



A COMPARISON OF ASPIRATION WITH NON ASPIRATION TECHNIQUE IN FINE NEEDLE CYTOLOGY OF THYROID LESIONS

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ABSTRACT

Back ground: Fine needle cytology is a valuable adjunct to preoperative diagnosis of thyroid lesions and it can helps in assessment of benign and malignant condition.

Aims and objectives: To compare the efficacy of fine needle non aspiration cytology (FNNAC) with that of fine needle aspiration cytology (FNAC) in thyroid lesions.

Materials and methods: FNAC and FNNAC techniques were studied in 50 cases of thyroid lesions. All the needle-sampling procedures were done by a single operator. The samples were assessed cytologically and evaluated using Mair et al scoring system

Result: The degree of cellular trauma, degree of cellular degeneration, blood contamination were less and the retention of architecture and cellular yield was more in FNNAC compared to FNAC with significant statistical difference. More number of FNNAC smears are diagnostically superior.

Conclusion: The FNNAC technique is the first and best choice for vascular organ like thyroid compared to FNAC.

KEYWORDS : FNNAC, FNAC, Thyroid lesions

INTRODUCTION:

Fine needle cytology (FNC) has gained tremendous popularity in recent times among the clinicians and the pathologists. It is easy to perform, quick and has a high degree of specificity and sensitivity¹. FNAC and FNNAC are the two techniques of fine needle cytology. FNC is used to sample all superficial mass lesions and even deeply seated lesions. Deeply seated lesions can be sampled with the aid of imaging techniques. The basic principle underlying fine needle aspiration cytology is the aspiration of cellular material from the target masses often utilizing fairly high suction pressure. The procedure requires a needle and a syringe advisedly held in a syringe holder enabling single handed suction to be exercised. This technique depends on the suction and is painful, traumatic and can cause hematomas, necrosis as well as yield hemorrhagic material². In more recent times a modified technique called fine needle nonaspiration cytology (FNNAC), pioneered in France came into vogue in 1981^{3,4}. It eliminates active aspiration by syringe, replacing it by the principle of capillary suction of fluid or semi fluid material into a thin channel (fine needle). It is less painful, less traumatic, and patient-friendly. Smears obtained by FNNAC are of "text book" quality. In the present study 50 cases, an attempt is made to compare both the techniques FNAC and FNNAC with reference to diagnostic adequacy of the material obtained and diagnostic accuracy in 50 patients with thyroid swelling.

MATERIALS AND METHODS:

The study was conducted at department of pathology government kilpauk Medical College during the year June 2014 to June 2015. This study included 50 samples obtained from patients who attended the cytology department for FNC of thyroid swelling. Institutional ethical committee clearance was obtained. A clear explanation was given to the patient about the procedure, number of pricks that would be made, complications of the procedure and a written consent was obtained.

The patients were subjected to FNAC and FNNAC using 23-gauge needles and 10-cc plastic syringes. All the procedures were performed by a single operator. FNAC or FNNAC sampling was carried out randomly with lesions, irrespective of consistency and size of lesions. Every slide was assessed without the prior knowledge of techniques utilized. The study was thus single blind and also prevented the observer bias. The smears were scored according to criteria using a predetermined scoring developed by Mair et al⁸. Table 1.

On the basis of five criteria tabulated, a cumulative score was obtained for each case which was then categorized accordingly to one of the 3 categories, category

1: Unsuitable for cytological diagnosis- (0-2), category 2: Diagnostically Adequate- (3-6), category 3: Diagnostically superior - (7-10). Wilcoxon signed rank test was performed using SPSS14 software. Differences between FNAC and FNNAC based on the above mentioned five parameters were analysed. All the results were analysed considering the statistical significance at a level of P = 0.05.

TABLE NO: 1 SCORING SYSTEM ACCORDING TO MAIR TO CLASSIFY QUALITY OF CYTOLOGICAL ASPIRATE

Criteria	Quantitative Description	Points
Amount of cellular material	Minimal to absent; diagnosis not possible	0
	Sufficient for cytodagnosis	1
	Abundant	2
Retention of appropriate architecture	Minimal to absent; diagnosis not possible	0
	Moderate; some preservation of architecture	1
	Excellent; architecture display closely resembling history, diagnosis obvious	2
Degree of cellular degeneration	Marked; diagnosis impossible	0
	Moderate; diagnosis possible	1
	Minimal; diagnosis obvious	2
Degree of cellular trauma	Marked; diagnosis impossible	0
	Moderate; diagnosis possible	1
	Minimal; diagnosis obvious	2
Background blood or clot	Large amount; great compromise to diagnosis	0
	Moderate amount; diagnosis possible	1
	Minimal; diagnosis easy; specimen to textbook quality	2

RESULTS:

The non aspiration technique yielded less diagnostically adequate and more diagnostically superior smear when compared with the aspiration technique. A total of 6 cases were unsuitable for diagnosis in non aspiration technique as compared with 10 cases in aspiration technique. (table-2)

DIAGNOSTIC CATEGORIZATION OF FNNAC ACCORDING TO MAIRETAL SCORING SYSTEM

Category	No. of Cases	Percentage
Diagnostically superior	37	74%
Diagnostically adequate	7	14%
Diagnostically unsuitable	6	12%
Total	50	100%

P value obtained by Wilcoxon signed rank test when comparing all the parameters FNNAC smears scored higher than FNAC and the difference is statistically significant. Except for the amount of cellular material aspirated FNAC smears scores high compared to FNNAC technique but the difference is statistically insignificant [Table 3].

TABLE NO: 3 CATEGORY WISE PERFORMANCE OF FNNAC AND FNAC

Criteria	Technique	Scores			p-value
		Total	mean	SD	
Background blood	FNNAC	71	1.42	0.722	0.003
	FNAC	62	1.24	0.744	
Amount of cellular material	FNNAC	68	1.36	0.722	0.655
	FNAC	69	1.38	0.780	
Degree of cellular degeneration	FNNAC	77	1.54	0.734	0.05
	FNAC	69	1.38	0.780	
Degree of cellular trauma	FNNAC	77	1.54	0.734	0.05
	FNAC	69	1.38	0.780	
Retention of architecture	FNNAC	76	1.52	0.735	0.014
	FNAC	70	1.40	0.782	

Table 3 Average score and P value for each parameter Non-aspiration sampling displayed more cellular material, less cellular trauma and degenerative changes, better retention of architecture and less likelihood of obscuring by blood. Table 4 depicts the frequencies of the various lesions encountered..

TABLE NO: 4 CYTODIAGNOSIS OF THYROID LESIONS

Cytodiagnosis	No. of Cases	Percentage
Colloid goiter	25	50%
Colloid cyst	3	6%
Hashimoto thyroiditis	15	30%
Adenomatoid goitre	6	12%
Follicular neoplasm	1	2%
Total	50	100%

Discussion:

FNAC, since its inception in 1847, has passed through two phases of initial scepticism and interim enthusiasm and has successfully reached the final stage of acceptance as identified by Orell¹ in his analysis of steps by which the assessment of innovative diagnostic practice progresses. FNAC is widely accepted as the primary method for diagnosis of thyroid lesions. The cytologist faced the common problem in interpreting the hemorrhagic material from thyroid obtained by FNAC². To overcome this inherent problem, an alternative technique FNNAC also called cytopuncture or fineneedle capillary sampling was used first in France for breast tumor and later for orbital and periorbital tumors. The thyroid gland, which is very vascular, often yields aspirate markedly admixed with blood. It has been suggested that FNNAC sampling, by eliminating the negative suction pressure employed in FNAC, decreases the dilution of thyroid cells by blood and the scientific basis was explained by Santos and Leiman³. Methods such as suction of material with a needle bore rely on the property of capillary tension in the narrow channel. The fluid or semi-fluid ascends into the narrow tube in inverse proportion to the diameter of that tube or capillary⁷. The important advantage of FNNAC sampling is easy operation and absolute control over operating hand, especially for neck, breast, cutaneous or subcutaneous tissue⁷. The FNNAC also allows a better perception of tumor consistency.

Results when compared for background blood contamination (fig:1), the score for non aspiration technique were statistically significant (p-value 0.03). This inferred non aspiration causes less degree of contamination by blood because; the specimen is obtained by spontaneous capillary suction principle. It also causes significant reduction in trauma to the tumour and surrounding tissue thereby reducing blood contamination. Santos JEC and Leiman G⁶ was observed blood cannot be completely prevented in thyroid cytology. Still, FNNAC smears were less contaminated by blood than FNAC. The other authors who had used the same scoring system also reported the result consistent with the present study.

When compared for amount of cellularity on smears, the score for aspiration technique were high which is statistically insignificant (p-value 0.655). The amount of cellular material is more because the negative pressure applied during procedure allows aspiration of more cells from the lesion. These results were similar to Jayaram G et al⁹, and it was opposed to other workers like Santos JEC and Leiman G⁶, who inferred FNNAC was superior. It may be due to; in present study aspiration is done by trained performer whereas in Santos and Leiman, which was done by surgeon. But Mair et al did not find any significant difference in both the techniques.

When compared with degree of cellular trauma, degeneration and retention of architecture (fig:2) the non aspiration smears shows less degree of cellular trauma, degeneration but retention of architecture is more which is statistically significant (p value < 0.05). This inferred spontaneous capillary action causes less trauma and degeneration to the cell and better preservation of the architecture with text book quality. It is contrast to the study done by Leo F Tauro et al¹⁰ who observed high score for cellular material in aspiration technique. So the destruction of few sheets of cell did not obscure the field of diagnosis and also observed that the architecture was retained in greater extent than FNNAC due to additional material yield.

CONCLUSION:

*Needle cytology proves to be a simple, reliable and cost effective, first line diagnostic procedure in thyroid without complication. Compared with fine needle aspiration cytology, fine needle non aspiration cytology is less painful and with better patient compliance, yields more diagnostically superior smear with less bloody and degenerative changes.

*Needle cytology can be used as initial modality in evaluating thyroid diseases and for differentiating lesions which require surgery from those can be managed medically.

*The conclusion of the present study; as thyroid is a highly vascular organ, fine needle non aspiration technique should be performed first. If the amount of cellular material is inadequate only, repeat needle sampling should be performed with aspiration.

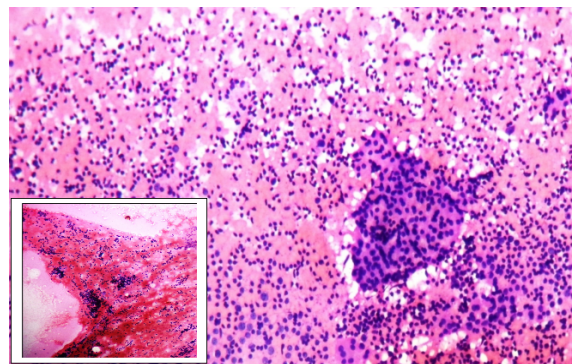
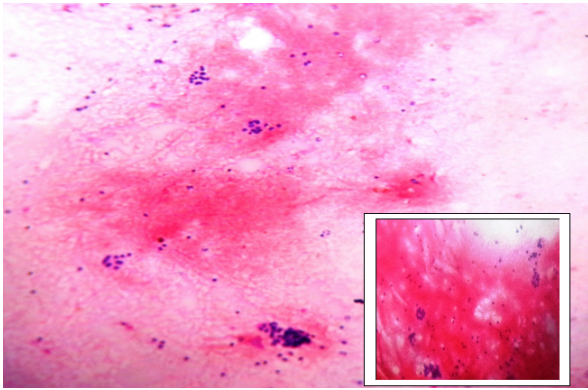


FIG 1: FNNAC-smears from hashimoto thyroiditis shows thyroid follicle & scattered lymphocytes with less trauma and haemorrhagic back ground compared to FNAC (Inset) (H&E, 10X)



PICTURE 3: FNNAC-smears from follicular neoplasm shows repetitive follicles with more retention of architecture & less haemorrhagic back ground compared to FNAC (Inset) (H&E, 10X)

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