

Correlation of FNAC with Histopathology in the Diagnosis of Differentiated Thyroid Carcinoma

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Conflict of Interest: None

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Abstract

Background: Fine-needle aspiration cytology (FNAC) is an important diagnostic tool for differentiating between neoplastic and non-neoplastic lesions of the thyroid. The current study was carried out to observe the comparison between preoperative fine needle aspiration cytology (FNAC) and postoperative Histopathology in the diagnosis of Differentiated Thyroid Carcinoma.

Methods: This cross sectional observational study was conducted in the department of Pathology, Rajshahi Medical College (RMC), Bangladesh from January 2019 to December 2020. Clinically suspected and diagnosed by FNAC, a total of forty patients of differentiated thyroid carcinoma attending outpatient and inpatient department of Otolaryngology, RMCH were enrolled in this study. Biopsy material was examined for histopathological diagnosis.

Results: In this study, out of forty cases, 35 were papillary and 5 were follicular carcinoma. Mean age was 25.48±9.70 years and Male: Female was 1:6. Among 40 cases of FNAC findings, 33 cases (82.5%) were classic papillary carcinoma, 01(2.5%) case was follicular variant of papillary carcinoma, 5 cases were (12.5%) were follicular lesion and 01(2.5%) case was nodular goitre. Among 40 cases of histopathological findings, 32(80%) cases were classic papillary carcinoma, 03(7.5%) were follicular variant of papillary carcinoma and 5 cases were follicular carcinoma. In histopathological findings, none of them was nodular goitre. So, all FNAC findings were consistent with histopathological findings except nodular goitre which was diagnosed as classic papillary carcinoma in histopathology.

Conclusion: FNAC is a safe and relatively accurate method for preoperative evaluation of thyroid malignancy before surgery. Therefore it is a reliable diagnostic test for evaluation of thyroid carcinoma.

Key Words:

Differentiated thyroid carcinoma.
FNAC, Histopathology

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Introduction

Diseases of thyroid gland are very common in our country.¹ Problems with the thyroid gland include a variety of disorders that result in production of too less or excess thyroid hormone. There are many types of thyroid disease, each with their own symptoms. Among them, Hypo-

thyroidism, Hyperthyroidism, Structural abnormalities, most commonly a goiter (enlargement of the thyroid gland) and Tumors which can be benign or malignant are notable.

Cancer of the thyroid gland is the most common endocrine malignancy and its incidence is increasing worldwide. Studies showed that about eighty percentages (80%) of thyroid tumors comprise well-differentiated carcinoma.² According to the WHO classification; differentiated thyroid carcinoma can be subdivided into papillary and follicular thyroid carcinoma. The histological differentiation is to be useful as papillary and follicular thyroid carcinoma differ in their biological behavior which may be reflected in a somewhat distinct therapeutic approach. Papillary and follicular thyroid carcinomas that

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usually carry an excellent prognosis while a minority progress to poorly differentiated carcinoma and, ultimately, to the highly aggressive and lethal undifferentiated carcinoma.³

Thyroid cancer causes a long term chronic disease. So, one of the challenges in thyroid cancer management is to provide the least invasive and most cost effective follow up which allows detection of recurrent or progressive disease. There are multiple modalities of diagnostic test for thyroid lesions like Ultrasonogram, thyroid scan, fine needle aspiration cytology (FNAC), thyroid function test etc.¹ FNAC is considered as the most common reliable test for the diagnosis of thyroid nodule or mass. FNAC is safe relatively simple and cost effective for evaluation of thyroid patients. This procedure provides a tool for detecting thyroid malignancies in an early stage, resulting in a better outcome of patients.⁴ For Final diagnosis, morphological examination of thyroid lesions is essential for which FNAC and histopathological examination becomes mandatory tests.^{5,6} It is useful for diagnosis of pathological lesions of multiple organs such as lymph nodes, breast, thyroid gland etc. Being superficial and easily accessible, thyroid is an ideal organ for FNAC procedure; it also helps in deciding the line of treatment and taking decision about the surgical procedure.⁷ Histopathological examination of surgically resected thyroid lesions is also one of the accurate ways to diagnosis the pathology. So, the aim and objective of this study was to compare the results of FNAC and Histopathology in diagnosis of the commonest thyroid malignancy that is Differentiated Thyroid Carcinoma.

Objectives:

Primary: To observe the comparison between preoperative fine needle aspiration cytology (FNAC) and postoperative Histopathology in the diagnosis of Differentiated Thyroid Carcinoma.

Secondary: (a). To observe the demographic profile of the patients with differentiated Thyroid Carcinoma. (b). To find out the percentage of variants of differentiated thyroid Carcinoma among study population.

Materials and methods

This was a cross sectional observational study, conducted in the department of Pathology, in collaboration with the department of Otolaryngology, Rajshahi Medical College Hospital (RMCH), Rajshahi from January 2019 to December 2020. Clinically suspected and diagnosed by FNAC patients of differentiated thyroid carcinoma attending outpatient and inpatient department of Otolaryngology, RMCH and in private clinics who fulfill the inclusion criteria constituted the study population for the study. Sample size was 40 in

number. Patients were selected by purposive sampling. Pre-designed data sheet was used for recording all relevant information's and laboratory results regarding patients. The data were recorded methodically and meticulously.

First the clinical information's regarding patients were recorded separately. FNAC was done before operation and data was recorded. After operation histological diagnosis was made based on H & E stain and histopathological reports were also recorded. The collected data was compiled in a master sheet. Data were analyzed by using SPSS-23 (Statistical Package for Social Science) software program of computer and where necessary manually. Mean and standard deviation were done for continuous data and percentage done for categorical data.

Results:

Table I

Age and sex distribution of differentiated thyroid carcinoma patients (n=40)

Age groups (years)	Sex		Total n (%)
	Male n (%)	Female n (%)	
<20	1(50%)	1(50%)	2(5%)
20-40	4(11.1%)	32 (88.8%)	36(90%)
>40	0(00%)	2(100%)	2(5%)
Total	5(12.5%)	35(87.5%)	40(100%)

Mean + SD = 25.48 + 9.70 years

Among the 40 patients studied, the age ranged from 17 to 74 years. Mean age was 25.48+9.70 years. Majority of the patients were in the age group 20 to 40 years. 35 cases (87.5%) were female and 5(12.5%) cases were male.

Table II

Age distribution of variants of differentiated thyroid Carcinoma patients (n=40).

Age group (years)	Papillary	Follicular
15-30	33(82.5%)	1(2.5%)
31-45	1(2.5%)	4(10.0%)
46-74	1(2.5%)	0(00.0%)

Among the 40 cases, 33 cases (82.5%) of papillary carcinoma were in age range of 15-30 years, 1 case was in 31-45 years age range and another 1 case was in 46-74 years age group. Rest of the 5 cases of follicular carcinoma, 4 cases was in age range of 31 -45 years and another one was in 15-30 years age group.

Table III

Sex distribution of papillary and follicular carcinoma patients (n=40).

Carcinoma Type	Cases	Male	Female	M:F Ratio
Papillary	35	5	30	1:7
Follicular	5	0	5	
Total	40	5	35	

This table showed that out of 40 cases, papillary carcinoma was 35 and follicular carcinoma was 5. In papillary carcinoma, 30 cases were female and 5 cases were male. M: F ratio was 1:6. In follicular carcinoma all cases

Table IV

FNAC findings of the study populations (n=40)

Findings	Numbers of cases n (%)
Papillary carcinoma (classic)	33(82.5%)
Follicular variant of papillary carcinoma	01(2.5%)
Follicular lesion/ Follicular carcinoma	06(15%)
Total	40(100%)

Among 40 cases of FNAC findings, 33(82.5%) cases were classic papillary carcinoma, 01(2.5%) case was follicular variant of papillary carcinoma, 6 cases (15%) were follicular lesion.

Table V

Histopathological distribution of differentiated thyroid carcinoma patients (n=40)

Findings	Numbers of cases n (%)
Papillary carcinoma (classic)	33(82.5%)
Follicular variant of papillary carcinoma	01(2.5%)
Follicular lesion/ Follicular carcinoma	05(12.5%)
Nodular goitre	01(2.5%)
Total	40(100%)

Among 40 cases of histopathological findings, 32(80%) cases were classic papillary carcinoma, 02(05%) were follicular variant of papillary carcinoma and 5 cases were follicular carcinoma. In histopathological findings 01(2.5%) case was nodular goitre. So, all FNAC findings were consistent with histopathological findings except one case which was misdiagnosed as follicular carcinoma in FNAC but histopathology confirmed as goitre.

Table VI

Correlation of FNAC with Histopathological Examination

FNAC	Histopathology		Total
	Neoplastic	Non Neoplastic	
Neoplastic	39	1	40
Non neoplastic	0	0	0
Total	39	1	

Sensitivity-100%, Accuracy – 97.5%.

Discussion:

Thyroid malignancy is estimated at about 1% of all malignancies. Eighty percentages (80%) of thyroid tumors comprise differentiated carcinoma. Differentiated thyroid carcinoma can be subdivided into papillary and follicular thyroid carcinoma.⁸ Differentiated thyroid carcinoma has favorable prognosis but it can also be aggressive, leading to recurrent disease or death and needs lifelong monitoring. The present study was undertaken with the aim to observe the comparison between preoperative fine needle aspiration cytology (FNAC) and postoperative Histopathology in the diagnosis of Differentiated Thyroid Carcinoma.

Total 40 patients of differentiated thyroid carcinoma attending department of Otolaryngology, Rajshahi Medical College Hospital were included in this study. The age of patients ranged from 17 years to 74 years, maximum study subjects were in age group of 20-40 years and mean age was 25.48+9.70 years. Md. Nazmul Haque et al (2021) showed in their study that most were between 31-40 years age group. Mean age was 29.5 years. In another study from Bangladesh, Alam (2005) showed that mean age of papillary carcinoma patients was 32.98 years and age range was 12-68 years.⁹ So the present study is consistent with others.

Among the 40 cases, 33 cases (82.5%) of papillary carcinoma were in age range of 15-30 years, 1 case was in 31-45 years age range and another 1 case was in 46-74 years age group. Rest of the 5 cases of follicular carcinoma, 4 cases was in age range of 31 -45 years and another one was in 15-30 years age group. Gimm O and Dralle H. showed that Papillary thyroid carcinoma comprises up to 80% of all thyroid malignancies. It occurs in all age groups but is most common in the 3rd to 5th decades. Follicular thyroid carcinoma represents approximately 10–20% of all thyroid malignancies. It occurs over a wide age range but is most common in the 5th and 6th decades.⁸

In this study, 35 cases (87.5%) were female and 5(12.5%) cases were male. So, Male: Female was 1:7. In papillary

carcinoma, 30 cases were female and 5 cases were male. M: F ratio was 1:6, which was supported by Alam (2005) (1:4.4).⁹

Among 40 cases of FNAC findings, 33(82.5%) cases were classic papillary carcinoma, 01(2.5%) case was follicular variant of papillary carcinoma, 6 cases (15%) were follicular lesion. Haque MN et al (2021) showed that in their study, preoperative FNAC was done for 104 cases. Among them 34.62% were neoplastic among which 22 patients (21.15%) were papillary carcinoma, 10 patients (9.61%) were follicular neoplasms, 2(1.9%) medullary carcinoma, 2(1.9%) anaplastic carcinoma of thyroid. So, in the both studies, papillary malignancy is the highest finding in FNAC.

Among 40 cases of histopathological findings, 32(80%) cases were classic papillary carcinoma, 02(05%) were follicular variant of papillary carcinoma and 5 cases were follicular carcinoma. In histopathological findings 01(2.5%) case was nodular goitre. In the study of Haque MN et al (2021), among 36 cases of FNAC based diagnosed malignancy those underwent surgery and subsequent histopathological examinations revealed three (3) cases false negative. In 10 cases of follicular Neoplasm 2 cases were Non conclusive cytological diagnosis and 1 false cytological diagnosis of anaplastic carcinoma. No false negative found in papillary malignancy. In their study, one case of goitre is misdiagnosed as follicular carcinoma. So our findings are consistent with the finding of this study.

In our study, all FNAC findings were consistent with histopathological findings except one case which was misdiagnosed as follicular carcinoma in FNAC but histopathology confirmed as goitre. So, the validity of FNAC in this study revealed, Sensitivity was 100%, diagnostic accuracy was 97.5%. This accuracy is compared with that of Haque MN et al (91.35%),¹ altavillaetal (92.86%)¹⁰ and Handu at al¹¹ grunt et al¹² found false negative rate of only 0.7% in 439 patients. Result of this study is almost similar to that of the international studies.

Conclusion

FNAC is a safe and relatively accurate method for preoperative evaluation in thyroid malignancy before surgery. Therefore it is a reliable diagnostic test for evaluation of thyroid carcinoma. FNAC can help to exclude many unnecessary thyroid surgeries by screening benign lesions.

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