ORIGINAL ARTICLE

Diagnostic Superiority of Fine Needle Aspiration Cytology (FNAC) Technique and Fine Needle Non-Aspiration Cytology (FNNAC) in Thyroid Lesions

ZAHID MAHMOOD AKHTAR, MUHAMMAD SAQIB HUSSAIN*, SAEED AHMAD**, *HASSAN SAEED****, *FILZA SAEED****

ABSTRACT

Background: Evaluate the diagnostic superiority of FNAC with FNNAC in lesions of thyroid gland. Study design: Cross Sectional Study.
Setting: Pathology Department, KEMU, Lahore.
Duration of study: 15-2-2015 to 14-08-2015.
Methods: FNAC/FNNAC was performed on 260 patients (taking expected percentage of diagnostic superiority of FNAC as 60%) and the diagnostic superiority was assessed using "Modified Scoring System of Mair and colleagues" (a score ≥7 was considered superior). Chi-square test was applied post-stratification with p-value ≤0.05 considered as significant.
Results: The results (when compared for size of nodule) supported FNNAC in smaller nodule 1-5 cm (p=0.021) however in larger nodule >10cm, the results supported FNAC (p=0.003). The results (when compared for all parameters) supported FNNAC but the difference was not statistically significant except background blood (p=0.014). On categorizing, FNNAC yielded more significant diagnostic superior samples (p=0.000) than FNAC.
Conclusion: There are significantly higher diagnostic superior results of FNNAC than FNAC for thyroid lesions.
Keywords: Thyroid lesions, FNAC, FNNAC, Modified scoring system of Mair and colleagues.

INTRODUCTION

Fine Needle aspiration cytology (FNAC) is currently being practiced all over the world. Fine needle aspiration cytology has been substantiated to be an effective primary diagnostic modality in evaluation of palpable thyroid diseases. However the thyroid gland is vascular tissue so in most of the lesions, an unsatisfactory smear especially those which are mixed with blood, creates an hindrance in proper evaluation. Hence to control such issues of vascularity of thyroid gland, an some other sampling technique i.e., fine needle non-aspiration cytology (FNNAC) was evolved in France by Brifford, Gentile and Hebert in 1982.It evades aspiration and depends on the physical property of pressure in capillary to aspirate cells inside the bore of the needle1.

METHODOLOGY

The study was conducted at Pathology Department, King Edward Medical University Lahore which has annual input of above 2000 cytological specimens, in collaboration with surgical departments. Duration of Study was 15th February 2015 to 14th August 2015. 260 patients, using 95% level of significance, 6% margin of error with an expected percentage of diagnostic superiority of FNAC as 60% was estimated. Inclusion criteria: Age 25-40 years, both genders and patients presenting with solitary nodule arising from any lobe of thyroid were included. Exclusion criteria: Patients with thyrotoxicosis, any type of thyroid surgery done previously and patients who had undergone previous irradiation were excluded.

Informed consent and details (name, gender and age) were attained from every patient. Subjects underwent FNAC/FNNAC after getting written consent. The order of FNAC and FNNAC sampling was pre-planned; in 260 patients. In both procedures a 23G needle was used and 4 slides of smears were acquired. Haematoxylin and Eosin stains were used in both smears. Diagnostic supremacy of FNAC and FNNAC was evaluated by a single pathologist by means of scoring system "Modified Scoring System of Mair and Colleagues" with a score ≥7 was deemed superior[2]. The data analysis was entered and analyzed by using SPSS version 16. Chi-square test was applied post-stratification with p-value ≤ 0.05 considered as significant.

*Resident, Deptt. of Pathology, KEMU, Lahore
**Assoc Prof. Pathology, Ameerud Din Medical College, Lahore
***King Edward Medical University Lahore
Correspondence to: Dr Zahid Mahmood Akhtar, Assistant Prof. Pathology. Email: drmuhammadfarooqmalik@gmail.com

RESULTS

In this study, the results (when compared for size of nodule) supported FNNAC in smaller nodule 1-5cm (p=0.021) and size 6 to 10cm (p=0.101) however in larger nodule >10cm, the results supported FNAC (p=0.003). In this study, frequencies of various lesions were colloid cyst 65, nodular colloid goiter166, follicular lesion of undetermined significance 11, follicular neoplasm 8, papillary carcinoma 7 and anaplastic carcinoma 3. In this study, the results (when compared to all parameters) supported FNNAC but the difference was not statistically significant except background blood that was statistically significant (p=0.014) Table I.

Table I: Comparison of FNAC and FNNAC for each parameter

Criteria	Technique	Means	Standard deviation	P-value
Background blood/ clot	FNAC	1.17	0.78	0.0087
	FNNAC	1.41	0.67	
Amount of cellular material	FNAC	1.37	0.70	0.145
	FNNAC	1.49	0.61	
Degree of cellular degeneration	FNAC	1.3	0.71	0.097
	FNNAC	1.44	0.63	
Degree of cellular trauma	FNAC	1.3	0.71	0.097
	FNNAC	1.44	0.63	
Retention of appropriate architecture	FNAC	1.41	0.69	0.201
	FNNAC	1.51	0.56	
Total	FNAC	6.55	3.59	0.0787
	FNNAC	7.29	3.1	

Table II: Diagnostic performance of FNAC and FNNAC technique

Diagnostic superiority	FNNAC		FNAC	
	n	%age	n	%age
Yes	158	64.63	102	86.59
No	102	35.37	158	13.41

Table III: Stratification of diagnostic superiority with respect to size of nodule.

Size of Nodule	FNNAC		FNAC		P value
	Yes	No	Yes	No	
1-5 Cm	86	18	18	86	0.000
6-10 Cm	48	37	37	48	0.092
>10 Cm	24	47	47	24	0.000

DISCUSSION

In this study, mean age of the patients was 31.8±4.8 years, 13% were males and 87% were females. In this study, for each of the techniques, the difference in providing the diagnostic superior smear from the different nodule sizes was statistically significant for smaller nodules 1-5 cm for FNNAC (p=0.021) and larger nodules >10cm for FNAC (p=0.003) that is opposite to the study done by Nyonyintono et al[3]. The results (when compared for all the parameters) supported FNNAC but the difference was not statistically significant except background blood that was statistically significant (p=0.014). On categorizing, FNNAC yielded more significant diagnostic superior samples (p=0.000) than FNAC.

The findings of our study was in agreement with a study reported by Maurya et al[4] and Kaur et al[5] except background blood that was statistically significant (p=0.014) and was similar for background blood but opposite for retention of architecture to the study done by Mahajanet al[6]. It is inferred that it avoids aspiration and relies on the physical property of capillary pressure to suck cells inside the needle bore. However, Malik et al[7] observed that retention of architecture was higher in FNAC than in FNNAC but the difference was not statistically significant.

In the present study, FNNAC yielded more diagnostically superior cases (158) than FNAC (102). It was similar to Mahajanet al[6] and Mauria et al[4]. In their study diagnostically superior specimens were more by FNNAC than FNAC. However, Malik et al. concluded that FNAC yielded more statistically significant diagnostically superior cases than FNNAC[7] A meta-analysis was done by Pothieret al[8] on results of four cross-over trials. They concluded that there is no evidence that one method is superior to the other. However, in our study, FNNAC techniques yielded more significant diagnostic superior samples (p=0.000).

CONCLUSION

The results of the study concluded significantly higher diagnostic superior results of FNNAC than FNAC for thyroid lesions.

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