



THYROID SWELLINGS; CYTOPATHOLOGICAL STUDY OF THYROID SWELLINGS BY FINE-NEEDLE ASPIRATION CYTOLOGY

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INTRODUCTION

Thyroid swellings, local or generalized, collectively termed as goiter. Goiter usually presents as swelling in front of neck visible on gross examination. Goiter is one of the commonest symptom, the patients are presenting in surgical out departments. Thyroid swellings are of cosmetic concerns beside the problems of hypo- or hyper functioning. Personal panic and apprehension is serious issue for patients who are concerned about malignancy. This is because the spectrum and predictability of thyroid swellings is variable ranging from benign to malignant nature.¹ Many non- invasive techniques are available for screening of thyroid swellings such as the thyroid scanning and sonography. Nowadays, minimal invasive surgical procedures such as the fine needle aspiration (FNAC) are commonly practiced. Cytological studies of thyroid lesions are possible for by FNAC. The FNAC yields thyroid swelling cells to investigate their nature and discriminating into benign and malignant

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ABSTRACT... Objectives: Investigating cytopathological characteristics of thyroid swellings by fine-needle aspiration cytology (FNAC) compared to histopathological examination. **Study Design:** Observational study. **Place and Duration:** Department of Pathology in collaboration with Department of Surgery, Liaquat University of Medical and Health Sciences from November 2014 to December 2016. **Methods:** A sample of 100 FNAC specimens was selected as per inclusion and exclusion criteria. FNAC procedure was conducted by technique of “to and fro movements” of needle for thyroid nodules of <1.5 cm size from central part of swelling. Peripheral part was aspirated in cases of large thyroid swellings. Smears were air dried and stained with May–Grunwald Giemsa (MGG) and H & E stain for histopathological examination by microscopy. Data was analyzed on SPSS 22.0 at 95% confidence interval ($p \leq 0.05$). **Results:** Mean \pm SD age was noted as 47.6 ± 8.6 years. Of total 200 cases, male and female were 90 (45%) & 110 (55%) respectively. Benign thyroid lesions were noted in 140 (70%), malignant thyroid lesions in 50 (25%) and 10 (5%) proved indeterminate thyroid lesions. FNAC shows sensitivity of 89%, specificity 97% and accuracy of 91%. **Conclusion:** FNAC is an easy, time escaping, cost- effective, simple procedure and valid technique for the triage of thyroid swellings.

Key words: Cytopathology, FNAC, Histopathology, Thyroid Swellings.

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lesions. FNAC is a minimally invasive procedure which is widely used in clinical practice.^{2,3} Large invasive procedure of excision biopsy has been simplified and replaced by real time FNAC. Diagnostic thyroid surgeries are now halved after the FNAC is available. FNAC is a robust screening test for probing into the nature of thyroid lesions before proceeding to major surgical procedure.⁴ Now FNAC is first line investigation for screening and diagnosis of thyroid pathologies.⁵ Many of unsuspected thyroid malignancies are now diagnosed by FNAC.⁶ FNAC is preferred to non-invasive techniques such as thyroid scintigraphy, radionuclide studies and sonography.⁷ Nowadays, the FNAC is considered a safe and cost effective screening testing before major thyroid surgical procedure. FNAC is a procedure of choice in old age persons and pregnant ladies because it is minimally invasive.^{8,9} Aspiration of thyroid nodule is simple, cytological interpretation is easy and procedures needs a trained surgeon with simple easily tool not more than a disposable syringe.¹⁰

FNAC is indicted for the cytological studies for the thyroid swellings of benign or malignant nature, cysts, autoimmune thyroiditis, etc. Primary intention of FNAC is to rule out malignant thyroid nodules. FNAC is a well established clinical procedure due to its easy, cost effective, and simple nature hence used as first line testing.^{11,12} The present study determined the frequency of various thyroid lesions from the fine needle aspiration cytology specimens received at the Department of Pathology of our tertiary care hospital.

SUBJECTS AND METHODS

An observation study was conducted at the Department of Pathology in collaboration with Surgical Wards and Outpatient Departments of Liaquat University of Medical and Health Sciences from November 2014 to December 2016. Pathology Department is busiest unit of hospital, where we receive hundreds of FNAC. A sample of 100 FNAC specimens was selected according to inclusion and exclusion criteria. Samples were collected in collaboration with surgical wards. Thyroid swellings and age >18 years were selected. Patients with co-morbid conditions, major systemic disease, or advanced thyroid lesion/cancer were excluded. Patient`s demographic characteristics were noted in a pre- structured proforma. Thyroid gland was examined by surgeon. FNAC procedure was conducted in the presence of surgeon. Technique of “to and fro movements” of needle was used for thyroid nodules of <1.5 cm size from central part of swelling. Peripheral part was aspirated in cases of large thyroid swellings. A 22 G Disposable syringe (BD, USA), a spirit swab and Saniplast were used for the procedure. FNAC was performed in minimum of 3 phases and 4-5 smears were prepared. FNAC smears were fixed on slides fixative alcohol for “Papanicolaou staining”. Smears were air dried. May–Grunwald Giemsa (MGG) stain was used for the staining. Adequate smear was defined as 5-6 groups of follicular epithelia with 10 or more cells/ group, or 10 large clusters of follicular epithelia of >20 cells each; or 6 groups of follicular epithelia (at least 2 of 6 aspirates) and/or 8-10 fragments of well preserved tissue.¹³ Cytological specimens

were stained properly. Slides were examined by Pathologist for the findings. Cytological findings were interpreted in clinical context to avoid discrepancy of interpretation. This was performed because the colloid goiter and cysts yield few cells or no cells but that is not non- diagnostic. Ethical approval was taken from the ethics committee of the institute. Data of pre- structured proforma was typed on SPSS 22.0 (IBM, Incorporation, USA) data sheet for statistical analysis. Continuous (e.g. age) and categorical variables (e.g. gender) were analyzed by Student`s t test and Chi square test respectively. Statistical significance was taken at 95% CI (P ≤ 0.05).

RESULTS

Of total 200 cases, male and female were 90 (45%) & 110 (55%) respectively (X²= 17.5, P= 0.013). Male to female ratio was 0.81:1.0. Age (mean± SD age was noted as 47.6±8.6 years. Rural and urban population was calculated as 122 (61%) & 78 (39%) showing rural predominance. Benign thyroid lesions were noted in 140 (70%), malignant thyroid lesions 50 (25%) and 10 (5%) proved indeterminate thyroid lesions Table-I. 140 benign thyroid lesions included thyroid cysts 39 (27.85%), de Quervain`s thyroiditis 3(2.14%), Hashimoto`s thyroiditis 2 (1.42%), Solitary nodule 43 (30.71%), Multinodular goiter 50 (35.71%) and inconclusive FNAC in 3 (2.14%) as shown in Table-II. Histopathological examination of malignant thyroid lesions is shown in Table-III. Papillary, follicular, Hurthle cell carcinoma, medullary cell carcinoma, anaplastic carcinoma, Non-Hodgkin`s lymphoma (NHL) and inconclusive were noted. FNAC shows sensitivity of 89%, specificity 97% and accuracy of 91% in present study.

	No.	%
Male	90	45
Female	110	55
Urban	78	39
Rural	122	61
Benign thyroid lesions	140	70
Malignant thyroid lesions	50	25
Indeterminate lesions	10	5

Table-I. Demographic distribution and FNAC spectrum of thyroid lesions in study subjects (n=200)

	No.	%
Thyroid cysts	39	27.85
de Quervain`s thyroiditis	3	2.14
Hashimoto`s thyroiditis	2	1.42
Solitary nodule	43	30.71
Multinodular Goiter	50	35.71
Inconclusive	3	2.14

Table-II. Histopathological spectrum of Benign thyroid lesions in study subjects (n=140)

	No.	%
Papillary carcinoma	13	26
Follicular carcinoma	11	22
Hurthle cell carcinoma	1	2
Medullary carcinoma	2	4
Anaplastic carcinoma	15	30
Nod Hodgkin`s lymphoma	3	6
Inconclusive	5	10

Table-III. Histopathological spectrum of Malignant thyroid lesions in study subjects (n=50)

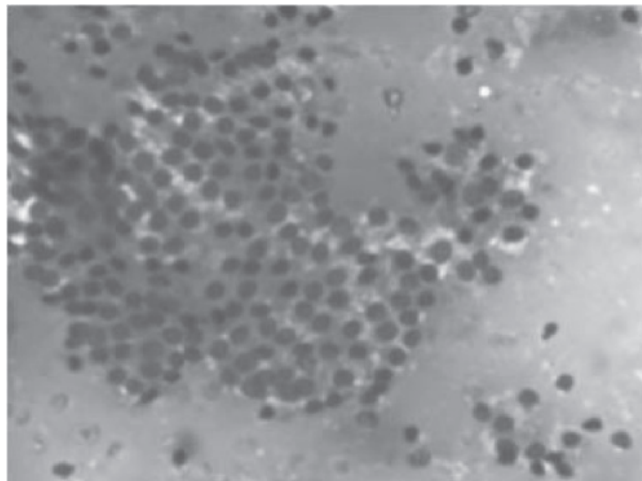


Figure-1. Colloid Goiter (MGG stain, x100)

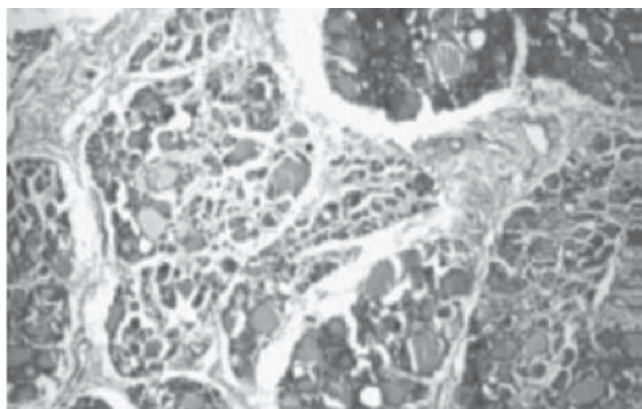


Figure-2. Multi nodular goiter, tissue septa seen (H & E, x100)

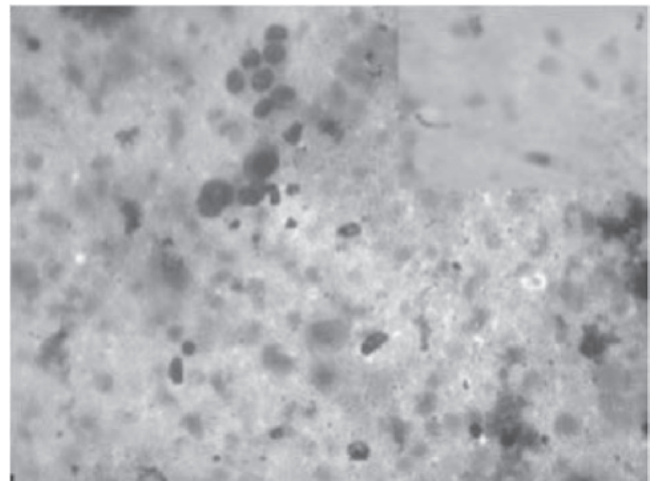


Figure-3. Granulomatous lesion showing follicular epithelial cells, caseating necrosis (ZN stain, x400)

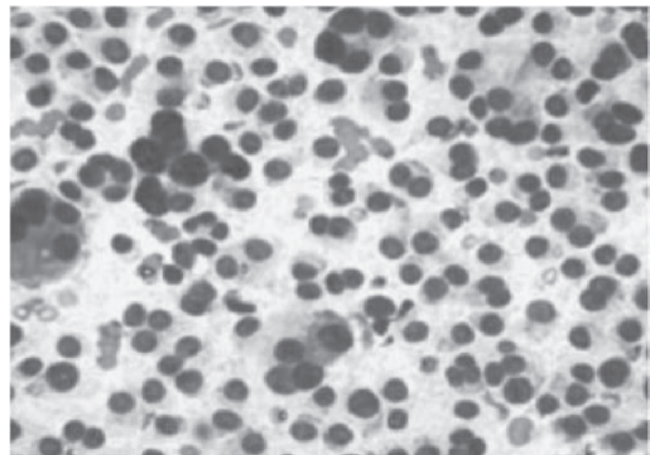


Figure-4. Follicular carcinoma (MGG stain, x100)

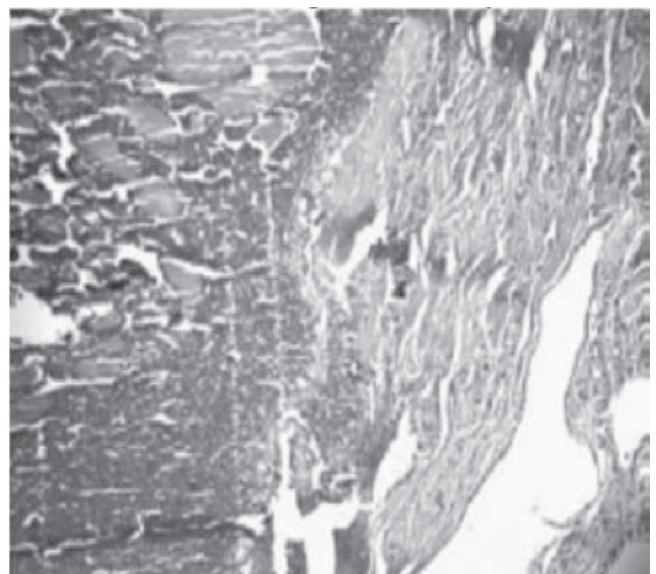


Figure-5. Follicular cell carcinoma showing invasion of capsule (H & E, x100)

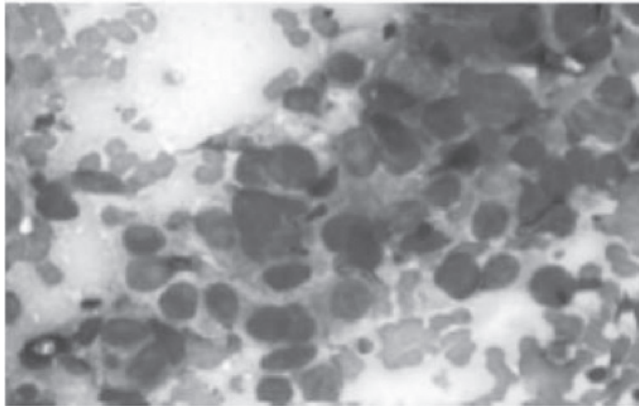


Figure-6. Anaplastic carcinoma showing prominent nucleoli within pleomorphic cells (MGG stain, x400)

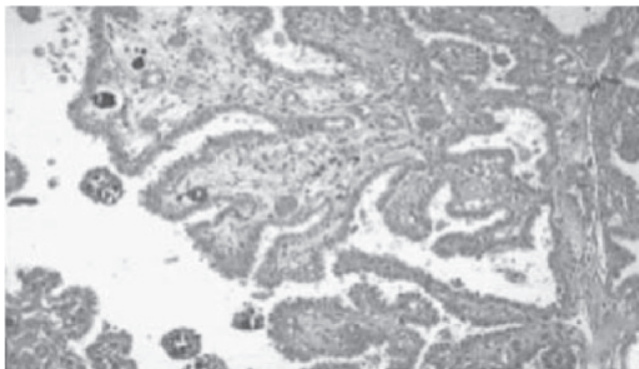


Figure-7. Papillary carcinoma (H& E, x100)

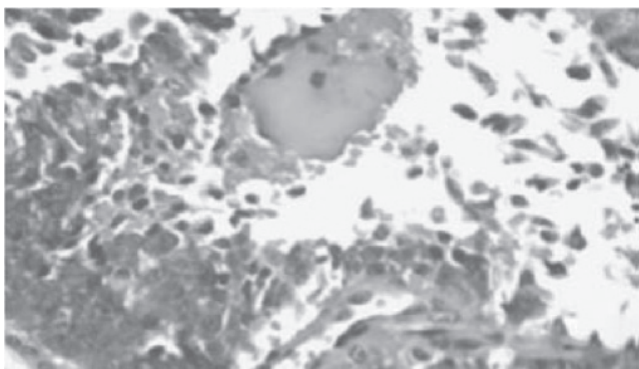


Figure-8. Medullary carcinoma (H& E, x100)

DISCUSSION

The present prospective study on the fine needle aspiration cytology (FNAC) of thyroid lesions in comparison to histopathological examination is being reported for the first time. Goiter is most common cause of neck swellings and is of cosmetic concern, and creates panic of might be cancerous.¹³ Because of social and medical concerns, there is dire need for validating simple, minimal-invasive, cost effective and

easily performed surgical procedures such as the FNAC for the neck swelling. This will help poor populations of developing countries. FNAC of thyroid lesions is widely performed surgical procedure for screening and differentiating the benign and malignant thyroid lesions. FNAC has yielded promising results because of its sensitivity, specificity and accuracy. In present study the sensitivity of 89%, specificity 97% and accuracy of 91% of FNAC is consistent with previous studies.^{11,12} Rationale of FNAC is to provide easy screening of benign thyroid lesions before proceeding for major invasive surgery. FNAC is now an established investigation in addition to thyroid scintigraphy and thyroid sonography in clinical context. FNAC aids to the diagnosis for a decisive surgical procedure.¹¹⁻¹³ In the present study, age (mean± SD) was 47.6±8.6 years, which shows majority of cases were in their 4th and 5th decade of life. These findings are consistent previous studies,^{14,15} which reported similar age. Of total 200 cases, male and female were 90 (45%) & 110 (55%) respectively (P= 0.013). Male to female ratio was 0.81:1.0, this shows female predominance. The female predominance of present study is consistent to previous studies.^{17,18} However other studies^{14,16} have reported contradictory results which may be because of different study populations. In present study, the benign thyroid lesions were noted in 140 (70%), malignant thyroid lesions 50 (25%) and 10 (5%) proved indeterminate thyroid lesions (Table-I), these results are in agreement with previous studies.¹⁴⁻¹⁶ Findings of benign thyroid lesions of present study are in keeping with previous studies.¹⁷⁻²⁰ Goiter findings are in keeping with previous studies.^{18,19} 140 benign thyroid lesions included thyroid cysts 39 (27.85%), de Quervain`s thyroiditis 3(2.14%), Hashimoto`s thyroiditis 2 (1.42%), Solitary nodule 43 (30.71%), Multinodular goiter 50 (35.71%) and inconclusive FNAC in 3 (2.14%) (Table-II), these findings are in line with previous studies.^{16,21} In the present study, majority of cases proved to be the benign thyroid lesions (70%), which is in agreement with previous studies.¹⁷⁻¹⁹ In the present study, 50 cases (25%) proved malignant thyroid lesions which is consistent with reported study.¹⁴ Finding of malignant thyroid lesions on FNAC

is also in agreement with previous studies.²²⁻²⁴ In present study, the anaplastic carcinoma was noted 15 (30%), papillary carcinoma 13 (26%) and follicular carcinoma in 22% of cases. The findings are concordant to previous studies.¹⁷⁻²⁰ However, a previous study²¹ reported follicular malignant tumors in majority of patients that is in disagreement with present study. The strengths of present study are the prospective study design and FNAC was compared histopathology, and only limitation is a small sample size. The present study concludes the fine needle aspiration is easy, time escaping, cost- effective and simple procedure for the screening and differentiation of thyroid lesions.

CONCLUSION

Fine needle aspiration cytology (FNAC) is an easy, time escaping, cost- effective and simple procedure for the screening and differentiation of thyroid swellings. It may prove helpful for easy screening of thyroid swellings before proceeding to invasive surgical procedures. In conclusion, the FNAC is valid technique for the triage of thyroid swelling screening and differentiating lesions.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Nazeer Ahmed Pathan	Literature review, Materials handling, Collection of compilation of results, Statistical analysis, Manuscript write up, Proof Reading, Biochemical analysis, Correspondence.	
2	Abdul Aziz Shaikh	Statistical analysis, Manuscript write up, Proof Reading, Biochemical analysis, Manuscript write up, Proof Reading.	
3	Manzoor Ali Shaikh	Concept, Materials handling, manuscript write up, Biochemical analysis and laboratory testing, Compilation of results, Proof reading.	