



Role of Ultrasonography in recognition of malignant potential of thyroid nodules on the basis of their internal composition

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Background and Objectives

Nodular thyroid is a common clinical entity. The optimal diagnostic strategy to evaluate the nodule and differentiate it into benign and malignant, keeping in mind all the associated accompanying features is still a matter of debate. The present study was undertaken to evaluate the diagnostic efficacy of ultrasonography and fine needle aspiration cytology in differentiating benign and malignant thyroid nodules on the basis of composition (solid, cystic or mixed).

Materials and Methods

A prospective study was carried out in 65 patients of all age groups and both sexes attending the radiology department of Bankura sammilani medical college and hospital, Bankura, during the period Of January 2018 to march 2018. These patients were referred to the department by Department of General Medicine, General Surgery and ENT.

Inclusion criteria-all patients with a palpable neck swelling clinically examined to be thyroidal in origin.

Exclusion Criteria- patients with diffuse neck swelling, ulcerative and fungating neck masses, moribund patients.

All patients thus included in the study, were evaluated by grey scale USG by the linear probe on HD7 Philips machine and colour Doppler and then subjected to FNAC after an informed consent was taken.

Histopathology was done whenever required. The results were then compared.

Statistical analysis was conducted on a master chart created in MS Word and Excel sheet, evaluated by SPSS 17.0. sensitivity, specificity, positive predictive value and negative predictive value were calculated to analyse the diagnostic accuracy of ultrasound and correlating with FNAC/HPE (Fine Needle Aspiration Cytology/ Histopathological Examination), as gold standard. For all statistical tests, $p < 0.005$ was taken to indicate a significant difference.

Observations and Results

This study was conducted in the Department of Radio-diagnosis of Bankura Sammilani Medical College and Hospital, Bankura. 65 patients were included in the study.

Chart 1-age distribution of patients included in the study

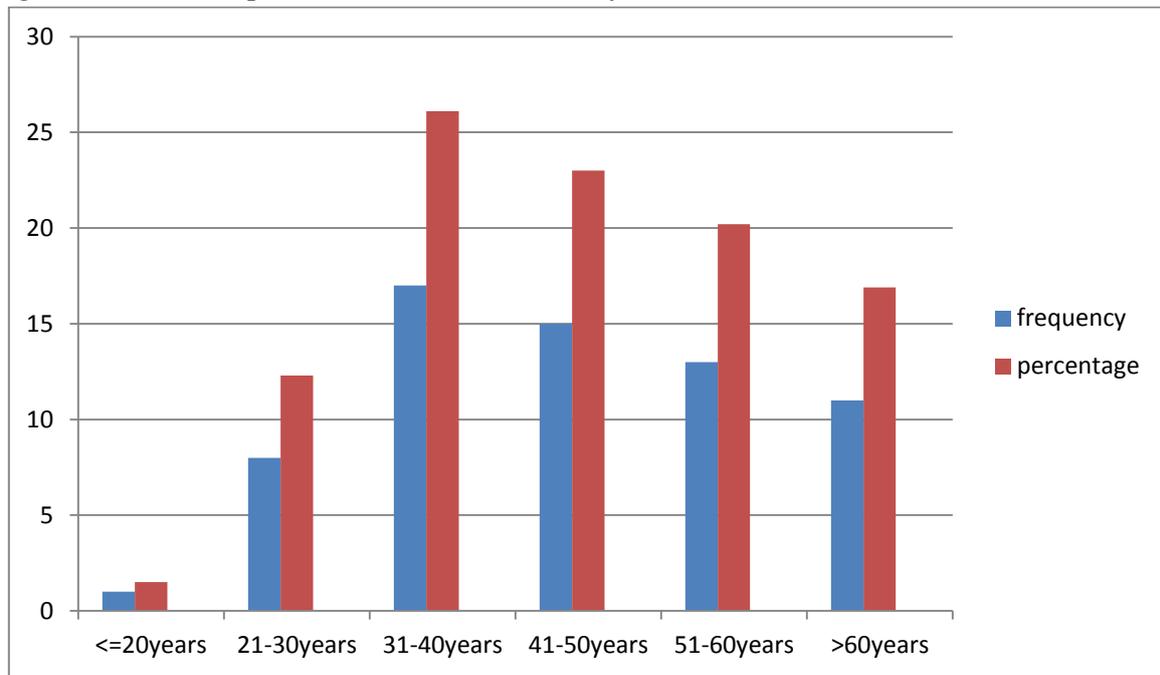


Chart 2- Sex distribution (n=65)

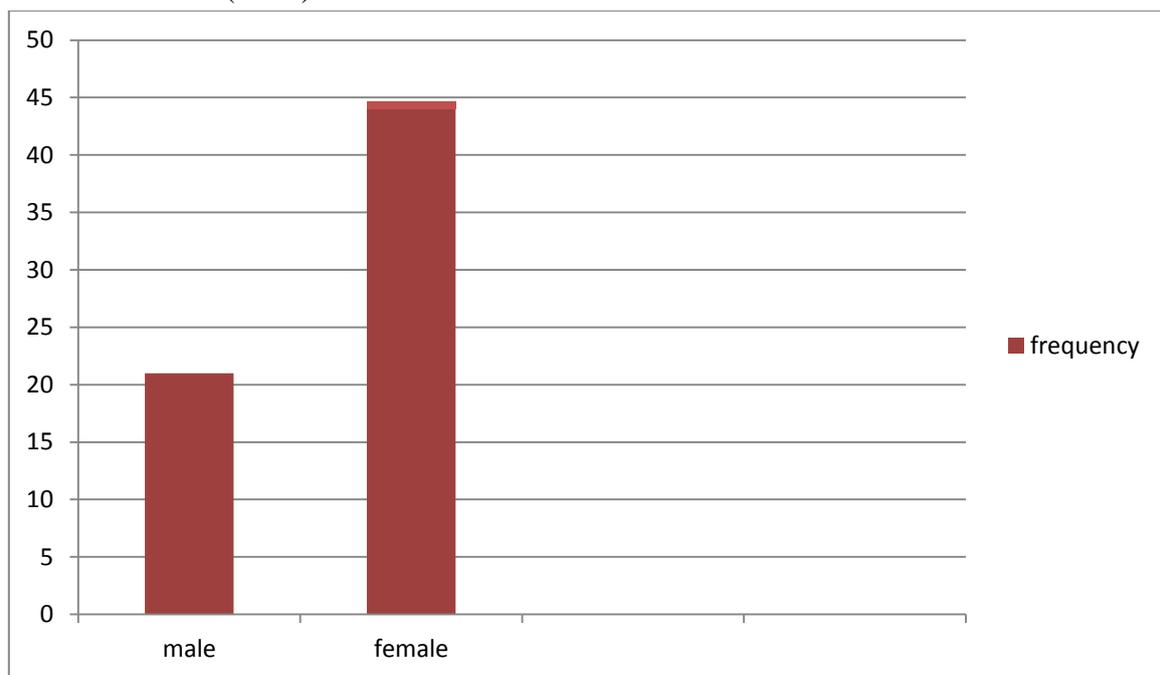


Table 1- Distribution of nodules based on echogenicity

Echogenicity	FNAC benign%	FNAC malignant%	P value
Anechoic	12	0	0.322
Heterogeneous	6	6.7	1.0
Hypoechoic	22	86.7	<0.001
Hyperechoic	24	0	0.05
isoechoic	36	6.7	0.049

Chart 3-Distribution depending on echogenicity

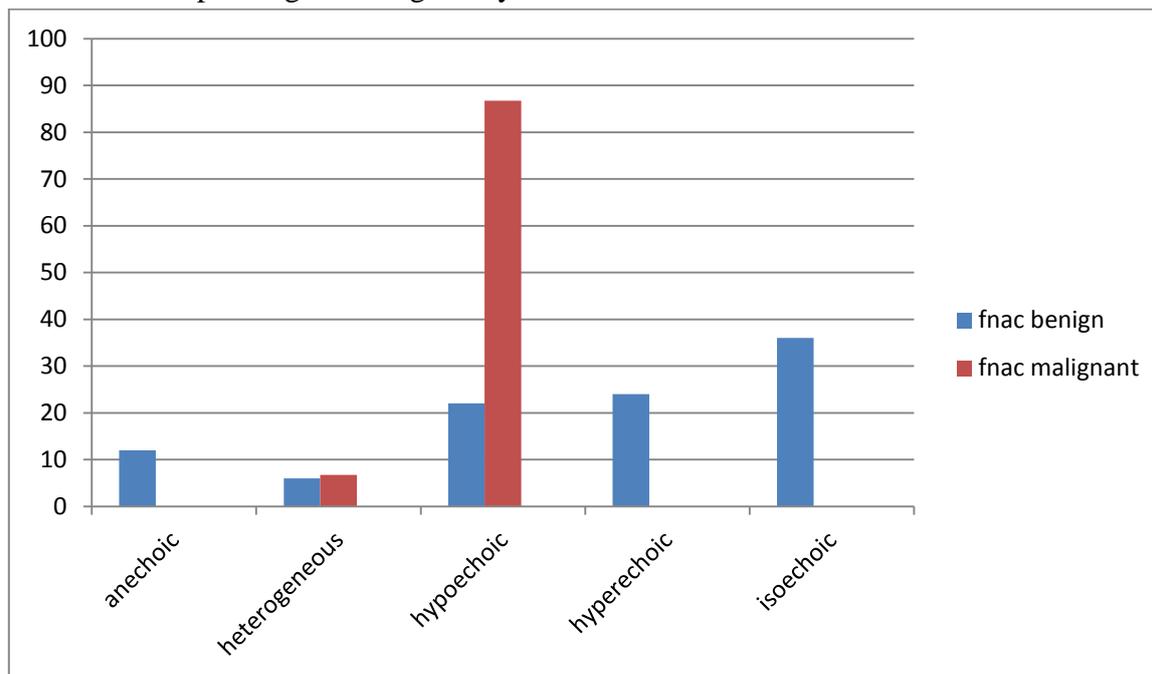


Table 2- Distribution of Thyroid nodules based on internal contents

Internal contents	FNAC	FNAC	FNAC	FNAC	P VALUE
	BENIGN	BENIGN	MALIGNANT	MALIGNANT	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE	
CYSTIC	5	10	0	0	0.70
MIXED	32	64	6	40	0.06
SOLID	13	9	60	0.015	

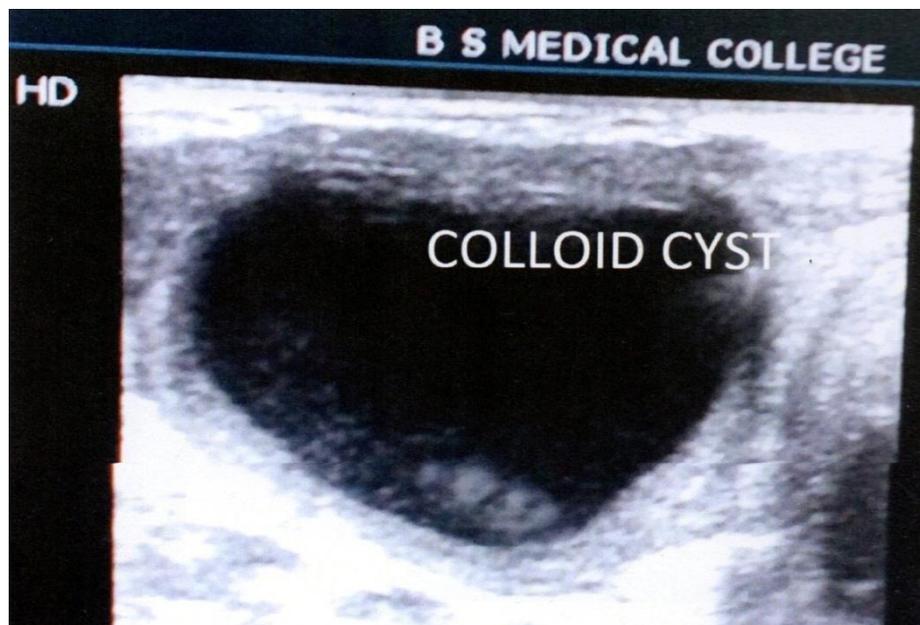


Figure above shows a well defined anechoic cystic Space occupying lesion in right lobe of thyroid. FNAC- colloid cyst

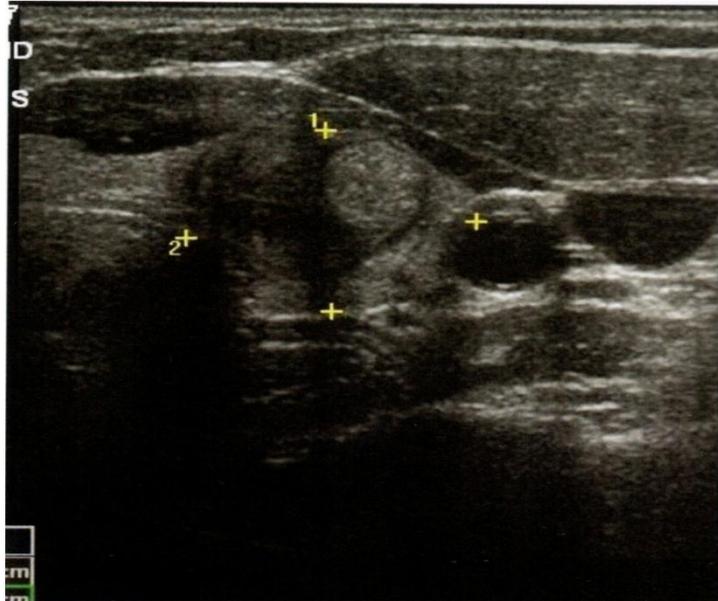


Figure above shows a mixed space occupying lesion with a mural nodule



Figure above shows a mixed internal composition space occupying lesion. FNAC-colloid nodule

Chart 4-Distribution depending on internal contents

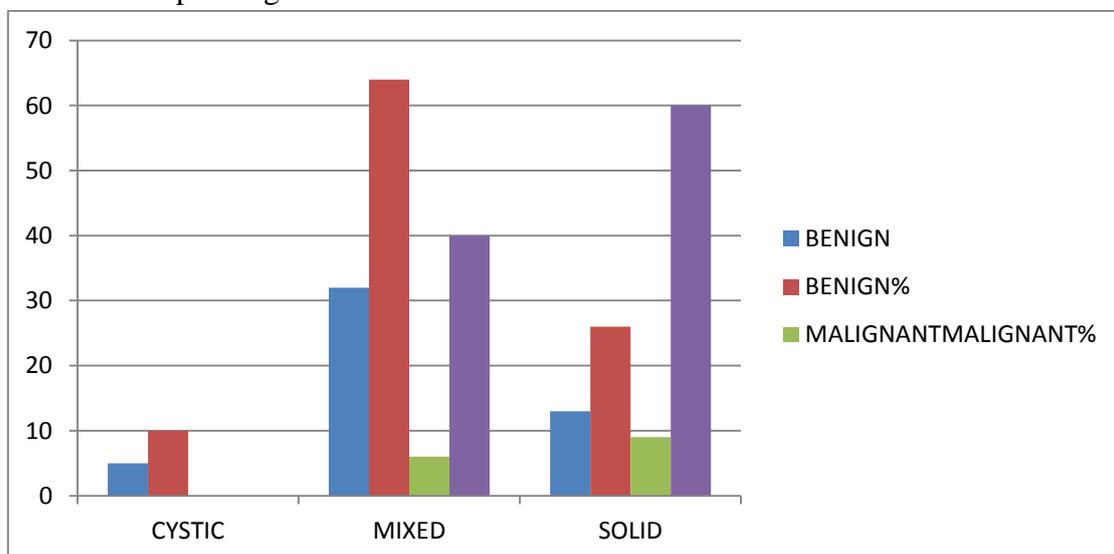


Table 3 Distribution of thyroid nodules based on calcification

Calcification	Fnac benign	%	Fnac malignant	%	P value
Absent	40	80	8	53.3	0.039
Macro	5	10	1	6.7	1.0
Micro	5	10	6	40	0.007

Chart 5-showing distribution on basis of calcification within nodules

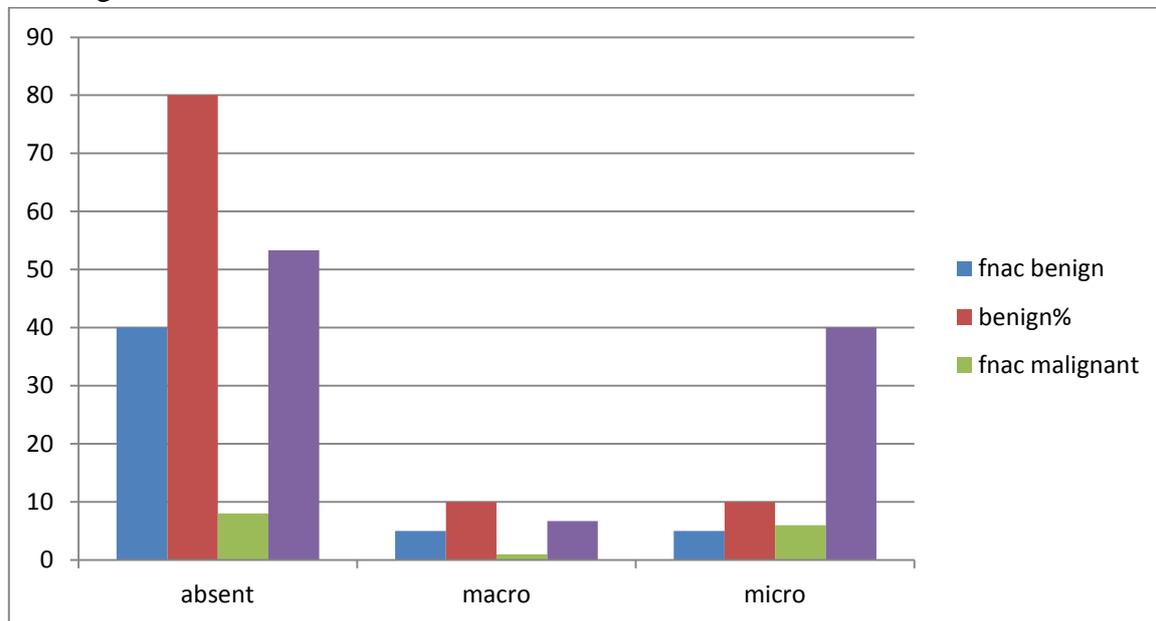
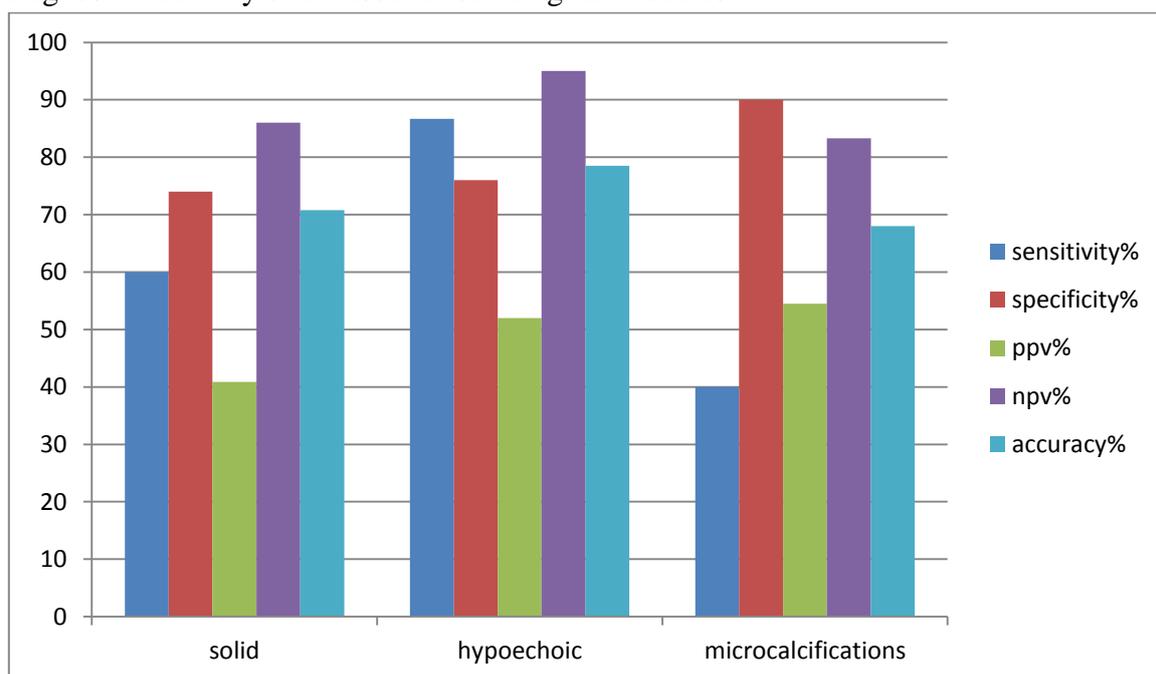


Table 4-Diagnostic accuracy of Duplex ultrasound features for internal composition of malignant nodules

USG features	Sensitivity%	Specificity%	Positive predictive value%	Negative predictive value%	Accuracy
Solid	60	74	40.9	86	70.8
Hypoechoic	86.7	76	52	95	78.5
microcalcification	40	90	54.5	83.3	68

Chart 6-diagnostic accuracy of ultrasound for malignant nodules



Interpretations and Conclusions-in our study, most of the benign nodules as well as the malignant nodules were predominantly solid or solid-cystic with predominant solid components. thus a predominantly solid component alone cannot be a useful criterion for the differentiation of malignant from benign nodules. The positive predictive value of solid nodules is only 40% compared to 86% on negative predictive value. out of 50 benign nodules, maximum were isoechoic to the normal glandular parenchyma. Hypoechoic appearance of malignant nodules is significant. presence of micro calcifications in 40% malignant nodules as compared to 10% benign nodules is also significant.

Summary

In our present study, we found that , most of the benign nodules as well as the malignant nodules were predominantly solid or solid-cystic with predominant solid components. thus a predominantly solid component alone cannot be a useful criterion for the differentiation of malignant from benign nodules. A combination of ultrasonographic features as well as pathological correlation is very necessary to increase the diagnostic accuracy and decrease the number of unnecessary invasive interventions in benign cases.

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