

Cytological Study of Thyroid Lesions by Fine-Needle Aspiration Cytology

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ABSTRACT

Objective: The present study assessed the cytological and morphological features of thyroid swellings by FNA cytology (FNAC) at a tertiary care hospital of Sindh.

Study Design:

Place and Duration of Study: This study was conducted at the Department of Surgery and Pathology, Indus Medical College Hospital from January 2016 to Dec 2017.

Materials and Methods: A sample of 90 cases of thyroid enlargement was selected according to inclusion and exclusion criteria. Demographic characteristics were noted by clinical history. FNAC was performed by senior surgeon and cytological examination by a senior pathologist. Data was analyzed on SPSS 22.0 at 95% confidence interval ($p \leq 0.05$).

Results: Mean $\pm$ SD age was noted as 43.56 ± 19.6 years. Of 90 cases, male and female were 33 (36.6%) 57 (63.3%) respectively ($p = 0.0001$). Of 90 cases, the non-neoplastic, neoplastic and indeterminate lesions were noted in 69 (76.6%), 15 (16.6%) and 6 (6.6%) respectively.

Conclusion: FNAC is a cost effective, uncomplicated and safe diagnostic procedure which may be used for the pre-operative screening of thyroid diseases in poor countries like Pakistan.

Key Words: Thyroid Nodules, FNAC, Cytology, Sindh

Citation of articles: Memon I, Memon MH, Memon A. Cytological Study of Thyroid Lesions by Fine-Needle Aspiration Cytology. Med Forum 2017;28(8):96-99.

INTRODUCTION

Thyroid nodules, particularly the thyroid swellings (Goiter), are frequently encountered disorders in the surgical practice. They present clinically as neck swellings. Thyroid nodules create panic and apprehension because their unpredictable behavior.¹ Several non-invasive screening techniques are available for the thyroid lesions such as the thyroid scanning, sonography etc. However, these techniques are not efficient in distinguishing benign and malignant thyroid nodules. A need of an investigative modality which can be employed before procedures always knocks the minds of clinicians to discriminate the benign and malignant thyroid nodules.^{2,3} Fine needle aspiration cytology is the answer to this lacunae. Now the FNAC has nearly halved the need of thyroid surgeries for diagnostic purpose, since it has proved robust screening test around the world.⁴

Now, the FNAC is an easily available, a well-established, cost effect, first-line, simple screening test. FNAC has proved a useful screening and diagnostic

tool for thyroid nodules.⁵ Many cases of unsuspected thyroid cancer have been diagnosed by FNAC which has proved helpful for the clinicians.⁶ FNAC has proved superior to other non-invasive techniques such as the thyroid scanning, radionuclide and sonography assessment.⁷ FNAC is a safe cost effective procedure in the outpatient's surgical departments. It is minimally invasive procedure that is useful for the aged and pregnant female equally.⁸ Now FNAC is a standard surgical procedure for screening of thyroid nodules. The sensitivity and specificity of FNAC averages 83% and 92% respectively for thyroid malignancies.⁹ FNAC needs simple materials and a trained pathologist / surgeon for aspiration of nodules. Aspiration technique is very simple and similar is the interpretation of the cytological findings.¹⁰ FNAC is useful for the diagnosis of thyroid nodules, both benign or malignant, autoimmune disorders and cysts, etc. The FNAC is used primarily for the exclusion of malignant thyroid nodules. Standard taxonomy of FNAC interpretation was designed by the NCI (National Cancer Institute), Thyroid FNA State-of the-Science Conference. The NCI has standardized the interpretation of FNAC which is very helpful for the clinicians.¹¹ A previous report, studied 284 cases, included children and adolescents with palpable thyroid lesions, concluded that FNAC is a useful screening test.¹² The present study was conducted to revisit the diagnostic utility of fine needle aspiration cytology at our tertiary care hospital. The present study will be helpful for clinicians to use the FNAC with confidence as cost effective, minimally

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Received: May 22, 2017;

Accepted: June 25, 2017

invasive and simple screening test for the thyroid lesions.

MATERIALS AND METHODS

The present case control study was conducted at the Department of Surgery and Pathology, Indus Medical College Hospital from January 2016 to Dec 2017. A sample of 90 cases of thyroid enlargement was selected according to inclusion and exclusion criteria. Diagnosed cases of thyroid disease of age >20 years was the inclusion criterion. Demographic characteristics were noted by clinical history. FNAC was performed by senior surgeon and pathologist, while cytological examination by expert pathologist. Materials used include the 22 G needle, a 5 ml and 10 Disposable syringes (BD, USA). Thyroid gland lesions were examined and findings were noted in a predesigned proforma. Patients were lying in the supine position with pillow under shoulder blades and neck to extend the head and neck. Site for FNAC was cleaned with antiseptic spirit swab. For thyroid nodules of <1.5 cm, the technique of “to and fro movements” of the needle within the nodule was used. While for the larger thyroid nodules, the peripheral sub-capsular part of nodules were aspirated rather than the center. A minimum of 3 phases were performed and fluid obtained was aspirated. Multiple smears with minimum 4-5 smears were made. The smears were fixed on slides fixative alcohol for Papanicolaou staining. Air-dried smears were stained with May–Grunwald Giemsa stain. A smear was considered “adequate” when: 1). 5-6 groups of follicular epithelial cells with 10 or more cells/ group were observed / well preserved, or 2). 10 large clusters of follicular epithelial cells with >20 cells each; or 3). 6 groups of follicular epithelial cells on at least 2 of 6 aspirates; and 4). At least 8-10 fragments of well-preserved tissue on each of two slides were noted.¹³ Smear findings were observed and interpreted in the clinical context to avoid any discrepancy, because cysts and colloidal goiter yield specimens with very few cells that would be considered cytological non-diagnostic but that is consistent with the clinical history of lesion. Data was analyzed on SPSS 22.0 statistical software. Ethical approval and patient consent was mandatory. Student's t test and Chi square test were used for the continuous (for example age) and categorical variables (for example gender) analysis respectively. Statistical analysis was performed at 95% confidence interval ($P \leq 0.05$).

RESULTS

The mean $\pm$ SD age was noted as 43.56 ± 19.6 years. Of 90 cases, male and female were 33 (36.6%) 57 (63.3%) respectively ($X^2 = 11.56$, $P = 0.0001$). Male to female ratio was 1:1.72. Rural population predominated comprised 67 (74.4%) compared to 23 (25.5%) urban population. Of 90 cases, the non-neoplastic, neoplastic

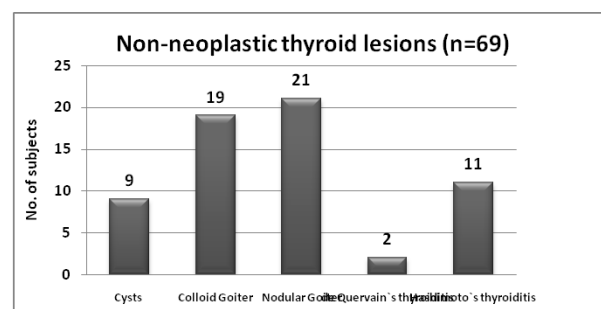
and indeterminate lesions were noted in 69 (76.6%), 15 (16.6%) and 6 (6.6%) respectively. Non-neoplastic lesions observed include the; cyst in 9 (13%), colloidal goiter in 19 (27.5%), nodular goiter in 21 (30.4%), de Quervain's thyroiditis in 2 (2.8%), Hashimoto's thyroiditis in 11 (15.9%) and inconclusive FNAC results were found in 7 (10.1%) cases.

Table No.1: Demographic distribution and thyroid lesions in study subjects (n=90)

	No.	%
Age		
- 20-29.9 years	19	21.1
- 30-39.9 years	30	33.3
- 40-49.9 years	25	27.7
- ≥ 50 years	16	17.7
Male	33	36.6
Female	57	63.3
Rural	67	74.4
Urban	23	25.5
Thyroid lesions		
- Neoplastic	15	16.6
- Non-neoplastic	69	76.6
- Indeterminate	06	6.6

Table No.2: Distribution of non-neoplastic thyroid lesions in study subjects (n=69)

	No.	%
Cysts	9	13.0
Colloid Goiter	19	27.5
Nodular Goiter	21	30.4
de Quervain's thyroiditis	2	2.8
Hashimoto's thyroiditis	11	15.9
Inconclusive	7	10.1



Graph No.1: Distribution of non-neoplastic thyroid lesions

DISCUSSION

The present is the first study from our tertiary care hospital reporting on the FNAC in thyroid nodule cytological examination. Thyroid swellings (Goiter) are common cases presenting in the routine surgical practice. As the thyroid nodules create panic and apprehension because of suspicious malignancy.¹³ Hence a simple, easy and cost effective screening test

certainly helps the poor population of developing countries like Pakistan. The present study proves the diagnostic significance of FNAC in differentiating the benign and malignant thyroid lesions. FNAC is a minimally invasive easy to perform technique, useful in distinguishing benign and malignant thyroid swellings. Thyroid swelling may be solitary nodule or diffuse enlargement needs to be investigated to rule out the possibility of thyroid malignancy.¹¹ At present, the FNAC has proved an effective diagnostic tool in thyroid nodule screening. Main purpose of FNAC is to provide a rational approach for the diagnosis to determine the correct surgical procedure. The FNAC primarily aids in investigating the thyroid nodules in addition to the sonography, thyroid function tests, scanning and antibody profile, to reach to the diagnosis and planning a decisive surgical procedure.¹¹⁻¹³ FNAC is to handpick the cases that can be treated surgically or conservatively without major cost. Use of different interpretation criteria of FNAC creates problems of true diagnosis; this creates confusion amongst the clinicians. Ultimate result of this discrepancy is a definitive diagnosis is not possible. In the present study, the average age of thyroid lesion patients was 3rd to 4th decade of life; the findings are in agreement with previous studies.^{14,15} In the present study, of 90 cases, the non-neoplastic, neoplastic and indeterminate lesions were noted in 69 (76.6%), 15 (16.6%) and 6 (6.6%) respectively. Non-neoplastic lesions observed include the; cyst in 9 (13%), colloid goiter in 19 (27.5%), nodular goiter in 21 (30.4%), de Quervain's thyroiditis in 2 (2.8%), Hashimoto's thyroiditis in 11 (15.9%) and inconclusive FNAC results were found in 7 (10.1%) cases. Similar observations have been reported previously.¹⁴⁻¹⁶ In the present study, male to female ratio was 1: 1.72 which is similar to previous studies^{17,18} but contrary to others.^{14,16} In the present study, non- neoplastic group – the goiter 69 (76.6%) which is in agreement with previous studies.¹⁷⁻²⁰ But a previous study²¹ reported follicular malignant tumors in majority of patients, the findings are discordant to present and previous studies.¹⁷⁻²⁰ The finding of goiter of present study is consistent with previous studies.^{18,19} They reported goiter was most common thyroid lesion. Both the studies are in agreement with the present study. In the present study, majority of cases proved to be the benign thyroid lesions, which is in agreement with previous studies.¹⁷⁻¹⁹ A previous study²² reported a benign thyroid lesions predominated, found in 79% of cases; the findings are concordant with present study. On the contrary, a previous study¹⁴ reported majority of thyroid lesions were malignant on FNAC which is inconsistent to present study. In the present study, 6 cases (6.6%) were categorized as malignant thyroid lesions which are concordant with previous study.¹⁴ The finding of malignant thyroid lesions on FNAC is also in agreement with previous studies.^{23,24}

The findings of present study of cyst in 9 (13%), colloid goiter in 19 (27.5%), nodular goiter in 21 (30.4%), de Quervain's thyroiditis in 2 (2.8%), Hashimoto's thyroiditis in 11 (15.9%) is in agreement with previous studies.^{16,26,26} The limitations of present study include; first- a small sample size and, second- population of peculiar ethnicity hence findings should be cautiously interpreted for other geographical areas and ethnical groups.

CONCLUSION

Fine needle aspiration cytology (FNAC) is a cost effective, minimally invasive and safe diagnostic procedure for the pre-operative screening of thyroid nodules in developing countries like Pakistan. FNAC may be used as a minimally invasive technique for the triage of patient screening and surgery of thyroid lesions. FNAC is a useful primary investigative modality that should be used for palpable thyroid nodules in surgical practice.

Author's Contribution:

Concept & Design of Study:	Inayatullah Memon
Drafting:	Muhammad Hanif Memon
Data Analysis:	Attiya Memon
Revisiting Critically:	Inayatullah Memon
Final Approval of version:	Attiya Memon
	Inayatullah Memon

Conflict of Interest: The study has no conflict of interest to declare by any author.

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