

ORIGINAL ARTICLE

CORRELATION OF FINE NEEDLE ASPIRATION CYTOLOGY WITH THYROID FUNCTION TEST IN TERTIARY CARE HOSPITAL, KATHMANDUDeliya Paudel^{1*}, Sushant Pokhrel², Dibit Adhikari³, Himanshu Regmi¹¹Department of Pathology, Manmohan Memorial Medical College and Teaching Hospital, Kathmandu, Nepal²Department of Laboratory Medicine, Manmohan Memorial Institute of Health Sciences, Kathmandu, Nepal³Department of Otorhinology, Manmohan Memorial Medical College and Teaching Hospital, Kathmandu, Nepal**ABSTRACT**

Background: FNAC is the gold standard method in the management of thyroid lesions and helps to rule out the surgical cases. Thyroid disorders show different abnormal thyroid function test. This study aims to find the association between thyroid function test and FNAC.

Methods: This cross-sectional study was conducted in 137 patients with thyroid swelling that attended in Manmohan Memorial Medical College and Teaching Hospital (MMTH). Thyroid lesion were evaluated by cytologically and compared with thyroid function test.

Result: Among the study population, 44.4% of patients presented with colloid goitre while 38.3% with lymphocytic thyroiditis. Age group of 30-40 years showed higher prevalence of thyroid lesion. 40.6% of the study population were had thyroid function test. About half of the lymphocytic thyroiditis had hypothyroidism with positive anti-thyroid peroxidase.

Conclusion: This study showed that having normal thyroid function test also presented with different types of thyroid lesion. Hence, we conclude that FNAC and TFT should be performed for the proper management of thyroid lesion.

Keywords: *FNAC; Thyroid lesion; Thyroid function test*

<https://doi.org/10.3126/jmmihs.v9i2.71863>

*Corresponding Author: Dr. Deliya Paudel, Assistant Professor, Department of Pathology, Manmohan Memorial Medical College and Teaching Hospital Kathmandu, Nepal

Email: deliya.paudel@mmth.edu.np

Received 01 October 2023; Received in Revised form 25 October 2024; Accepted 7 November 2024

INTRODUCTION

Fine Needle Aspiration Cytology (FNAC) is considered a “gold standard” as it is a cost-effective invasive preoperative investigation to rule out surgery in the management of thyroid nodules (1). Thyroid nodules that include firm, palpable or associated with worrisome clinical features should be considered for FNAC (2). FNAC reduces the incidence of thyroidectomy for benign disease of thyroid in the assessment of thyroid nodules (3). Goitre and Lymphocytic thyroiditis or autoimmune thyroiditis is the most common type of thyroid lesion (4). Goitre is most commonly present in women and with iodine deficiency. Early diagnosis of goitre prevents hypothyroidism, thyroid lymphoma and thyroid papillary carcinoma (5). Thyroid hormones changes are common features in lymphocytic thyroiditis, goitre and thyroid papillary carcinoma.

This study examines the level of thyroid hormone with different findings of FNAC. This study also aim to find out the relationship of anti-thyroid peroxidase hormone with lymphocytic thyroiditis.

METHODOLOGY

This study was conducted among 137 patients with thyroid swelling attending the Department of Pathology of Manmohan Memorial Medical College and Teaching Hospital (MMTH), swyambhu, Kathmandu, Nepal from April 2018 to December 2019. Among 137 cases, 4 of the cases were with unsatisfactory FNAC sample. Since it is a less painful procedure, no anaesthetic drug was used. Prior to performing the FNAC, patients were informed about the procedure and consent was taken. FNAC was performed by aseptic condition with non-aspiration or aspiration technique using a 23G needle with 10 ml of sterile and disposable syringe. Air-dried smear and wet ethanol fixed smear were prepared and stained with Giemsa and Hematoxylin & Eosin respectively.

Thyroid Function Test (TFT) (free T3, free T4, TSH) and anti TPO antibody was measured by Maglumi 1000 CLIA system. The values obtained from the measurement were classified into hypothyroidism, hyperthyroidism, subclinical hypothyroidism and subclinical hyperthyroidism.

RESULTS

Among 133 cases, Male to female ratio of the study population was 1:4.11 with age group of 8-81 years. Table 1 showed age-wise distribution of cases. The age group of 30-40 years had higher prevalence followed by 40-50 years and 20-30 years age group respectively. 54/133 (40.6%) of the study population presented with normal thyroid function test. Figure 1 demonstrates FNAC examination report of the study group. Among the study population, 44.4% presented with colloid goitre while 38.3% were presented with Lymphocytic thyroiditis. Table 2 describes the thyroid function test in Lymphocytic thyroiditis. About half of the lymphocytic thyroiditis cases were hypothyroidism with positive anti-thyroid peroxidase. Along with, around two-third of the lymphocytic thyroiditis cases were anti-thyroid peroxidase positive. Table 3 illustrates the thyroid function test in colloid goitre. More than half of the colloid goitre cases presented with normal thyroid function test.

Table 1: Age wise distribution of thyroid lesion

Age group (years)	Number (n)	Percentage
< 20	4	3.0
20 – 30	27	20.3
30 – 40	35	26.3
40 – 50	29	21.8
50 – 60	19	14.3
> 60	19	14.3

How to Cite

Paudel, D., Pokhrel, S., Adhikari, D., & Regmi, H. Correlation of Fine Needle Aspiration Cytology With Thyroid Function Test in Tertiary Care Hospital, Kathmandu. Journal of Manmohan Memorial Institute of Health Sciences, 9(2), 35–38. <https://doi.org/10.3126/jmmihs.v9i2.71863>



Table 2: Thyroid Function test and anti-TPO in Lymphocytic thyroiditis

Condition	Anti-TPO		Total
	Positive	Negative	
Normal	6	-	6
Subclinical hypothyroidism	2	-	2
Hypothyroidism	26	6	32
Hyperthyroidism	3	8	11
Total	37	14	51

Table 3: Thyroid Function Test in colloid Goitre

Condition	Number (n)	Percentage
Normal	32	54.2
Subclinical hypothyroidism	16	27.1
Subclinical hyperthyroidism	2	3.4
Hypothyroidism	6	10.2
Hyperthyroidism	3	5.1

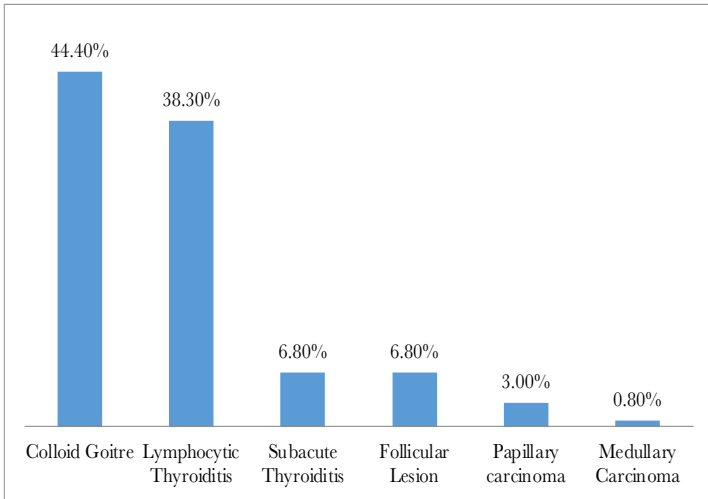


Figure 1: Bar diagram showing different types of thyroid lesion

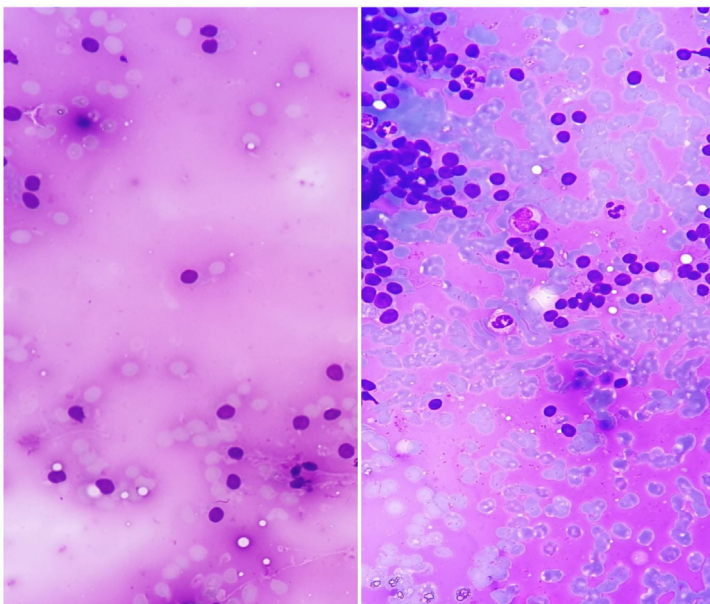


Figure 2: Follicular cells with colloid in the background in Colloid Goitre (400X)

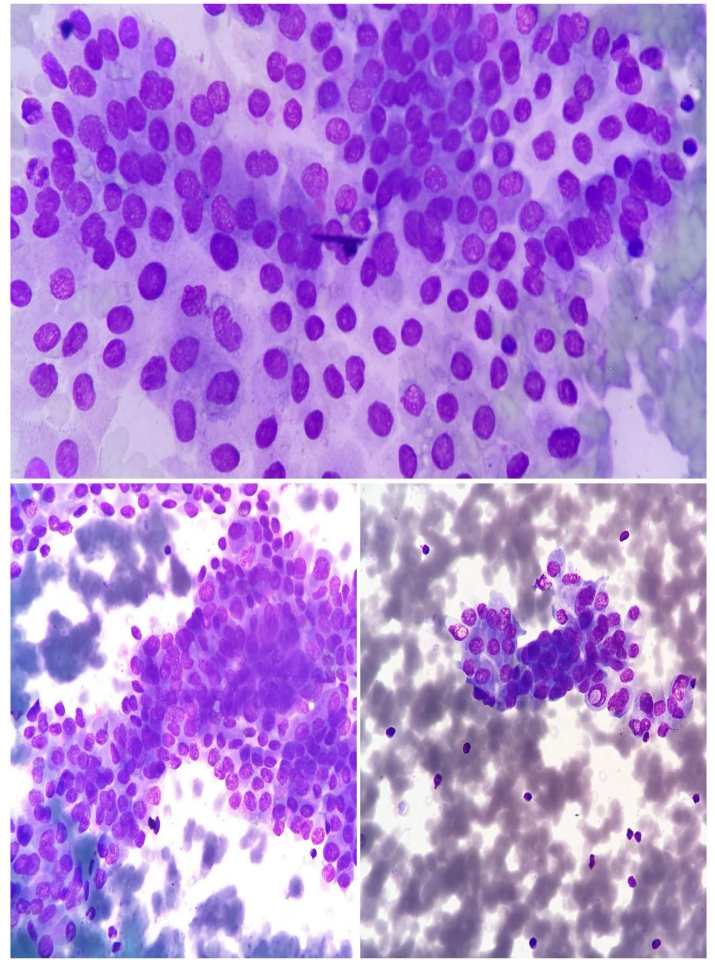


Figure 3: Papillary pattern, nuclear crowding and intranuclear cytoplasmic inclusion in PTC (400X)

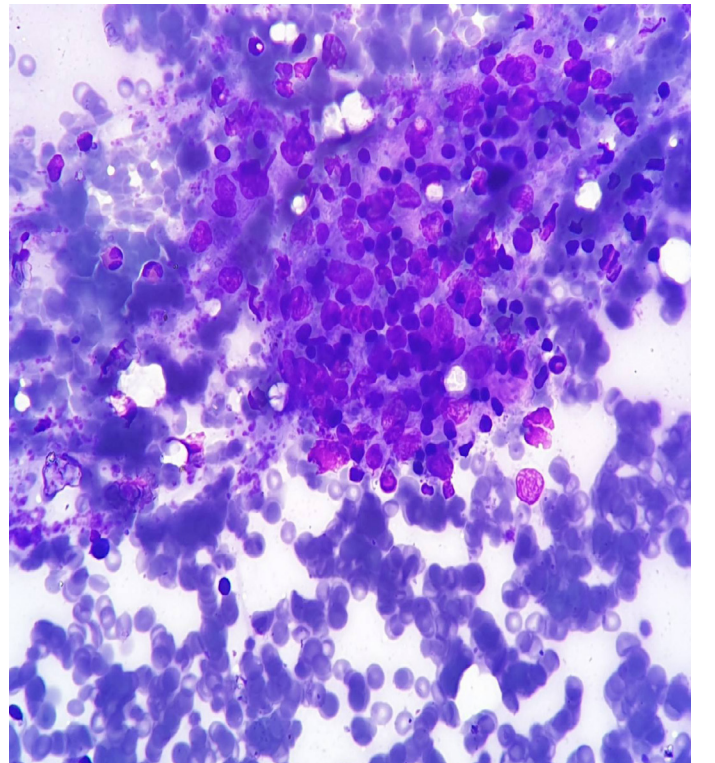


Figure 4: Lymphocytes are seen impinging upon the follicular cells in Hashimoto's Thyroiditis

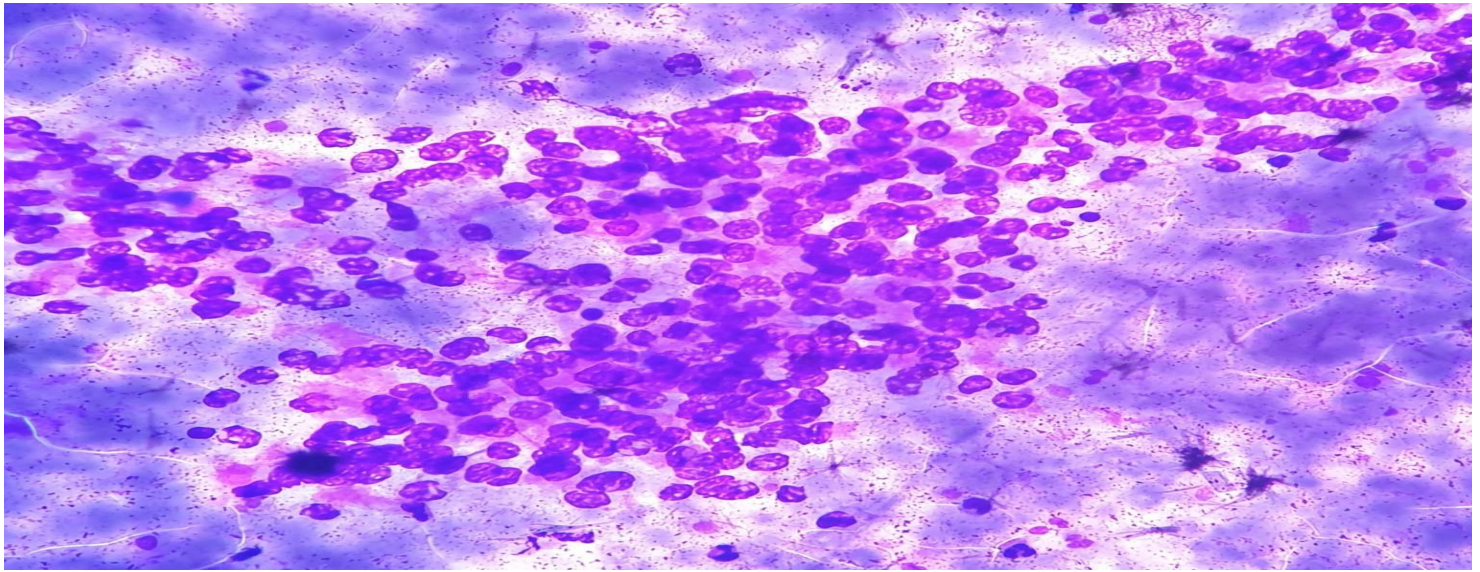


Figure 5: Clusters of follicular cells in Follicular Neoplasm (400)

DISCUSSION

FNAC of thyroid gland is the primary investigation and is followed by other investigation such as Thyroid function test (TFT), ultrasonography (USG) examination, antibody levels, and thyroid scan which are performed to rule out surgery in patients (6). It is the most accurate and cost effective method which provides definite diagnosis of malignancy. In the present study, the commonest age group is 30-40 years which is similar to other studies. Poudel S et al study in Nepal (7) and Rathod GB et al study in India (8) showed higher prevalence of thyroid lesion in the similar age group. Prevalence of thyroid nodules is 4 times more common in females than male (9) which is similar to our findings. It is still unclear that why women causes with higher incidence of thyroid nodules but it has been suggested that, it might be due to combined effect of sex hormone i.e estrogen and progesterone (10). Some authors suggested that pregnancy along with iodine deficiency and tobacco consumption was associated with enlarge in size of preexisting thyroid nodules volume or new thyroid nodular formation (11, 12).

The most common type of thyroid lesion is colloid goitre 44.4% of the study population followed by lymphocytic thyroiditis 38.3%. Mahar SA et al study (13) and Poudel S et al study (7) showed consistent with our findings. Sub-acute thyroiditis and follicular lesion comprised 6.8% respectively while malignant lesions were presented with 3.8% of study population. Diagnosis of fine needle aspiration thyroid lesion were based on the evaluation of different cytomorphological variables such as pattern, cellular aspirates, and nuclear morphology of follicular cells, lymphoid cells, foam cells, hurthle cells, giant cells, and inflammatory infiltrate.

Out of 59 patients with colloid goitre, 54.2% were the normal thyroid function test followed by 30.5% of colloid goitre with high TSH. In contrast to Knudsen et al findings (12), it might be due to the genetic variation, environmental factors, hormonal factors, and diet supplementation. In spite of the fact that TSH is major growth stimulating factor for thyroid, some patient shows normal TSH with colloid goitre. Since the causes are controversial, some researcher suggest that unknown growth factor may play a role in this condition (14).

Among 51 patients with Lymphocytic thyroiditis, 72.5% were positive with anti thyroperoxidase antibody. 62.7% with lymphocytic thyroiditis present with hypothyroidism. Anti- TPO and anti-thyroglobulin autoantibodies are present in lymphocytic thyroiditis; however increased in anti-TPO antibody seen in higher number of cases (15, 16). TPO is presents in the apical surface of thyroid follicular cell and acts as antigen which involved in the humoral and cell mediated cytotoxicity (4, 17). Anti-TPO on thyrocytes activate antibody dependent cell cytotoxicity and TPO specific T cells causes destruction of thyroid either by programmed apoptosis or by cytotoxicity mediated by CD4 and CD8 T cells (18). Sood N study suggested that anti TPO and TSH together are significant for

lymphocytic thyroiditis (4). Similarly present study showed that, 6 cases showed increased anti-TPO with normal TSH while other cases presented with abnormal TSH level.

CONCLUSION

In the study, common age group of thyroid lesion was 30 to 40 years with male to female ratio 1:4.1. This study showed that normal thyroid function test with thyroid lesion presented with colloid goitre while lymphocytic thyroiditis presented with positive antiTPO antibody and higher TSH level. Hence, we conclude that FNAC and TFT should be performed for the proper management of thyroid lesion.

REFERENCES

1. Pacini F, Schlumberger M, Dralle H, Elisei R, Smit JW, Wiersinga W. European consensus for the management of patients with differentiated thyroid carcinoma of the follicular epithelium. *European journal of endocrinology*. 2006;154(6):787-803.
2. Sengupta A, Pal R, Kar S, Zaman F, Sengupta S, Pal S. Fine needle aspiration cytology as the primary diagnostic tool in thyroid enlargement. *Journal of Natural Science, Biology and Medicine*. 2011;2(1):113-8.
3. Bottles K, Miller TR, Cohen MB, Ljung BM. Fine needle aspiration biopsy. Has its time come? *The American journal of medicine*. 1986;81(3):525-31.
4. Sood N, Nigam JS. Correlation of fine needle aspiration cytology findings with thyroid function test in cases of lymphocytic thyroiditis. *Journal of thyroid research*. 2014:430510.
5. Saraf S, Gadgil N, Yadav S, Kalgutkar A. Importance of combined approach of investigations for detection of asymptomatic Hashimoto Thyroiditis in early stage. *Journal of Laboratory Physicians*. 2018;10(3):294-8.
6. Giuffrida D, Gharib H. Controversies in the management of cold, hot, and occult thyroid nodules. *The American journal of medicine*. 1995;99(6):642-50.
7. Poudel S RS, Shahi A, Samdurkar A. Cytopathological Evaluation of Thyroid by Fine Needle Aspiration Cytology and Correlation with T3 T4 and TSH Levels. *Journal of Universal College of Medical Sciences*. 2015;3(4):5.
8. athod GB RP, Rai S. A prospective study of ultrasonographic and FNAC correlation of thyroid pathology. *International Archives of Integrated Medicine*. 2015;2(11):6.
9. Popoveniuc G, Jonklaas J. Thyroid nodules. *Medical Clinics*. 2012;96(2):329-49.
10. Fleury Y, Van MG, Woringer V, Gaillard RC, Portmann L. Sex-dependent variations and timing of thyroid growth during puberty.

- The Journal of Clinical Endocrinology & Metabolism. 2001;86(2):750-4
11. Kung A, Chau M, Lao T, Tam S, Low L. The effect of pregnancy on thyroid nodule formation. *The Journal of Clinical Endocrinology & Metabolism*. 2002;87(3):1010-4.
 12. Knudsen N, Bulow I, Laurberg P, Ovesen L, Perrild H, Jorgensen T. Parity is associated with increased thyroid volume solely among smokers in an area with moderate to mild iodine deficiency. *European journal of endocrinology*. 2002;146(1):39-43.
 13. Mahar S, Husain A, Islam N. Fine needle aspiration cytology of thyroid nodule: diagnostic accuracy and pitfalls. *Journal of Ayub Medical College, Abbottabad : JAMC*. 2006;18:26-9.
 14. Muirhead S. Diagnostic approach to goitre in children. *Paediatrics & Child Health*. 2001;6(4):195-9.
 15. Gürkan ED, Kiyak G, Bozkurt B, Tokaç M, Polat B, Cakir B, et al. Correlation of thyroid fine-needle aspiration with final histopathology: a case series. *Minerva chirurgica*. 2013;68(2):191-7.
 16. Rathi M, Ahmad F, Budania SK, Awasthi S, Kumar A, Dutta S. Cytomorphological aspects of Hashimoto's thyroiditis: Our experience at a tertiary center. *Clinical Medicine Insights: Pathology*. 2014;7:CPATH. S13580.
 17. Terauchi M, Yanagawa T, Ishikawa N, Ito K, Fukazawa T, Maruyama H, et al. Interactions of HLA-DRB4 and CTLA-4 genes influence thyroid function in Hashimoto's thyroiditis in Japanese population. *Journal of endocrinological investigation*. 2003;26(12):1208-12.
 18. Ng H, Kung AW. Induction of autoimmune thyroiditis and hypothyroidism by immunization of immunoreactive T cell epitope of thyroid peroxidase. *Endocrinology*. 2006;147(6):3085-92.

ACKNOWLEDGMENTS

We thank all the patients participating in this study. Our special thanks go to all the laboratory staff, management and officials of Manmohan Memorial Medical College and Teaching Hospital, Kathmandu, Nepal for providing the opportunity to carry out this research work.

AUTHOR'S CONTRIBUTION

Conceptualization, DP and SP; methodology, DA and HR.; software, SP; validation, DP and HR; formal analysis, DA; investigation, DP; resources, D.P.; data curation, SP; writing—original draft preparation, DP and SP; writing—review and editing, S.P.; visualization, H.R.; supervision D.A.

COMPETING INTEREST

All the authors declare no competing interests.