery. To avoid the situation of an airway emergency, it is very important to do thorough airway assessment in the pre-operative period **[12]**.

Education and informed consent: Thyroidectomy is a well-tolerated procedure with infrequent complications when performed by an experienced (high-volume) surgeon. The surgeon should educate and inform patient about the potential risk of a neck scar, recurrent laryngeal nerve injury, hypocalcemia, bleeding, pain, possibility of transfusion, reoperation, and other alternatives available before the operation. Lifelong thyroid hormone replacement is required. Only about 20% to 30% of patients will require thyroid hormone replacement after thyroid lobectomy **[10,11]**.

Diet restriction and fluid supplement: NPO past midnight is recommended for all patients before thyroidectomy **[11]**.

Pre-operative skin preparation: Is required to prevent surgical site infection (SSI) and performed according to the routine maneuver of each center. In male patients, shaving off a beard is required **[11]**.

Procedures of open thyroidectomy:

Anesthesia: General anesthesia is induced, and the patient is intubated. Hypotensive anesthesia is an advantage. While operating a hyperthyroid adenoma or Graves' disease, it is best to divide the muscle and avoid unnecessary handling of the gland. Needless to say, the various out flow channels for blood should be ligated at the earliest **[10,12]**.

Patient positioning: The patient should be placed in the supine position on the operating table with the arms tucked close to the side. A shoulder roll is placed lengthwise between the shoulders to extend the neck. A gel head ring should be placed to secure the head. The bed is placed in a beach-chair (semi-Fowler) position to reduce venous pressure/distention within the neck and minimize bleeding **[10,11]**.

Skin preparation and draping: The operative field is then prepared with a routine surgical maneuver. When the surgical prep solution is completely dry, the operative field is defined with disposable operative drapes **[10,11]**.

1- Skin Incision and dissection:

Demonstrates surface marking for the incision. Transverse lower cervical incision about 2cm above the suprasternal notch is preferred for thyroid surgeries **[13]**.

We make 4-6cm long incision for thyroidectomy. Subplatysmal flaps are created using electrocautery along the deep aspect of the platysma. The flap is extended to the thyroid cartilage. The inferior aspect of the platysma is grasped, and the inferior flap is created in a similarly **[10,11]**.

2- Exposure of the gland:

The sternohyoid muscles are separated in the midline raphe using electrocautery, exposing the anterior surface of the thyroid. The incision should be extended from the thyroid notch to the sternal notch to facilitate exposure. The ipsilateral strap muscles (sternothyroid and sternohyoid) are grasped, retracted laterally and dissected off the anterior aspect of the thyroid gland using blunt dissection down to the level of the internal jugular vein along the entire length of the thyroid from the superior to inferior pole. If one should decide to divide the strap muscles, it is done at the level of the cricoid cartilage above the insertion of ansa cervicalis into the straps muscles which enters inferiorly **[10,12]**.

3- Management of upper pole:

The key here is again adequate exposure and ligating the superior thyroid vessels by skeletonizing each. This avoids injury to the external branch of the superior laryngeal nerve whatever may be the course of the nerve **[12]**. Once the superior pole is fully mobilized, the thyroid gland can be mobilized anteriorly and medially out of the operative wound. In this position, the RLN and parathyroid glands can be identified, as the tracheoesophageal groove is well exposed **[10]**.

4- Dissecting the superior and inferior parathyroid glands:

The next step is to identify and separate the parathyroid gland in the sub-capsular plane. The upper parathyroids are encountered, and care is taken not to dissect the fascia lateral to the parathyroids. The parathyroid glands are usually within 1cm of where the RLN crosses the inferior thyroid artery. The superior gland is typically located in a position that is superior and posterior to the RLN, and the inferior gland is usually inferior and anterior to the RLN. The superior parathyroid gland is frequently adherent to the posterior capsule of the thyroid near the tubercle of Zuckerkandl. A plane between the thyroid capsule and the superior parathyroid gland should be created, permitting the parathyroid gland to be swept off the thyroid out of the operative field while preserving its blood supply, which typically comes from the inferior thyroid artery **[10,12]**.

5- Preserving the RLN:

The RLN should always be clearly identified and traced along its course during thyroidectomy. Routine visualization of the nerve has been shown to reduce the incidence of nerve injury. The most reliable place to identify the nerve is just caudal to the inferior thyroid artery. If there is significant inflammation or scar in this area, the nerve can be identified in a more caudal location. The RLN may pass posteriorly, anteriorly, or between branches of the inferior thyroid artery. A non-RLN coming directly from the vagus nerve may occur (right side) and should be suspected in patients with known aortic arch anomalies. Branches of the inferior thyroid artery should not be ligated until the RLN and any of its branches are clearly identified to avoid inadvertent injury. Extreme caution should be exercised when dissecting the RLN to prevent inadvertent traction injury or division of the RLN or any branches that may occur prior to entering the cricothyroid muscle. Also, electrocautery should be used sparingly in proximity to the RLN to minimize the risk of a thermal injury **[10]**.

6- Management of lower pole:

Once the RLN is clearly identified and protected, the end branches of the inferior thyroid artery are divided on the capsule of the thyroid gland to preserve the blood supply to the parathyroid glands **[12]**.

7- Management of ligament of Berry:

The final dissection through the ligament of Berry is where the RLN is most prone to injury. The nerve traced up to its insertion in the larynx at the cricothyroid joint, the width of Berry's ligament, the posterior condensation of thyroid fascia is divided completing the procedure on the given side **[10,12]**.

8- Specimen removal:

Once the anterior surface of the trachea is exposed, typically in an avascular plane, the thyroid can be dissected from the trachea with electrocautery. If a thyroid lobectomy is planned, the thyroid isthmus can be oversewn with a running suture, or divided with a sealant device **[10]**.

9- Histological assessment:

Once the specimen be removed, it should be sent for histopathological examination to ensure the diagnosis.

Statistical analysis and data interpretation:

The collected data were coded, processed and analysed using the SPSS (Statistical Package for Social Sciences) version 27 for Windows® (IBM SPSS Inc, Chicago, IL, USA). Data were tested for normal distribution using the Shapiro Walk test. Parametric quantitative data were expressed as mean ± SD (Standard deviation). Qualitative data were represented as frequencies and relative percentages.

Data analysis:

Qualitative data: Chi-Square test for comparison of 2 or more groups. Monte Carlo test as correction for Chi-Square test when more than 25% of cells have count less than 5 in tables (>2*2). Fischer Exact test was used as correction for Chi-Square test when more than 25% of cells have count less than 5 in 2*2 tables.

Quantitative data between two independent groups:

Parametric data: Student *t*-test was used to compare 2 independent groups.

Non-Parametric data: Mann-Whitney U test was used to compare 2 independent groups.

Level of significance:

Significance test results are quoted as two-tailed probabilities. For all the above-mentioned tests, the level of significance was tested, expressed as the probability of (p-value) and the results were explained as following: Non-significant if the p-value is >0.05. Significant if the p-value is ≤0.05. Highly significant if the p-value <0.001.

Results

Regarding to data in Table (1), 26 patients underwent HT (50%) and a 26 underwent TT (50%). In the HT group there were 16 women and 10 men a mean age of 50 years (range 22 to 77 years) and the TT group included 15 female and 11 male (p<0.777) with a mean age of 52 years (range 22 to 77 years) (p<0.604). Table (1) showed analysis of demographic data in the study cases. There was no significant difference regarding patients' age or gender.

Table (1): Analysis of demographic data in the study cases [According to operation].

	Group 1 [Total thyroidectomy] (N=26)	Group 2 [Hemi-thyroidectomy] (N=26)	Test of significance	p-value
Age (Years)	51.96±13.44	49.96±14.17	t=0.522	0.604
Sex:				
Male	11 (42.3%)	10 (38.5%)	χ^2=0.080	0.777
Female	15 (57.7%)	16 (61.5%)		

χ^2: Chi-square test. t: Independent samples t-test.

In Table (2), regarding the clinical presentation roughly 85% in group of total thyroidectomies and 73% in the group of hemi-thyroidectomies were palpable.

In consideration to the size of the nodule, there was no significant difference between both groups as the mean size is roughly 2.5cm for each. (p<0.308).

According to the radiological data, it shows no statistical significance between the two groups in terms of TIRADS classification. (p<0.404).

The only statistically significant difference in this area of comparison is the type of the nodule. The dominant nodules represent about 35% of group 1 cases compared to 11.5% in group 2 cases (p<0.048), while solitary nodules represent 65% of group 1 cases compared to 88.5% in group 2 cases.

Referring to Table (3), after histological evaluation, carcinoma was found in 18 (34%) of the 52 cases. Total thyroidectomy was performed procedure in 8 of the 18 patients whereas thyroid lobectomy was performed in the other 10 patients who returned to the operating room for completion thyroidectomy.

Considering the studied population, hemithyroidectomy was considered adequate treatment for 16 patients (61.5%) while the 8 patients who underwent HT (38.5%), a completion thyroidectomy was necessary. Furthermore, we observed that TT was an over-treatment in 69% of cases.

No one had postoperative complications in HT group (0%). The laryngeal nerve was identified in all cases. In the TT group, mean postoperative complications included 4 (15%), 1 transient hypocalcaemia (3.8%), 1 temporary tracheostomy (3.8%) and 2 (7.7%) temporary hoarseness of voice. (Complete recovery after 3 months) (p<0.228).

Table (2): Analysis of clinical data in the study cases [According to operation].

	Group 1 [Total thyroidectomy] (N=26)	Group 2 [Hemithyroidectomy] (N=26)	Test of significance	p-value
Clinical presentation:				
Non-palpable	4 (15.4%)	7 (26.9%)	FET=1.038	0.308
Palpable	22 (84.6%)	19 (73.1%)		
Radiology size (cm)	2.65 (1.2-4.5)	2.45 (0.9-5)	t=–1.020	0.308
TIRADS classification:				
TIRADS 3	5 (19.2%)	2 (7.7%)	MC=1.815	0.404
TIRADS 4	14 (53.8%)	14 (53.8%)		
TIRADS 5	7 (26.9%)	10 (38.5%)		
Type of the nodule:				
Solitary nodule	17 (65.4%)	23 (88.5%)	FET=3.900	0.048*
Dominant nodule of multi nodular goitre	9 (34.6%)	3 (11.5%)		

MC: Monte-Carlo test. z: Mann-Whitney U-test.
FET: Fischer's exact test. *: Statistically significant (p≤0.005).

Table (3): Analysis of postoperative data in the study cases [According to operation].

	Group 1 [Total thyroidectomy] (N=26)	Group 2 [Hemithyroidectomy] (N=26)	Test of significance	*p*-value
Postoperative pathology:				
Benign	18 (69.2%)	16 (61.5%)	MC=1.079	0.583
Follicular carcinoma	4 (15.4%)	3 (11.5%)		
Follicular variant of papillary thyroid cancer FVPTC	4 (15.4%)	7 (26.9%)		
Complications:				
No significant complications	22 (84.6%)	26 (100%)	MC=4.333	0.228
Temporary tracheostomy	1 (3.8%)	0 (0%)		
Temporary hypocalcaemia	1 (3.8%)	0 (0%)		
Hoarseness of voice	2 (7.7%)	0 (0%)		

MC: Monte-Carlo test.

Table (4) shows that the mean age among benign cases is about 49 years compared to 54 years in malignant cases with no statistical significance.

In the benign group, there were 20 women (58.8%) and 14 men (41.2%) and the malignant group included 11 female (61.1%) and 7 male (38.9%) (p<0.560). The mean age of group 1 is 49 years compared to 54 years for group 2 (p<0.232).

According to data of Table (5), total thyroidectomy was performed in approximately 53% of benign pathology group (group 1) patients compared to about 44% of malignant pathology group (group 2) patients.

Table (4): Analysis of demographic data in the study cases [According to pathology].

	Group 1 [Benign pathology] (N=34)	Group 2 [Malignant pathology] (N=18)	Test of significance	*p*-value
Age (Years)	49.29±11.62	54.11±16.91	*t*=–1.210	0.232
Sex:				
Male	14 (41.2%)	7 (38.9%)	χ^2 = 0.340	0.560
Female	20 (58.8%)	11 (61.1%)		

χ^2: Chi-square test. *t*: Independent samples *t*-test.

Table (5): Analysis of clinical and operative data in the study cases [According to pathology].

	Group 1 [Benign pathology] (N=34)	Group 2 [Malignant pathology] (N=18)	Test of significance	*p*-value
Operation:				
Total thyroidectomy	18 (52.9%)	8 (44.4%)	χ^2 = 0.340	0.560
Hemithyroidectomy	16 (47.1%)	10 (55.6%)		
Clinical presentation:				
Non-palpable	6 (17.6%)	5 (27.8%)	FET=0.724	0.395
Palpable	25 (82.4%)	13 (72.2%)		
Radiology size (cm)	2.2 (0.9-5)	2.8 (1.2-3.5)	z=–0.048	0.961
TIRADS classification:				
TIRADS 3	7 (20.6%)	0 (0%)	MC=15.577	<0.001*
TIRADS 4	22 (64.7%)	6 (33.3%)		
TIRADS 5	5 (14.7%)	12 (66.7%)		
Clinical presentation:				
Solitary nodule	26 (76.5%)	14 (77.8%)	FET=0.011	0.915
Dominant nodule of multi nodular goitre	8 (23.5%)	4 (22.2%)		

MC: Monte-Carlo test.
FET: Fischer's exact test.
χ^2: Chi-square test.
z : Mann-Whitney U-test.
* : Statistically significant ($p \leq 0.05$).

Coming to the area of clinical presentation, palpable nodules represented roughly 82% of group 1 and 72% in group 2. The mean size of the nodules in group 1 was 2.2cm compared to 2.8cm in group 2.

According to TIRADS classification, the only statistical significance is attributed to TIRADS 5 which represents about 67% of malignant cases compared to only about 15% of benign cases (p<0.001).

The type of the nodule has no statistical significance as solitary nodules represent 77.5% of benign group compared to about 78% of malignant group, while dominant nodules represent 22.5% of benign group compared to 22% of malignant group (p<0.915).

In Table (6), the data shows a single patient in group 2 complicated with temporary tracheostomy while 3 patients in group 1 harbored post-operative complications (completely resolved within 3 months). There is no significant difference between the two groups.

In Tables (7,8), hemithyroidectomy was significantly lesser in operative time and pain than total thyroidectomy (p-value <0.001).

Table (6): Analysis of postoperative complications data in the study cases [According to pathology].

	Group 1 [Benign pathology] (N=34)	Group 2 [Malignant pathology] (N=18)	Test of significance	p-value
Complications:				
No significant complications	21 (91.2%)	17 (94.4%)	MC=3.491	0.322
Temporary tracheostomy	0 (0%)	1 (5.6%)		
Temporary hypocalcaemia	1 (2.9%)	0 (0%)		
Hoarseness of voice	2 (5.9%)	0 (0%)		
Wound infection	1 (2.9%)	1 (5.6%)		

MC: Monte-Carlo test.

Table (7): Analysis of the operative time in the study cases [According to operation].

	Group 1 [Total thyroidectomy] (N=26)		Group 2 [Hemithyroidectomy] (N=26)		Test of significance	p-value
Operative time (minutes)	120.58	25.43	78.27	27.20	t=5.793	<0.001 *

t: Independent samples t-test. *: Statistically significant (p<0.05).

Table (8): Analysis of the early postoperative data in the study cases [According to operation].

	Group 1 [Total thyroidectomy] (N=26)	Group 2 [Hemithyroidectomy] (N=26)	Test of significance	p-value
Pain VAS score	5 (2-8)	2 (1-7)	z=–4.093	<0.001 *
Hospital stay (Days)	1 (1-3)	1	z=–1.766	0.077
Day of drain removal (Days)	1 (1-3)	1 (1-3)	z=0	1

z: Mann-Whitney U-test. FET: Fischer's exact test. *: Statistically significant (p<0.05).

Discussion

In our study, we are focusing on follicular lesion of a thyroid nodule ranked as Bethesda 3 in Bethesda classification system. The aim is to determine the optimal surgical strategy for those patients diagnosed with follicular lesion thyroid nodule on pre-operative FNAC.

In our study, age has no significant difference between the two groups, however in other studies it has. This difference could be explained because younger patients tended to undergo HT in these studies in contrast to our study which based on a randomized selection.

Also, we reported that the overall rate of malignancy in follicular lesion thyroid nodule is 34.6% of the studied cases (18/52) with male to female ratio 1:1.6. A higher malignancy rate was observed in patients older than 45 years (77.5 %), as Conzo et al., reported in their study; however, the signif-

icance of age is still controversial. Baloch suggested thyroidectomy in >50 years old patients, which was in contrast with other studies [14,15].

A majority of studies have shown that up to 20% of the thyroid lesions classified as such are found to be malignant on surgical excision (low to intermediate risk of malignancy 20-30%). This percentage may be higher in Hurthle cell lesions if the nodule is equal to or larger than 3.5cm in greatest dimension [14].

Regarding the clinical presentation, neither being solitary or dominant nor palpable or non-palpable had a significant difference between the two groups. Similarly, the size of the nodule showed no significant difference that could be considered as a predictive of malignancy. The mean size in HT and TT groups was around 2.5cm and the mean size in benign and malignant groups was around 2.5cm too.

In contrast, some studies have suggested that clinical criteria such as nodule size >4cm, being solitary and age of the patient may be associated with increased risk for malignant potential whereas others have not confirmed these observations and that was not observed in our series of patients [16].

According to our study, TIRADS 5 category in the ultrasound assessment was shown to be the only factor that could be relied on in suggesting malignancy in a thyroid nodule classified as follicular lesion in FNAC. This is because about 67% of the nodules classified as TIRADS 5 proved to be malignant postoperatively. This observation aligns with the study performed by Ashamallah G.A. and El-Adalany M.A. which concluded that the positive predictive value of TIRADS 5 category is 67% with accuracy exceeds 80% [17].

Total thyroidectomy was performed as the initial surgical procedure in 8 of the 18 patients diagnosed postoperatively as malignant thyroid cancer whereas hemithyroidectomy was performed in the other 10 patients who underwent completion thyroidectomy.

Considering the total population of the study, hemithyroidectomy was found to be adequate surgical management for 18 patients (69%) while the remaining 8 patients (31 %), who had a malignant postoperative pathology, had to face a second surgical step which is a completion thyroidectomy. On the other hand, we observed that total thyroidectomy was an over-treatment in 16 patients (61.5%).

This observation is in agreement with that of a study done o compare between total thyroidectomy and hemithyroidectomy in management of follicular lesion thyroid nodule [6].

In view of the post-operative complications, hazards associated with thyroid surgery depend on variable factors such as the extent of surgery, whether this is the first or second operation, the nature of the thyroid disease present, the presence of co-existing medical conditions and the skill and experience of the surgeon [18].

In our study, we considered tracheostomy, hypoparathyroidism, hoarseness of voice, operative time, post-operative pain, period of hospital stay and time of drain removal. Neither permanent recurrent laryngeal nerve palsy nor permanent hypoparathyroidism occurred after either procedure.

The laryngeal nerve was identified in all cases. In the total thyroidectomy group, postoperative complications included 2 (7.7%) hoarseness of voice, 1 (3.8%) temporary hypocalcemia and 1 (3.8%) temporary tracheostomy. All of these mentioned complications resolved over time. To summarize, total thyroidectomy has no additive significant complications over hemithyroidectomy in short term observation. In relation to our data, Rafferty et al. (2007) concluded the same result [19].

The mean operative time for hemithyroidectomy was 78 min compared to 120min for total thyroidectomy and so, a significant difference was recorded (<0.001 *). This result is similar to the study of Abdelnassef et al. (2019) [6].

Postoperative pain was assessed according to a visual analogue scale (VAS) from 0 (no pain) to 10 (worst pain imaginable) on the postoperative day (POD) 0 and POD 1, if the patient was not discharged. In hemithyroidectomy group, the mean VAS score was 2 (ranging from 1 to 7) while in total thyroidectomy, it was 5 (ranging from 2 to 8). This significant statistical difference is in agreement with the study done by Abdelnassef MM et al., 2019 which reported that patients having hemithyroidectomy experienced significantly less pain than patients undergoing total thyroidectomy, as evaluated by VAS [6].

According to a review of the selected Toronto experience for patients undergoing total thyroidectomy vs initial hemithyroidectomy followed by completion thyroidectomy, there was no significant difference between the three procedures considering

postoperative complications, except for patients who underwent completion thyroidectomy had a slightly longer hospital stay **[19]**.

Moreover, Grigsby PW et al., reported that the presence of small amounts of cancer in the other thyroid lobe after completion thyroidectomy is less likely to have any adverse prognostic implications **[20]**.

As is known from the literature, frozen section has its limitations in detecting malignancy in thyroid surgery. It cannot assess appropriately capsular and vascular invasion, which are characteristics that separate benign from malignant follicular neoplasms; however, for patients likely to have a FVPTC, intraoperative assessment with frozen section/touch prep cytology may confirm malignancy, allowing a single stage thyroidectomy **[10,21]**.

Udelsman R and his colleagues concluded that the vast majority of patients (96.4%) with follicular neoplasms of the thyroid, frozen section is neither informative nor cost-effective **[22]**.

Conclusion:

Overall rate of malignancy in follicular lesion thyroid nodule is 34.6% of the studied cases. The higher rate of malignancy was among patients older than 45 years. Hemithyroidectomy was an adequate management option in the majority of the studied cases.

TIRADS 5 category of ultrasound assessment is the only significant factor that could be relied on to suspect malignancy in a follicular lesion thyroid nodule on FNAC and so total thyroidectomy could be considered in such patients.

In our study, no clinical or demographic data are significant in suspecting malignancy in follicular lesion thyroid nodule.

Hemithyroidectomy has the advantage over total thyroidectomy in terms of less both operative time and postoperative pain.

The major challenge in the management of a follicular lesion thyroid nodule remains the assessment as to which nodule requires surgical intervention and which can be followed conservatively. New diagnostic tools are needed to decrease the number of operations performed for benign pathology in patients with a needle biopsy diagnosis of follicular lesion. Finally, the management of follicular lesion thyroid nodule still an area of debate.

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مقارنة استئصال الغدة الدرقية الكامل بالاستئصال النصفى فى علاج الآفة الجريبية فى عقيدات الغدة الدرقية

يعد حدوث العقيدات الدرقية حالة شائعة جداً حيث التقديرات إلى أنه من ٣٪ إلى ٧٪ من سكان العالم لديهم عقيدات درقية يمكن اكتشافها بالفحص السريرى، وقد تصل هذه النسبة إلى ٧٦٪ عند استخدام الموجات فوق الصوتية.

عند اكتشاف وجود عقيدات بالغدة الدرقية، فإن الخطوة الأولى هى تحديد ما إذا كانت هذه العقدة سرطانية أم لا، وذلك عن طريق خزعة بالإبرة.

ورغم ذلك، فإن ١٥–٢٠٪ من العقيدات التى يتم تقييمها باستخدام خزعة بالإبرة لا يمكن تصنيفها من حيث كونها خبيثة أم حميدة، ولا يتم ذلك إلا بعد الاستئصال الجراحى وتحليل وتحليل الأنسجة من العينة الجراحية.

يعد استئصال الفص المعطوب من الغدة الدرقية هو الحد الأدنى المقبول من التدخل الجراحى الذى يجب إجراؤه لتحديد طبيعة هذه العقيدات على الرغم من مصاحبته لبعض العيوب والمضاعفات مثل الحاجة إلى التدخل الجراحى لاستكمال استئصال الفص المتبقى إذا أثبت تحليل الأنسجة وجود ورم سرطانى، وكذلك ضرورة المتابعة المستمرة للفص المتبقى عن طريق الموجات فوق الصوتية وما يحمله ذلك من زيادة الأعباء على المرضى، وكذلك احتمال الحاجة إلى الجراحة مرة أخرى لظهور عقيدات جديدة فى الفص المتبقى وهو ما قد يحدث لنصف عدد المرضى فى خلال عشر سنوات.

الهدف من العمل : تهدف الدراسة إلى محاو لة تحديد نوع التدخل الجراحى الأفضل للمرضى الذين يعانون من وجود عقيدات الغدة الدرقية تحمل نمط جريبى ذو طبيعة غير محددة.

نتائج الدراسة : فى دراستنا توصلنا للآتى :

– المعدل العام للأورام الخبيثة فى عقيدات الغدة الدرقية التى تم تشخيصها بوجود الافة الجريبية ٣٤.٦٪ من الحالات المدرجة فى الدراسة.

– يبدو الاستئصال النصفى للغدة الدرقية خياراً مناسباً فى غالبية الحالات المدرجة فى الدراسة.

– تعد الفئة الخامسة من التقييم بالموجات الفوق صوتية هى العامل الوحيد الذى يمكن الاعتماد عليه لترجيح وجود ورم خبيث فى عقيدات الغدة الدرقية ذات الأفة الجريبية، وبالتالى يمكن النظر فى إمكانية إجراء استئصال كلى للغدة الدرقية فى هؤلاء المرضى.

– يتميز الاستئصال الجزئى عن الاستئصال الكلى للغدة الدرقية من حيث الوقت الأقل وكذلك ألم أقل بعد الجراحة.

– يظل التحدى الرئيسى فى علاج العقيدات ذات الأفة الجريبية بالجراحة هو تقييم العقيدة التى تتطلب التدخل الجراحى من التى يمكن متابعتها فقط بالفحوصات اللازمة، ولا تزال هناك حاجة إلى وضع أدوات تشخيصية جديدة لتقليل عدد العمليات التى يتم إجراؤها للمرضى ذووا العقيدات الحميدة.