

Original article

FNAC in the diagnosis of thyroid nodules

¹Qureishi R , ²Usmani M H , ³Singh U R , ⁴Kol P C , ⁵Valame S

¹Assistant Professor, Department of Pathology, SSMC Rewa MP 486001

²Associate Professor, Department of Medicine, SSMC Rewa MP 486001

³Head, Department of Pathology, SSMC Rewa MP 486001

⁴Associate Professor, Department of Pathology, SSMC Rewa MP 486001

⁵Postgraduate student, Department of Medicine, SSMC Rewa MP 486001

Corresponding author: Dr. Qureishi R , Assistant Professor, Department of Pathology, SSMC Rewa , MP 486001

Abstract

Context: Swellings of the thyroid are commonplace in day-to-day practice. Whether symptomatic or not, the differentiation of a benign from malignant swelling is a primary objective for all physicians. In the recent past, Fine Needle Aspiration Cytology (FNAC) has emerged as the foremost application in the diagnosis of thyroid swellings. Through this study, we evaluated the accuracy of FNAC in our setting.

Settings & design: The study was conducted in Shyam Shah Medical College and associated Sanjay Gandhi Memorial Hospital, Rewa (MP), on 86 patients who presented with thyroid swellings.

Methods & material: 86 subjects presenting with thyroid swellings were included on whom FNAC was done whereas histopathology was carried out on 22. The predictive value for FNAC was retrospectively correlated clinically and with biopsy results, if available.

Results: In the current study, 80 diagnoses clinically correlated to 86 cytological diagnoses. The most common thyroid swellings were benign adenomas (69.76%). Out of the 22 biopsies performed, 20(90.91%) were correctly diagnosed by FNAC itself.

Conclusion: FNAC achieved a diagnostic accuracy of 95.34% and a discordance of only 4.66%. As it provides the advantage of being less complicated, cheap, and produces a faster result compared to biopsy, FNAC efficiently differentiates benign from malignant lesions, obviating the patients need to undergo surgery for accurate diagnosis.

Keywords: Fine-Needle Aspiration Cytology; Histology; Thyroid Gland

Introduction

Thyroid disorders are a very common cause of endocrinological disturbance. In a country like ours, 349.8 million (1) are at risk for developing iodine deficiency disorders, goitrogens (2) like cauliflower, cabbage, mustard seeds, radish and turnip are an integral part of the diet, it is imperative to evaluate a diagnostic method whereby such disorders can be easily diagnosed. The prevalence of thyroid nodules is 4-7% in the

adult population (3). The diagnostic dilemma arises as only 5% of thyroid nodules represent cancer (4). Clinically difficult to distinguish between the various presentations, Fine Needle Aspiration Cytology (FNAC) gives the physician an approach towards its treatment. FNAC of the thyroid gland is a first line tool to evaluate thyroid lesions – both diffuse, and nodular. The result is useful in confirming the benignity of the lesion; thereby reducing unnecessary surgery. (5)

Our aim was to diagnose various thyroid mass lesions via FNAC and correlating the results with clinical and histopathological diagnosis.

Settings & Design:

The study was conducted in Shyam Shah Medical College and associated Sanjay Gandhi Memorial Hospital, Rewa (MP) over a period of two years. 86 subjects who presented with swellings in the anterior midline of the neck, referred from various clinical departments to our cytopathology unit, were included in the study. Patients who did not give informed consent and those with swellings not deemed to be of thyroid origin, were excluded.

Materials & methods:

Thyroid swellings were aspirated using (23/24) gauge disposable needles using standard procedures (10). FNAC was performed on 86 subjects and smears were evaluated after Giemsa and/or Haematoxylin & Eosin staining ad

Papanicolaou stains following recommended steps. No inadequate smears were included. Diagnosis of cytological smears was done according to standard criteria defined by various authors (5,11,12). Detailed history, demographic and clinical variables were elicited and relevant investigations were recorded on the structured proforma. Cytological diagnoses were compared with the clinical diagnoses which included the hormonal and radiological diagnoses. Patients with benign diagnoses who did not undergo surgery were followed up with repeated clinico-radiologic assessment. The cytopathological diagnoses were compared to the histopathological results of the same excised tissue, which was available in 22 cases. In cases of discrepancy, histopathologic results were considered the gold standard.

Observations

Table 1: Cytological, Clinical and Histopathological Correlation of Thyroid Gland Lesions

Diagnosis		Number	Clinical Accuracy (%)	Histological Confirmation	FNAC Accuracy (%)
Benign	Adenoma	60(69.76%)	58(96.67%)	17	15(88.23%)
	Cyst	7(8.14%)	6(85.71%)	2	2(100%)
	Nodular Hyperplasia	4(4.66%)	4(100%)	1	1(100%)
	Inflammation	7(8.14%)	7(100%)	1	1(100%)
Malignant		8(9.30%)	7(87.5%)	1	1(100%)
Total		86	80(95.34%)	22	20(90.91%)

The most frequent thyroid lesions were benign adenomas comprising 69.76% of the total lesions. Inflammatory and cystic lesions were seen in 8.14% of cases each while malignancies were seen in 9.3%. When correlated to clinical findings, an accuracy of 95.34% was reached. Histological

confirmation was carried out for 22 lesions with an overall FNAC accuracy of 90.91%. The accuracy of malignant, inflammatory, cystic and hyperplastic lesions was 100%, while that of benign adenomas was 88.23%.

Table 2: Sex Profile of Thyroid Gland lesions

Lesion	Male	Female	Total
Benign Adenoma	20(33.33%)	40(66.67%)	60
Cyst	3(42.86%)	4(57.14%)	7
Nodular Hyperplasia	1(25%)	3(75%)	4
Inflammation	4(57.14%)	3(42.86%)	7
Malignant	0	8(100%)	8
Total	28(32.56%)	58(77.44%)	86

p=0.039

In the current study, thyroid lesions showed a significant affection for the female sex with an overall occurrence of 77.44%. Benign Adenomas (66.67%) and malignant lesions (100%) also were seen more frequently in females. However, inflammatory lesions were slightly more common in males with an occurrence of 57.14%.

Medworld asia

Dedicated for quality research

Wwww.medworldasia.com

Table 3: Age Profile of Thyroid Gland lesions

Age (yrs)	Benign	Cyst	Nodular Hyperplasia	Inflammatory	Malignant	Total
0-10	1 (1.67%)	0	0	0	0	1 (1.16%)
11-20	5 (8.33%)	1 (14.28%)	0	0	0	6 (6.98%)
21-30	14 (23.33%)	1 (14.28%)	0	1 (14.28%)	0	16 (18.61%)
31-40	12 (20%)	2 (28.58%)	2 (50%)	2 (28.58%)		18 (20.93%)
41-50	18 (30%)	3 (42.86%)	2 (50%)	3 (42.66%)	3 (37.5%)	29 (33.72%)
>50	10 (16.67%)	0	0	1 (14.28%)	5 (62.5%)	16 (18.60%)
Total	60	7	4	7	8	86

p=0.029

Although thyroid lesions were found across all ages, they significantly affected the older population with 33.72% of lesions seen in the 41-50 year age group and 18.6% seen in >50 year age group.

Benign thyroid lesions spanned the entire age spectrum, but most commonly affected the 41-50

year age group. Inflammatory lesions were evenly seen across adulthood; peaking in the 41-50 year age group at 42.66%. Malignant lesions, on the other hand, had a significant preponderance in older age with 62.5% of lesions occurring in the >50 year age group.

Table 4: Final Comparative Analysis between Cytology and Histopathology

Cytology	Histopathology		Total
	Benign	Malignant	
Benign	75	3	78
Malignant	1	7	8
	76	10	86

Thus the diagnostic reliability of FNAC in the diagnosis of thyroid lesions are summarised as below:

- | | |
|------------------------------|--------|
| 1. Sensitivity | 70% |
| 2. Specificity | 98.68% |
| 3. Positive Predictive Value | 87.5% |
| 4. Negative Predictive Value | 96.15% |
| 5. Accuracy | 95.34% |
| 6. Discordance | 4.66% |

Discussion

The FNAC accuracy through our study was 95.34%. Various other studies have shown a histological correlation with cytodiagnosis of 95.8% (6), 96.2% (7), 97% (8) and 92.8 (9). Thus, even in our setting, FNAC proves to be an invaluable technique in the diagnosis of thyroid disorders. Esmaili (8) classified 64.3% lesions as benign and 7.8% as malignant. Our study similarly revealed a higher amount of benign lesions (90.7%) but an equivalent percentage (9.3%) of malignant lesions. While 69.76% of benign lesions

were cases of goitre, Esmaili's study (8) included 94.4% cases of the same.

In our 86 cases, 32.56% were male while the remaining 67.44% were females giving a male to female ratio of 1:2.07. Similarly, Sinna's study (9) also revealed a greater proportion of thyroid disease affliction in females (83.8%) over males (16.2%). Among the females in the study, cytology revealed an overwhelming majority of benign goitre (68.97%) compared to malignancy (13.79%).

Thus, the current study, compared with previous similar studies, drew similar conclusions.

Table 5: A comparison of various parameters of FNAC between other studies and current study

Parameter	Current Study	Esmaili ⁸	Sinna ⁹	Bagga ⁷
Sensitivity	70%	91.6%	92.8%	66%
Specificity	98.68%	100%	94.2%	100%
Positive Predictive Value	87.5%	100%	94.9%	-
Negative Predictive Value	96.15%	95.8%	91.8%	-
Accuracy	95.34%	97%	93.6%	96.2%
Discordance	4.66%	3%	6.4%	3.8%

Thus, it is evident from the above comparison how this study also convincingly proved FNAC to be a useful diagnostic utility in the diagnosis of patients presenting with thyroid lesions. Our study achieved a specificity of 98.68% just like the other studies mentioned. On the whole, FNAC evaluation prevents unnecessarily putting the patient 'under the knife'. Hence, FNAC of thyroid

swellings would reduce the need of surgical confirmation.

Recommendations

The results of this study show a high accuracy of FNAC in differentiating benign from malignant thyroid lesions. The avoidance of unnecessary surgery, especially in patients with benign lesions, is a target that is achievable through astute clinical and pathological evaluation via FNAC.

Bibliography

1. Pandav CS, Yadav K, Srivastava R, Pandav R, Karmarkar MG. Iodine deficiency disorders (IDD) control in India. The Indian Journal of Medical Research 2013;138(3):418-433.
2. Chandra AK, Mukhopadhyay, Lahari D, Tripathy S. Goitrogenic content of Indian cyanogenic plant foods & their in-vitro anti-thyroidal activity. Indian J Med Res 119, May 2004, pp 180-185
3. W. C. faquin, "Aspiration of the thyroid," in Atlas of Diagnostic Cytopathology, B. F. Atkinson, Ed., pp. 460-470, Saunders, 2004.
4. Castro MR, Gharib H. Thyroid nodules and cancer: when to wait and watch, when to refer. Postgrad Med 2000; 107(1): 113-24.
5. Orell SR, Sterrett GF. Fine needle aspiration cytology (5th ed.), Churchill-Livingstone, New Delhi (2012), pp. 118-155.
6. Kukar N, Malhotra V, Saluja M. *Analysis Of Fine Needle Aspiration Cytology Of Thyroid Lesions*. The Internet Journal of Pathology. 2013 Volume 15 Number 1.
7. Bagga PK, Mahajan NC. Fine needle aspiration cytology of thyroid swellings: how useful *and accurate is it?*; Indian J Cancer. 2010 Oct-Dec;47(4):437-42.
8. Esmaili HA, Taghipur H. Fine-Needle Aspiration in the Diagnosis of Thyroid Diseases: An Appraisal in Our Institution; ISRN Pathology Volume 2012 (2012).
9. Sinna EA, Ezzat E. Diagnostic accuracy of fine needle aspiration cytology in thyroid lesions. Journal of the Egyptian National Cancer Institute. Volume 24, Issue 2, June 2012, Pages 63-70.
10. T.J. Smit, H. Safali, E.A. Foster, R.B. Reinhold Accuracy and cost effectiveness of fine needle aspiration biopsy Am J Surg, 149 (1985), pp. 540-555
11. Hamburger JI, Husain M, Nishiyama R, Nunez C, Solomon D. Increasing the accuracy of fine needle biopsy for thyroid nodules. Arch Pathol Lab Med 1989;113:1035-41
12. Sidaway MK, DelVecchio DM, Knoll SM. Fine needle aspiration of thyroid nodules: correlation between cytology and histology and evaluation of discrepant cases. Cancer 1997;81:253-9.