

Comparison between Cytological and Histopathological Diagnosis for Mononodular Thyroid Disease

ALAA ABDULQADER ABDULRAZAQ¹, TAREK MAHDI SALIH²

¹*Ibn Sina University of Medical and Pharmaceutical Sciences, Iraq, Baghdad*

²*Turath University College, Iraq, Baghdad*

Correspondence to Dr. Alaa Abdulqader Abdulrazaq

ABSTRACT

Background: solitary thyroid nodule (any palpable discrete swelling within normal thyroid gland); is usually benign lesion. However; physician, pathologist and patient alike are typically concerned about the possibility of thyroid cancer. FNAC is considered the gold standard diagnostic test for the diagnosis of thyroid nodule.

Aim: The major goals in the evaluation of the "solitary thyroid nodule" is the differentiation of "benign" and "hyperplastic" from "true neoplasm".

Study setting: A prospective analysis carried out in Al-Ramadi Teaching Hospital "surgical department and histopathology department".

Methods: A total of 150 patients were diagnosed as a mononodular thyroid disease between February 2017 and December 2019. For all patient's clinical examination and specific investigations were done. Patients with specific inclusion criteria were selected. "FNAC" was done using a 23-gauge needle; fixed in ethanol-95% alcohol solution, and stained with Papanicolaou's staining. All patients selected were under gone thyroidectomy; and the specimens were evaluated by histopathological examination. Specimens were processed; staining was performed with routine hematoxylin and eosin stain.

Results: Age of the patient range between 10-59 years; median age 38 years; female predominance "90%" and the site of swelling was more in Rt. lobe "56.7%" compared to Lt. lobe and isthmus. Different types of benign and malignant thyroid lesion were diagnosed. The values of sensitivity; specificity; false positive%; false negative %; positive predictive value; negative predictive value and accuracy rate were "91.5%", "61.2%", "8.5%", "38.8%", "51.8", "94.0%" and "70.7%", respectively. Benign lesions were "103" cases and malignant lesions were "47" cases. The final diagnosis were colloid goiter "62", follicular adenoma "26", follicular carcinoma "6", papillary carcinoma "38", Hurthel cell adenoma "3", Hurthel cell carcinoma "3", Hashimoto thyroiditis "9" and Lymphocytic thyroiditis "3".

Conclusion: we conclude that "FNAC" is highly significant for malignant lesions and they should be subjected to surgery. False negative results for benign lesions should be considered and those patients required regular follow up. Patients with results of "suspicious of malignancy" require surgery.

Keywords: Thyroid nodule, FNAC, thyroidectomy

INTRODUCTION

Swelling of the neck is a common presentation in clinical practice; most clinicians were in faces with multiple kinds of neck pathologies in relations to thyroid gland pathologies which affect a high number of patients & remains a challenge for adequate management especially when these problems not related to the thyroid tissue , in addition to cosmetic unpleasant appearance , neck masses may cause other clinical pressure signs and symptoms in correlation with other nearby organs which may related to its size and clinico-histopathological types. To exclude malignancy, biopsy is necessary specifically in adenoma cases¹.

Four to ten percent of thyroid nodules were elicited in general adult population which was higher than 0.2-1.2% recorded in children². The cytological examination is the best for discrete thyroid mass, and is very pleasant for patient's compliance, also is rapid and easy to done (In outpatient clinic). FNAC results; should be reported "using standard terminology". Aspiration under ultrasound guidance may be necessary in special cases in order to obtain satisfactory sample³.

The majority of thyroid, nodules are benign (only 5%–30%) are malignant and require surgical intervention (4).

Disadvantage of this procedure is the false positive and false negative reports¹.

The objective of the current research is to assess the mass which need surgical removal and benign mass which can assess clinically and decrease surgical intervention rate in benign nodule. Also, it may correlate FNAC reports with histopathological findings to avoid unnecessary thyroidectomy.

MATERIAL AND METHODS

Our prospective study of 150 patients was diagnosed as a mononodular thyroid disease who presented to the Al-Ramadi Teaching Hospital between February 2017 and December 2019. For all patient's clinical examination and specific investigations were done. Inclusion criteria for those patients represents: discrete thyroid mass and euthyroid patients through hormonal assessment, otherwise patients with hypo or hyperthyroidism were excluded from our study, also patients with multiple thyroid nodules and patients who were not underwent surgery.

A 23-gauge needle was used for aspiration "FNAC"; using ethanol-95% alcohol solution for fixation, and stained with Papanicolaou's staining. After that, thyroidectomy was done for all patients and the specimen was evaluated by

histopathological examination. Specimens were processed; staining was performed with routine hematoxylin and eosin stain. Correlation of cytohistopathological findings was performed. Sensitivity, specificity, accuracy, positive predictive value, and negative predictive value were calculated for neoplastic lesions.

RESULTS

Age of the patient range between 10-59years with median age 38years with female predominance (90%) and the site of swelling was more in Rt. lobe (56.7%) compared to Lt. lobe and isthmus as shown in table one.

Table 1: The distribution of age, gender and site of swelling

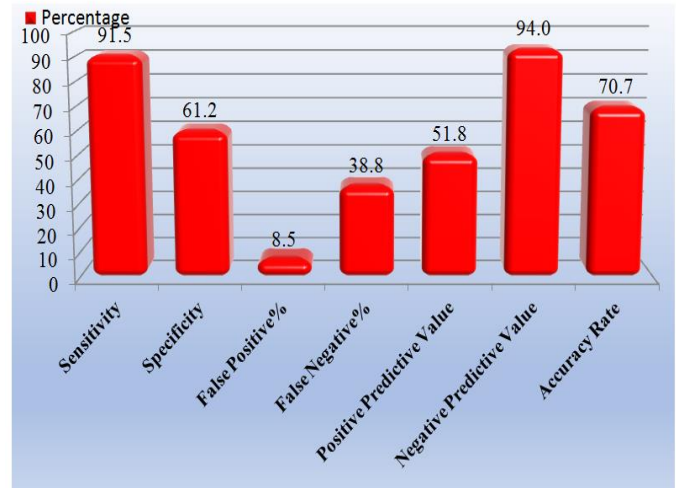
		No	%
Age (years)	10---19	8	5.3
	20---29	7	4.7
	30---39	70	46.7
	40---49	45	30.0
	50---59	20	13.3
	Mean SD (Range) [Median]	38.6±9.7 [38.0]	(10-59)
Gender	Male	15	10.0
	Female	135	90.0
Swelling site	Right lobe	85	56.7
	Left lobe	35	23.3
	Isthmus	30	20.0

The final diagnosis among thyroid nodules were colloid goiter (62), follicular adenoma (26), follicular carcinoma (6), papillary carcinoma (38), Hurthel cell adenoma (3), Hurthel cell carcinoma (3), Hashimoto thyroiditis (9) and Lymphocytic thyroiditis (3) as demonstrated in table 2 with sensitivity (91.5%), specificity (61.2%), false positive % (8.5%), false negative (38.8%), positive predictive value (51.8%), negative predictive value (94.0%) and accuracy rate (70.7%) as shown in figure-1. The P-value was 0.0001 which was highly significant and Kappa test=0.436 (moderate agreement).

Table 2: Cytohistological correlation of thyroid nodule

FNA result	stopathology result
Colloid goiter & benign cystic changes; (n=67)	Colloid goiter; (n=59) Follicular adenoma; (n=4) Papillary carcinoma; (n=4)
Papillary carcinoma ; (n=34)	Papillary carcinoma; (n=34)
Follicular neoplasm ; (n=31)	Follicular Adenoma; (n=22) Follicular Carcinoma; (n=6) Colloid goiter; (n=3)
Hurthel cell tumor; (n=6)	Hurthel cell Adenoma; (n=3) Hurthel cell Carcinoma; (n=3)
Suspected malignancy; (n=12)	Hashimoto thyroiditis; (n=9) Lymphocytic thyroiditis; (n=3)

Figure 1: Percentage of sensitivity, specificity, false positive, false negative, positive predictive value, negative predictive value and accuracy rate



There were (47) malignant cases of thyroid nodule confirmed by histopathological examination and (103) benign thyroid nodule as shown in table 3.

Table 3: Benign and malignant thyroid nodules

FNA	Histopathology		Total
	Malignant	Benign	
Malignant/Suspected malignancy	43	40	83
Benign	4	63	67
Total	47	103	150

DISCUSSION

In our study the patients ages were ranging between (10-59 years) with median age (38 years) because this age group is more vulnerable for thyroid disorders. This is similar to finding of Manoj Gupta; et al were (44%) of the patients were in the same age group⁵.

In this study revealed mononodular thyroid pathology (90%) females and (10%) were males because thyroid disorders are more common in female than in male while other study found that (4–9 times), high percent in females than in males^{6,7}.

Reports with false negative results were (38.8%) in reports of malignant pathologies. which contributes to disadvantages of this technique “as the malignancy can go untreated”. This is mostly occur with an expert hands, very small nodule less than 1cm and when the aspiration done blindly without ultrasound guidance. Another study revealed that the percent of false negative reports decreased 3%⁸.

Reports with false positive results were (8.5%) for malignant pathologies compared to (11.8%) false positive reports in Fatemeh and Elham study⁹. The more accuracy, sensitivity, specificity of cytological examination (FNAC) for detection neoplasms were (91.5%), (61.2%) and (70.7%) respectively; but accuracy, sensitivity, specificity, of cytological examination for mononodular thyroid disease were (80%), (86.6%), and (84%) respectively⁽¹¹⁾, and (79%), (98.5%), and (87%) respectively as in Kessler et al, finding⁽¹⁰⁾. These results were influenced by many factors

such as size and site of tumor, expert hand and expert pathologist as there were many cellular changes that can occur in both benign and malignant nodules.

In this study (47) cases histopathological reports were malignant ("38 papillary carcinoma", "6 follicular carcinoma" and "3 hurthle cell carcinoma". Total papillary carcinoma 34 cases were diagnosed cytologically (FNAC) and histologically this study similar with previous study^{10,11}.

FNAC is a valuable tool for diagnosing different types of, malignancy. In addition, it should be noted that FNAC is a tool for separating cases that are in need of, surgery from other cases. In our study, there were "31 cases" of follicular neoplasm, all being identified as candidates for surgical resection with a cytological diagnosis of "suspicious for malignancy or, follicular neoplasm." Another study found that, preoperative cytological aspiration of non-significant value for had no selection of the surgical procedure¹².

CONCLUSIONS

We recommended that cytological diagnosis by FNAC for malignancy is highly significance and then patient should be undergoing surgery and patients with benign cytological reports must be careful taken in consideration because the presence of false negative results then should be followed up especially for those patients with clinically suspicion of malignancy in spite of negative cytological results.

REFERENCES

1. Rout K, Subrat C, Arayan R. A comparative study of FNAC and histopathology of thyroid swellings. *Otolaryngeal head and neck surgery* 2011 oct; 63(4): 370-372.
2. Ridgway EC. "Clinical evaluation of solitary thyroid nodules," in *The Thyroid: A Fundamental and Clinical Text*, pp.1377-1385, G. B. Lippincott, Philadelphia, Pa, USA, 1986.
3. Bailey and Love's. short practice of surgery. 25th edition;2008. Chapter 48; p 755.
4. Bakhos R, Selvaggi SM, DeJong S, et al., "Fine needle aspiration of the thyroid: rate and causes of cytopathologic discordance," *Diagn Cytopathol*, 2000; 23(4): 233-237.
5. Gupta M, Gupta S, Gupta VB. Correlation of Fine Needle Aspiration Cytology with Histopathology in the Diagnosis of Solitary Thyroid Nodule. SAGE-Hindawi Access to Research. *Journal of Thyroid Research*. 2010; 2010: Article ID 379051. doi:10.4061/2010/379051.
6. Dorairajan N, Jayashree N. "Solitary nodule of the thyroid and the role of fine needle aspiration cytology in diagnosis," *Journal of the Indian Medical Association*, vol. 94, no. 2, pp. 50-52, 1996.
7. Bouvet M, Feldman JI, Gill GN, et al., "Surgical management of the thyroid nodule: patient selection based on the results of fine-needle aspiration cytology," *Laryngoscope*, 1992; 102(12): 1353-1356.
8. Sinna EA, Ezzat N. Diagnostic accuracy of fine needle aspiration cytology in thyroid lesions. *J Egypt Natl Canc Inst*. 2012; 24: 63-70.
9. Hajmanoochehri F, Rabiee E. FNAC accuracy in diagnosis of thyroid neoplasms considering all diagnostic categories of the Bethesda reporting system: A single-institute experience. *US National Library of Medicine National Institutes of Health. J Cytol*. 2015; 32(4): 238-243.
10. Kessler A, Gavriel H, Zahav S, et al. "Accuracy and consistency of fine-needle aspiration biopsy in the diagnosis and management of solitary thyroid nodules," *Israel Medical Association Journal*, 2005; 7(6): 371-373.
11. Dorairajan N, Jayashree N. "Solitary nodule of the thyroid and the role of fine needle aspiration cytology in diagnosis," *Journal of the Indian Medical Association*, 1996; 94(2): 50-52.
12. Brooks AD, Shaha AR, DuMornay W, et al., "Role of fineneedle aspiration biopsy and frozen section analysis in the surgical management of thyroid tumors," *Annals of Surgical Oncology*, 2001; 8(2): 92-100.