



Original Article

Aspiration and non-aspiration technique in the study of thyroid gland lesion cytology

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ABSTRACT

Background: Fine needle aspiration cytology is used as a primary diagnostic tool in thyroid lesions. But the bloody smears caused by negative pressure during aspiration compromise cellular concentration and cell morphology which may lead to its improper interpretation. FNNAC avoids active aspiration and depends on capillary tension to collect tissue sample in the needle bore, thus reducing bleeding and tissue trauma to the highly vascular thyroid.

Material and Methods: This is a one year prospective study where FNNAC and FNAC were done on 87 patients. Cytopathologist was blind folded regarding the technique used and was asked to score the quality of slide base of Mair scoring system.

Results: FNAC yielded significantly better material on the basis of hemorrhage and cellularity. Fifty six (64.37%) cases showed adequate diagnostic material in FNNAC technique while 54/87 (62.05%) cases showed adequate diagnostic material in FNAC technique. Twelve (13.79%) cases showed unsuitable diagnostic material in FNNAC technique and 26/ 87 (29.89%) cases unsuitable diagnostic material in FNAC technique. Among the individual criteria used in Mair scoring system, background clot/ blood was significantly low in FNNAC than FNAC with the p value less than 0.001. Amount of cellular material was significantly more in FNNAC with p value less than 0.001.

Conclusion: FNNAC yielded more cellular and less hemorrhagic material and more diagnostic superior material than FNAC. Since thyroid is a highly vascular gland, FNNAC should be used instead of FNAC for less hemorrhagic and more cellular material.

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INTRODUCTION

Nodular thyroid lesions are one of the most common clinical problems, malignancy rate of which can be up to 10 %.¹ Hence, early diagnosis and treatment has become important in these lesions.² Fine needle aspiration cytology (FNAC) for lump was first done by Martin and Ellis in 1930 AD in the United States.³ Fine needle aspiration cytology is used as a primary diagnostic tool in thyroid lesions.⁴ It is minimal invasive technique with high sensitivity, specificity and accuracy.⁵ But the bloody smears caused by negative pressure during aspiration compromise cellular concentration and cell morphology which may lead to

its improper interpretation.⁶ while working to find its solution Brifford et al in 1982 developed fine needle non aspiration cytology (FNNAC).⁷ But he used this technique in breast. This method is also called cytopuncture or fine needle capillary sampling or fine needle non aspiration.⁸ In thyroid this technique was first used by Santos and Leiman in 1988.⁹ FNNAC avoids active aspiration and depends on capillary tension to collect tissue sample in the needle bore, thus reducing bleeding and tissue trauma to the thyroid.² In FNNAC, same bore needle as FNAC is used but it won't be attached to it. Needle is passed in a similar way as in FNAC in a lesion but the negative pressure is not created by the syringe. The contents of the needle is then spread on to the slide and interpretation is done after staining.⁴

Several studies have done in the past to find out diagnostic supremacy of FNNAC and/or FNAC. There were many conflicting results. This study is done to find out, if we can use FNNAC as a diagnostic tool instead of FNAC in thyroid.

MATERIALS AND METHODS

This is a prospective study carried out in Department of Pathology, Nobel medical college teaching hospital from September 1st, 2016 to August 31st, 2017. A total of 87 patients were included in the study. Both FNAC and FNNAC techniques were done in the same setting by the same pathologist irrespective of consistency and size. Permission from the institutional review committee was obtained. Patients with known case of thyrotoxicosis were not included in the study. After the procedure sample were labelled as A and B and was noted in the register. Cytopathologist was not aware about the technique used and the label in it to prevent the observation bias. For both procedures 22 gauge needle was used. FNAC was done with 10 ml syringe attach to it. After the collection of the sample it was put in a clean and dry slide and smear was made. FNNACs sample was blew to the slide with the help of new 10ml syringe filled with air. After spreading sample, half of the sample from both techniques was immediately fixed with 95% ethyl alcohol. Half of the sample was allowed to air dried. Air dried sample were stain with May Grunwald Giemsa Stain and wet alcohol fixed slides were stained with Papanicolaou stain. Slides were then evaluated for background clot/blood, cellularity, degree of cellular degeneration, degree of cellular trauma and retention of appropriate architecture. For this Mair et al scoring system was adopted.¹⁰ (Table 1).

A cumulative score was given for each slide, ranging from 0 to 10. It was then categorized into three categories as per score.

1. Category 1 (score 0-2): smear not suitable for diagnosis.
2. Category 2 (score 3-6): smear suitable for cytological

Table 1: Point scoring system to classify quality of cytological aspirate¹⁰

Criteria	Quantitative description	Point score
Background blood/clot	Large amount, great compromise of diagnosis	0
	Moderate amount, diagnosis possible	1
	Minimal amount, diagnosis	2
Amount of cellular material	Minimal to absent, diagnosis not possible	0
	Sufficient for cytodiagnosis	1
	Abundant, diagnosis possible	2
Degree of cellular degeneration	Marked, diagnosis impossible	0
	Moderate, diagnosis possible	1
	Minimal, diagnosis easy	2
Degree of cellular trauma	Marked, diagnosis impossible	0
	Moderate, diagnosis possible	1
	Minimal, diagnosis easy	2
Retention of appropriate architecture	Minimal to absent, non-diagnostic	0
	Moderate, some preservation of, for eg. Follicle, papillae, acini, flat sheets, syncytia or single cell pattern	1
	Excellent architectural display closely reflecting histology, diagnosis obvious	2

Table 2: Comparison of diagnostic quality between FNNAC and FNAC

Results	TECHNIQUE	
	FNNAC	FNAC
	No. of cases (%)	No. of cases (%)
Diagnostic superiority	19 (21.84)	7 (8.06)
Diagnostic adequate	56 (64.37)	54 (62.05)
Unsuitable	12 (13.79)	26 (29.89)
Total	87 (100)	87 (100)

Table 3: Frequency of various thyroid lesions

Type of lesion	No. of cases	%
Colloid goiter	25	28.73
Nodular goiter	23	26.44
Thyroiditis	16	18.39
Follicular lesion	13	14.95
Follicular neoplasm	2	2.30
Papillary carcinoma	7	8.04
Medullary carcinoma	1	1.15
Total	87	100

diagnosis

3. Category 3 (score 7-10): diagnostic superior smear.

The scores were then tabulated and SPSS 17 software was used for data analysis. Chi square test was used. P value

Table 4: Comparison of various studies

	No. of cases	FNNAC			FNAC		
		DS	DA	U	DS	DA	U
Rizvi et al ²⁰	150	67	80	3	30	110	10
Ramachandra et al ⁴	69	14	47	8	5	47	17
Our study	87	19	56	12	7	54	26

of <0.05 was considered significant.

RESULTS

A total of 87 patients were included in our study. Seventy four of them were females and 13 were males. Table 1 shows the comparison of both techniques. Nineteen (21.84%) cases showed diagnostic superiority in FNNAC technique while 7/87(8.06%) cases showed diagnostic superiority in FNAC. Two cases showed diagnostic superiority in both FNAC and FNNAC techniques.

Fifty six (64.37%) cases showed adequate diagnostic material in FNNAC technique while 54/87 (62.05%) cases showed adequate diagnostic material in FNAC technique. Thirty four cases showed adequate diagnostic material in both FNAC and FNNAC techniques.

Twelve (13.79%) cases showed unsuitable diagnostic material in FNNAC technique and 26/87 (29.89%) cases showed unsuitable diagnostic material in FNAC technique. Four cases showed unsuitable diagnostic material in both FNAC and FNNAC techniques.

Among the individual criteria used in Mair scoring system, background clot/ blood was significantly low in FNNAC than FNAC with the p value less than 0.001. Amount of cellular material was significantly more in FNNAC with p value less than 0.001. Degree of cellular degeneration, degree of cellular trauma and retention of appropriate architecture did not show any statistical significant between FNNAC and FNAC techniques.

Frequency of thyroid lesions encountered during the study was tabulated in table 3. Goiter was the most common lesion (n=48; 55.17%) followed by thyroiditis (n=16; 18.39%).

DISCUSSION

FNAC since its inception has been accepted as a diagnostic tool in a nodular lesions by now.¹¹ FNAC has been a primary diagnostic tool in case of thyroid nodule as it is easy to perform, rapid, less complication with high sensitivity and high specificity.¹² Thyroid being a highly vascular glands, it is sometimes painful, traumatic and yield hemorrhagic material for cytological study. FNNAC which doesn't need negative pressure to collect the sample depends on a capillary action of the fine needle, where semi fluid or fluid

substance ascends immediately in a tube, depending upon the diameter of the tube.⁹ Due to this reason the procedure is less painful and less traumatic.¹³

A total of 87 patients were included in our study. 22 gauze needles were used in our study. Torres et al¹⁴ and pinki et al also used needle of 22 gauze.⁸ Others used needle of 25 gauze needle for the procedure.¹⁵⁻¹⁷

Background blood/ clot was significantly less in our study which was similar to the study done by Pinki et al⁸ and ramachandra et al⁴ but akther et al did not find significant difference¹⁸ but it was on the lymph node.

Cellularity was higher significantly higher in our study which was similar to the study done by Jayaram et al¹⁹ but Mair et al¹⁰ and zajdela et al³ did not find any significant difference between two techniques in terms of cellularity. Comparison of various studies is tabulated in table 4.

CONCLUSION

FNNAC yielded more cellular and less hemorrhagic material and more diagnostic superior material than FNAC. Since thyroid is a highly vascular gland, FNNAC should be used instead of FNAC for less hemorrhagic and more cellular material.

Conflict of interest: None

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