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Original research article

Correlation of ultrasonography guided fine needle aspiration cytology with postoperative histopathology in diagnosis of thyroid nodule: A study in tertiary care centre

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Abstract

Background and Objectives: The main risk with a thyroid nodule is its potential to turn out to be a malignant. FNAC is commonly done by palpatory method but this approach has various limitations. An ultrasound-guided fine needle aspiration cytology (UN FNAC) is considered the gold standard to evaluate thyroid malignancy.

The aim of our study is to correlate ultrasonography guided Fine Needle Aspiration Cytology (US FNAC) with postoperative histopathology in Diagnosis of Thyroid Nodule

Keywords: US FNAC, Thyroid nodule

Introduction

Thyroid nodules are commonly encountered in clinical practice. The majority of nodules are asymptomatic and are benign. Thyroid nodules are reported more frequently in women in comparison with men [1]. The main concern of a thyroid nodule is its potential to turn into a malignancy. The incidence of malignancy in thyroid nodules is 5-10% [2].

Fine Needle Aspiration Cytology (FNAC) of the thyroid gland is a well established first-line diagnostic test and it has revolutionized the management of thyroid nodules, providing an extremely safe, simple, quick, and cost-effective method for detecting malignancy [3]. It is rapid, cost-effective, and very useful method in classifying thyroid nodules as either benign nodules reducing unnecessary surgery or malignant nodules requiring surgery.

FNAC is commonly done by palpatory method but this approach has various limitations, including difficulty in sampling nodules that are small, indistinct, predominantly cystic, posterior in location and difficulty in selecting the suspicious nodule within a multinodular goitre. FNAC performed under US guidance helps overcome these limitations. Ultrasound-guided fine-needle aspiration biopsy (US FNAC) enables continuous imaging of needle insertion and sample collection, allowing for the needle's location within the lesion to be confirmed with confidence and ease. Small solid and cystic suspicious nodules can be discovered and biopsied using a needle that can be directed to the solid area [4]. Bethesda classification system established a standardized, category-based reporting system for thyroid FNACs [5].

Materials and Methods

This is a prospective study conducted in Department of Pathology between July 2022 and December 2022 in Kanachur Institute of Medical Sciences Mangalore. A total of 58 patients of all ages, both male and female who underwent US FNAC and surgery for thyroid swelling with subsequent histopathological study of excised tissue, were included in this study.

Fine needle aspiration of solid area of thyroid nodule was done in each case with USG guidance. Aspiration technique with 23 Gauge needle connecting to a 10-ml syringe was used. Multiple needle passes, usually 3-4 times were made within the lesion at varying angles and depths and with constant negative pressure. Before final withdrawal, the negative pressure was released prior to the needle emerging out from the skin. The cytological material was transferred on to glass slides. The aspirated material was then smeared on 2-4 slides, fixed in 95% ethanol and stained by Papanicoloau stain. The air dried slides were stained with Giemsa stain. The stained slides were seen under light microscope and the FNAC results were classified according to Bethesda system of reporting. The biopsy specimen which was well fixed in 10% formalin solution, was grossed, processed through automatic tissue processor and

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stained with H&E stain.

Results: In the present study, most of the patients were in the age group between 21-50yrs. In our study 42 patients were females (72.2%) with male to female ratio 1:2.6. (Table-1).

Table 1: Age and sex distribution

Age (yrs)	Number (58)	Percentage	Male	Female
<20yrs	3	5.2%	1	2
21-30	13	22.4%	3	10
31-40	16	27.5%	6	10
41-50	15	25.9%	4	11
5-60	7	12.1%	2	5
61-70	3	5.2%	0	3
>70	1	1.7%	0	1

Highest number of cases were diagnosed in Bethesda class II-Benign (56.9%)in USG guided FNAC. Thyroid FNAC Results (Bethesda system) and histopathology results are shown in Table 2.

Table 2: Thyroid ultrasound guided FNAC (Bethesda system) and Histopathology Results

Group by classes	US guided FNAC	Histopathology	
		Benign	Malignant
Class I: Non-diagnostic or unsatisfactory	3. (5.2%)	Not operated	
Class II: Benign	33(56.9%)	31	2PTC
Class III: Atypia of undetermined significance or follicular lesion of undetermined significance	3(5.2%)	2	1FTC
Class IV: Follicular neoplasm or suspicious for follicular neoplasms	8(13.8%)	2FA	6FTC
Class V: Suspicious for malignancy	6(10.3%)	0	6PTC
Class VI: Malignant	5(8.6%)	0	3PTC and 2MTC
Total	58	35(60.3%)	20(34.5%)

PTC: Papillary thyroid carcinoma, FA: Follicular adenoma, MTC: Medullary thyroid carcinoma, FTC: Follicular thyroid carcinoma

In US guided FNAC, Class II Bethesda showed 2 (6.1%) cases of papillary thyroid carcinoma(PTC),Class III and Class IV showed 1(33.3%) and 6(75%) follicular thyroid carcinoma (FTC) respectively. In Class V and VI all cases (100%) were malignant in which 6 (100%) PTC in class V and 3(60%)PTC and 2(40%)medullary thyroid carcinoma (MTC) in class VI in histopathological examination. Correlation of US FNAC and histopathology is shown in Table 3.

Table 3: Correlation of USG guided FNAC with Histopathology.

		Histopathology						
US FNAC	No.	Colloid goitre	Multinodular goitre	Follicular adenoma	Hashimoto thyroiditis	PTC	FTC	MTC
Non diagnostic	3	-	-	-	-	-	-	-
Benign	33	20	8	-	3	2	-	-
Atypia of undetermined significance	3	-	-	2	-	-	1	-
Follicular neoplasm	8	-	-	2	-	-	6	-
Suspicious for malignancy	6	-	-	-	-	6	-	-
Malignant	5	-	-	-	-	3	-	2

US FNAC= USG guided fine needle aspiration cytology, PTC= Papillary carcinoma of thyroid, FTC= Follicular carcinoma of thyroid, MTC= Medullary carcinoma of thyroid

Discussion

FNAC is the best method for early approach for evaluating thyroid nodules. USG guided FNAC is a least invasive, simple and most accurate method to evaluate thyroid nodule.

In the present study, age of the patients ranged between 21-50 years with female preponderance affecting

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72.2%of females and Male to female ratio is 1:2.6.

In our study highest number of cases were diagnosed in Bethesda class II (56.9%)in USG guided FNAC indicating that most of the thyroid nodules are benign. In Histopathological examination, 60.3%thyroid nodules were benign and 34.5% were malignant. Most common benign pathology in our study was benign colloid goitre seen in 20(60.6%) cases which is almost similar to a finding in a study done by Prasad *et al*, [6].

Out of 8 cases in Bethesda class IV, two cases were diagnosed as follicular adenoma and 6 cases were papillary thyroid carcinoma in histopathology. This is due to the fact that FNAC has a limitation to differentiate follicular adenoma from follicular carcinoma [7].

All class V (suspicious for malignancy) and class VI (malignant) were turned out malignant in histopathology. This shows high concordance between US guided FNAC and histopathology findings. Similar results were reported by Kessler *et al*. [8].

In our study most common malignancy was papillary carcinoma which is similar to a finding in study done by Singh P *et al*. [9].

Conclusion

Regarding concordance between FNAC and histopathological assessment of the thyroid nodules, the study showed a satisfactory agreement rate between FNAC and histopathological findings, especially for malignant features. This study shows that diagnosing malignancy using FNAC is easy, cost-efficient, and demonstrates accuracy in the case of thyroid malignancy. Hence USG guided FNAC is nearly as accurate as histopathology in diagnosis of malignancy.

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