

ULTRASOUND OF THE COLD THYROID NODULE

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INTRODUCTION

110 patients with thyroid nodules were examined by ultrasound during the period from April 1981 to June 1983. All patients had thyroid isotope scans which showed cold nodules. Subsequent surgery was performed in each case and histology of the lesions identified. Prior to the introduction of ultrasound the only useful preoperative diagnosis was made by thyroid scintiscanning.¹ The present study was done primarily to determine the nature of the nodules. Miskin and Rosen² concluded that ultrasound was undoubtedly the most useful examination to distinguish solid from cystic thyroid nodules. A further attempt of this study was to determine the incidence of malignancy in the solid lesions. Damascelli *et al.*,³ suggested that ultrasound could be useful in distinguishing benign from malignant lesions, although Thijs⁴ found it difficult on ultrasound alone to differentiate benign from malignant solid nodules.

MATERIALS AND METHOD

A Philips Sonodiagnost 50 Contact Compound scanner was used. Miskin² suggested the use of

2.5 and 5 megahertz probes; and in our series 3.5, 5 and 8 megahertz probes were employed. All these transducers were pointed and producing narrow, pulsed-echo beams. Generally serial transverse and longitudinal sections were made by direct scanning method, as suggested by Goldberg,⁵ Taylor⁶ and Miskin.² High resolution real-time ultrasonograms can also be obtained using the technique described by Scheible,⁷ but such a technique was not employed in the present study.

Fig. 1 shows the position of the patient during the scanning procedure. The neck was hyperextended on a support and small nodules with smooth surfaces were scanned in a single continuous sweep. Large, irregular nodules required some modification in scanning techniques, especially in the transverse sections. In such cases, we would commence scanning from the midline. Half the gland was scanned, and a complete picture of the whole gland in section was made by scanning the other half after freezing the first image. During scanning, the patient was told to remain still and swallowing was not permitted. Midline markers and sternal notch positions were then indicated on the images and these were recorded either as polaroid or multifformat images.

Transverse sections of typical thyroid lesions such as a cyst (Fig. 2), thyroid adenoma (Fig. 3) and haemorrhage into an adenoma (Fig. 4) are shown.

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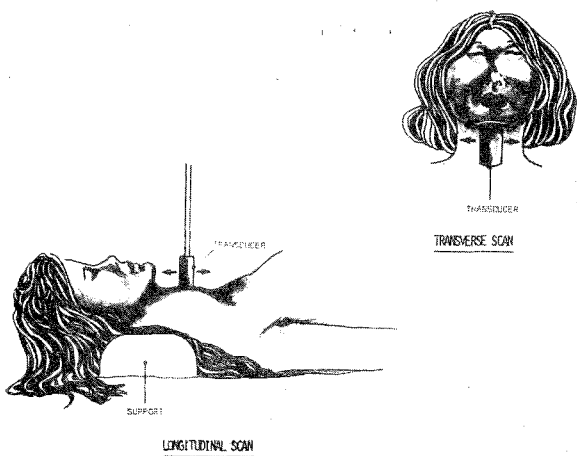


Fig. 1 The positions and directions of the transducer in longitudinal and transverse sections.

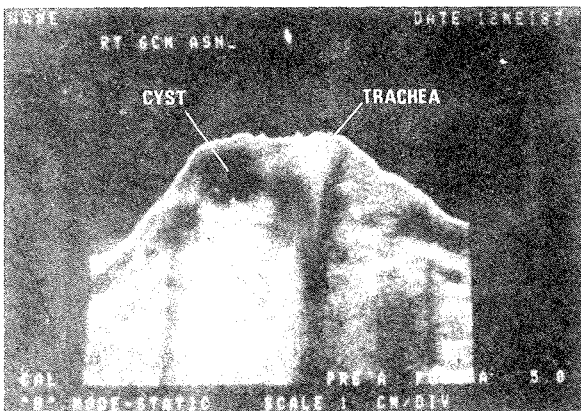


Fig. 2 A right lobe cyst is demonstrated. The trachea is shifted to the left.

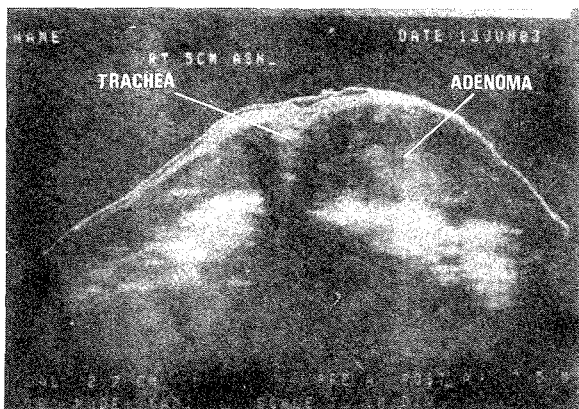


Fig. 3 This figure shows a left thyroid adenoma. The trachea is shifted to the right.

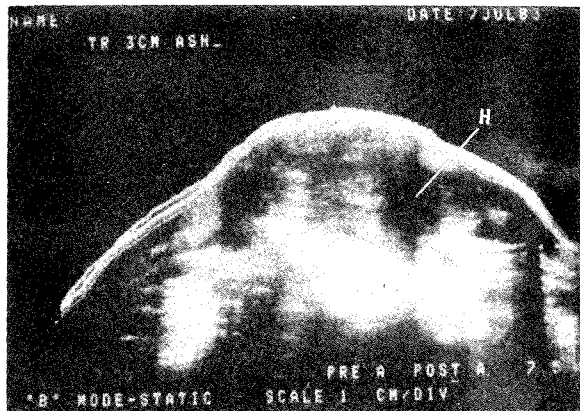


Fig. 4 This figure shows haemorrhage (H), into a left thyroid adenoma. The patient complained of pain at the site of swelling.

RESULTS AND DISCUSSION

From Table I, it can be seen that the majority of the cystic lesions are benign (92.7%), while only 24.6% of the solid lesions are malignant. Fujimoto et al.⁸ found that 12.5–32% of solid thyroid lesions, which were isotopically cold, were malignant.

Among the benign lesions, adenoma formed the majority (55.5%), followed by cysts (20.9%) and nodular goitre (5.5%). Leopold,⁹ in his series

TABLE I
SUMMARY OF RESULTS*

Lesions which are solid on ultrasound	No. of patients	%
Benign lesions	52	75.4
Malignant lesions	17	24.6
Total	69	100.0

Lesions which are cystic on ultrasound	No. of patients	%
Benign lesions	38	92.7
Malignant lesions	3	7.3
Total	41	100.0

* No. of patients with cold thyroid nodules on isotope scans = 110.

TABLE II
HISTOLOGICAL TYPES

	No. of Patients	% of total
Benign Lesions:		
Adenoma	61	55.4
Cysts	23	20.9
Nodular Colloid goitre	6	5.5
Malignant Lesions:		
Papillary carcinoma	17	15.5
Follicular carcinoma	2	1.8
Anaplastic carcinoma	1	0.9

of cold nodules reported 60% adenomas and 20% cysts.

There were 17 cases (15.5%) of papillary carcinoma in our series, and only 1.8% follicular carcinoma. Only one case of anaplastic carcinoma was encountered. Out of the total of 110 cases, 90 cases or 81.8% were benign and only 18.2% were malignant. (Table II).

The following two tables show the distribution of the cases by age, race and sex (Table III) as well as the distribution of malignant thyroid lesions by age, race and sex (Table IV).

TABLE III
DISTRIBUTION OF CASES BY
AGE, RACE AND SEX

Age (yrs)	Malay		Chinese		Indian	
	M	F	M	F	M	F
10 - 19	1	2	-	-	-	1
20 - 29	1	21	1	-	-	4
30 - 39	2	19	3	-	-	4
40 - 49	1	5	1	-	-	6
50 - 59	1	1	-	-	-	1
60 - 69	-	3	1	-	-	1
70 - 79	-	-	1	-	-	-
80 - 89	-	-	1	-	-	-
Total	6	51	8			17

Note: M - male; F - female

TABLE IV
DISTRIBUTION OF MALIGNANT THYROID
LESION BY AGE, RACE AND SEX

Age (yrs)	Malay		Chinese		Indian	
	M	F	M	F	M	F
10 - 19						
20 - 29		6				
30 - 39		1	2			1
40 - 49		1				2
50 - 59						1
60 - 69		2		1		
70 - 79			1			
80 - 89			1	1		
Total		10	4	2		4

Note: M - male; F - female

From the above tables, it is seen that the majority of the patients were in the 20 - 50 year age groups. Of the malignant lesions, although the majority were again in the 20 - 50 year age groups, five patients belonged to the 60 - 90 year age groups. 16.6% of the Malays and Chinese patients, respectively, and 23.5% of the Indians in this series, had malignant thyroid lesions. It is interesting to note that among the Chinese, four of the six patients with carcinoma were males. There were no Indian male patients in our series.

CONCLUSIONS

Ultrasound provides a simple and quick differentiation between solid and cystic thyroid nodules. Accurate localisation and measurement of lesions can be made at the time of examination. Although it is difficult to distinguish benign from malignant lesion on ultrasound alone, it is found that the majority of the cold thyroid nodules turn out to be benign. In our series, the malignant lesions form only 18.2%, conforming to the figures found in most series.

The appearance of benign cystic lesions on ultrasound are typical. Solid lesions which show irregular or ill-defined walls, and which show low echogenicity, tend to favour malignancy. It is hoped that early diagnosis of thyroid cancers can be made, but a combination of diagnostic modalities such

as ultrasound, isotope imaging, and xeroradiography are certainly required to achieve this aim.

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