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Evaluation of the Role of Fine Needle Aspiration Cytology in the Diagnosis of Follicular Patterned Lesions of Thyroid

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ABSTRACT

Aim: *The study aimed to evaluate the role of Fine Needle Aspiration Cytology (FNAC) in follicular patterned lesions of thyroid.*
Materials and methods: *A prospective study was done in 30 cases in which FNAC showed follicular patterned lesions. Histopathological correlation was done wherever possible.*
Result: *Out of 30 cases of follicular patterned lesions 17 cases were reported as follicular neoplasm, 12 cases were reported as adenomatous goiter and one case was reported as follicular variant of papillary carcinoma of thyroid in FNAC. Based on the FNAC diagnosis, surgery was done and histopathological correlation was available in nine cases.*
Conclusion: *FNAC is quite accurate in follicular patterned lesions of thyroid with a sensitivity of 70.6%, specificity of 100% and diagnostic accuracy of 80%.*

Keywords: *FNAC, Follicular patterned lesions, Thyroid*

INTRODUCTION

Thyroid nodules occur in 20% to 70% of the population, which shows an increasing trend in the incidence with age and comprise a significant proportion of cytology specimens. Fine needle aspiration cytology (FNAC) is the most sensitive, accurate and cost effective initial method for the clinical management of patient with thyroid nodules.[1] Majority of the thyroid nodules are benign, with cancer accounting for only 1 % of all the lesions. Hence it is imperative for the treating surgeon to know the biologic nature, as to benign versus malignant lesions and thus plan appropriate treatment. [2] This would in turn avoid unnecessary surgeries. Follicular patterned lesions is a grey zone area in cytology. This category encompasses wide variety of lesions ranging from benign to malignant lesions such as dominant nodule of an adenomatous goiter, follicular neoplastic lesions including adenoma and carcinoma and follicular variant of papillary carcinoma. The major cause of false positive and false negative rates at FNAC has been attributed to follicular patterened lesions. There are several studies published in literature revealing the difficulties posed by the pathologist in the area of follicular patterned lesions of thyroid.[3,4] In the present study the efficacy of FNAC in the diagnosis of the follicular patterened lesions of thyroid was evaluated.

MATERIALS AND METHODS

A prospective cross sectional study was conducted over a duration of three years. 30 cases depicting follicular patterned lesions at FNAC were selected from the files of cytopathology, irrespective of age and sex of the patient. FNAC was done by non aspiration technique using a 23 guage needle. 50% slides were fixed in 50% ethanol and 50% were air dried. The fixed slides were stained with Haematoxylin and Eosin, modified Papanicolaou stains. The air dried smears were stained with Giemsa stain. Two experienced Pathologist reported on the smears in double blinded fashion. Only the adequate smears with predominant follicular cell pattern were included in the study.
The lesions were classified into three categories as adenomatous goiter, follicular neoplasm and follicular variant of papillary carcinoma (FVPCT).

RESULTS

Cytology diagnostic categories:
Among 30 cases of follicular patterened lesions, 17 cases were reported as follicular neoplasm, 12 cases were reported as adenomatous goiter and one case was reported as follicular variant of papillary carcinoma of thyroid. (Table 1)

Cytology - Histopathologic correlation:
Histopathological correlation was available in nine cases. Table 2 shows cyto histopathology correlation in the nine cases. Concordant diagnosis was obtained in six cases. There were two cases of false positive wherein a follicular adenoma was misinterpreted as adenomatous goiter. There was one false negative wherein a case of FVPCT was missdiagnosed as follicular neoplasm. Sensitivity, specificity and accuracy of FNAC in the interpretation of follicular patterned lesions was found to be 70.6%, specificity of 100% and diagnostic accuracy of 80%.

Table 1: Table depicting cytodiagnostic categories in follicular patterned lesions.

Categories	Categories of follicular patterened lesions	FNAC Diagnosis N (%)
1	Adenomatous goiter	12 (%)
2	Follicular neoplasm	17(%)
3	Follicular variant of papillary carcinoma	01(%)
	Total	30

Table 2: Depicting the Cyto histopathologic correlation.

FNAC	Histopathology	
	Concordant cases	Discordant cases
FN (4)	03	01
FVPC(1)	01	-
AG (4)	02	02
Total (9)	06	03

FNAC- Fine needle aspiration cytology, FN – Follicular neoplasm, FVPCT- Follicular variant of papillary carcinoma of thyroid, AG-Adenomatous goiter.

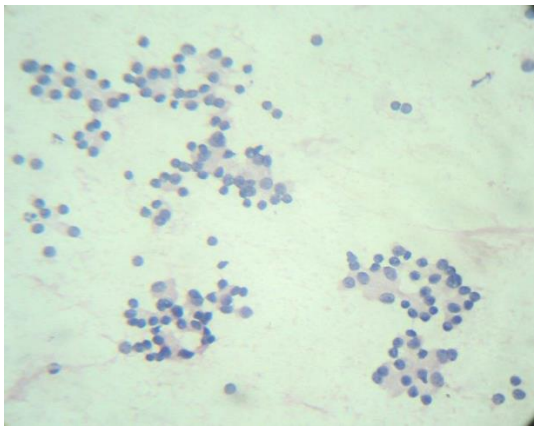

Fig. 1: FNAC smears repetitive microfollicles in follicular patterened lesions of thyroid. (H and E, × 40).

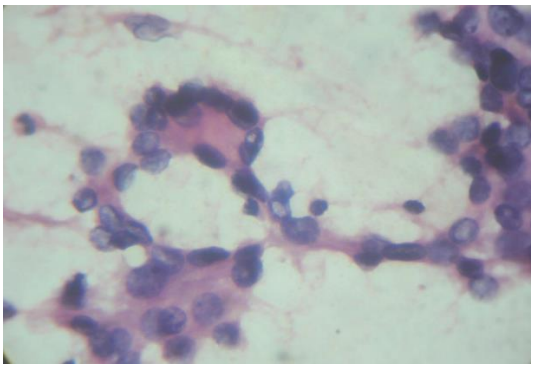

Fig. 2: FNAC smears of follicular variant of papillary carcinoma showing nuclear clearing and nuclear grooving (arrow marks) (H and E, × 1000).

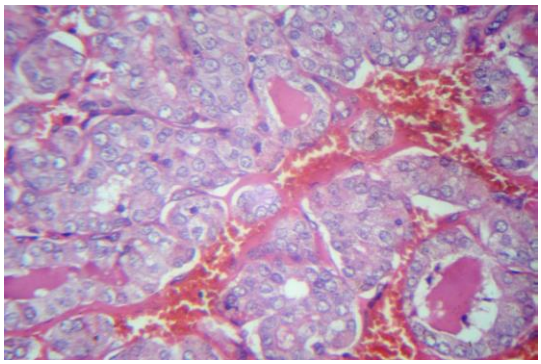

Fig. 3: Sections of follicular variant of papillary carcinoma of thyroid (H and E, × 1000).

DISCUSSION

FNAC is a sensitive and specific tool in distinguishing neoplastic from non-neoplastic thyroid lesions. Meticulous examination of the pattern along with cellular details and background characteristics would be helpful in accurately diagnosing thyroid lesions.[4] By light microscopy at FNAC a thyroid lesion is designated as follicular when it totally or almost totally (more than 95%) displays a follicular growth pattern or thyroid follicles with central lumen containing variable amounts of colloid. The differential diagnosis of follicular patterned lesion or neoplasm in thyroid FNAC specimens includes hyperplastic/adenomatous goiter, follicular adenoma and carcinoma and follicular variant of papillary thyroid carcinoma.[4] They are diagnosed based on cytoarchitectural pattern, nuclear features, cytological atypia, and background colloid material.

Several studies have shown that the major pitfall of FNAC in thyroid has been the follicular patterned lesions.[6,7,8] Adenomatous/hyperplastic goiter yields cellular smear with follicular cells in micro and macro follicular pattern. The follicular cells are small and are in the background of colloid. At times dominant nodule of an adenomatous goiter poses a diagnostic challenge if the aspirate shows only repetitive microfollices. This can lead to the overdiagnosis as follicular neoplasm. However variable pattern comprising of micro and macrofollicles in other areas of the smear/another smears, background of colloid would aid in the diagnosis of a goitrous lesion. In doubtful cases repeat FNAC from other areas would solve the dielemma. Adenomatous goiter on histopathology shows a complete or partial encapsulation and mixture of micro and macro follicles filled with colloid associated with degenerative changes like hemorrhage, fibrosis and calcification, a morphology which can be appreciated at cytology.[9] Likewise in follicular neoplasm, aspirate from a macrofollicular area would yield abundant colloid and a variable micro and macrofollicular pattern. This would erroneously label a neoplastic lesion as an adenomatous goiter.

Nevertheless, cytological features like increased cellularity with nuclear crowding and overlapping, repetitive microfollicular pattern, scanty or no colloid can be of aid in distinguishing follicular neoplasms from nodular goiters.[10] It has been proposed that the risk of follicular neoplasm is inversely related to size of the follicle and amount of colloid. Smears with abundant colloid and macrofollicles are at low risk of being neoplastic while smears with scant or no colloid is at high risk.[11] Follicular carcinoma however should have the nuclear features like crowding, overlapping, prominent nucleoli, chromatin clumping and parachromatin clearing.

However at FNAC these lesions would fall under the category of follicular neoplasm. Nothing short of capsular and vascular invasion at histopathology would classify them as follicular carcinoma. In the present study two discordant cases were of follicular adenomas which was diagnosed as adenomatous goiter at FNAC. This discordance was due to the presence of normo/macrofollicles and abundant colloid. Similar pitfall in diagnosis was encountered by Clary *et al*.[12] The necrotic material in the aspirate might be misinterpreted as thick colloid. FVPCT showed cell rich smears with follicular epithelial cells in predominantly micro follicular pattern. Ocasionally papillary fragments may be noted. The classical nuclear features of papillary carcinoma like nuclear grooving, clearing and intranuclear inclusions and powdery chromatin pattern make the diagnosis evident. However at times fixation error may obscure these findings making the diagnosis difficult. In the present study, we observed similar problem, leading to a false negative diagnosis.[13]

Careful observation of the cell pattern along with cytomorphologic details and background material would classify the follicular patterned lesions into appropriate category, as to non-neoplastic or neoplastic. However at times the grey zone lesions poses dilemma, at such time immunohistochemistry would help the pathologist and surgeons plan appropriate management.

CONCLUSIONS

Follicular patterned lesions is a grey zone area in FNAC of thyroid lesions. Careful observation of the cell pattern along with cytomorphologic details and background material would classify the follicular patterned lesions into appropriate category. In the present study FNAC was quite accurate in follicular patterned lesions of thyroid with a sensitivity of 70.6%, specificity of 100% and diagnostic accuracy of 80%.

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