



Fine Needle Aspiration Cytology versus Fine Needle Non Aspiration Cytology-A Comparative Analysis in Various Breast Lesions

Authors

Shalini Srivastava^{1*}, Alok Kumar Varma²

¹Assistant Professor, Department of Pathology, Saraswati Medical College, Unnao (U.P.)

²Consultant Surgeon, Prem Neurosurgical Clinic, Kanpur Road, Lucknow

*Corresponding Author

Shalini Srivastava

Assistant Professor, Department of Pathology, Saraswati Medical College, Unnao (U.P.), India.

Tel. 9450335521, Email: shalinisri01@gmail.com

Introduction

FNAC (Fine Needle Aspiration Cytology) is a well established and reliable diagnostic tool. It is considered an important first line procedure for the assessment of various superficial and deep-seated lesions.

FNAC technique was modified by Zajdela et al¹ to obtain cytological specimen without aspiration-Fine needle non aspiration cytology (FNNAC). The technique was based on the principle that capillary action in a fine needle is sufficient to keep the scrapped cells inside the lumen. The technique of non aspiration was especially recommended for obtaining cytological specimens in vascular lesions like thyroid. The non aspiration technique has however been of limited use in breast lesions.

The present study was undertaken to compare the efficacy of FNNAC with that of FNAC in various breast lesions. The techniques were compared objectively to ascertain whether FNNAC could be

established as a useful and superior technique in the cytological diagnosis of breast lesions.

Material and Method

The present study included 140 patients with various breast lesions referred to the Department of Pathology, GSVM Medical College, Kanpur (U.P.), India. After a detailed clinical history and examination, the lesions were sampled by both the techniques, using a 21 gauge needle. A 20 ml syringe was used to create negative pressure for the aspiration technique. All sampling was done by a single operator. The smears were examined without prior knowledge of the technique used, and interpreted based on point scoring system developed by Mair et al². The two sampling techniques were given scores on 5 parameters:

1. Background blood or clot.
2. Amount of cellular material.
3. Degree of cellular degeneration.
4. Degree of cellular trauma.
5. Retention of appropriate architecture.

Each parameter was given a score of 0, 1 and 2 accordingly.

CRITERION	QUANTITATIVE DESCRIPTION	SCORE
Background blood or clot	Large amount; great compromise to diagnosis	0
	Moderate amount; diagnosis possible	1
	Minimal; diagnosis easy; specimen of text book quality	2
Amount of cellular material	Minimal or absent; diagnosis not possible	0
	Sufficient for cytodiagnosis	1
	Abundant; diagnosis simple	2
Degree of cellular degeneration	Marked; diagnosis impossible	0
	Moderate; diagnosis possible	1
	Minimal; good preservation; diagnosis easy	2
Degree of cellular trauma	Marked; diagnosis not possible	0
	Moderate; diagnosis possible	1
	Minimal; diagnosis obvious	2
Retention of appropriate architecture	Minimal to absent; non diagnostic	0
	Moderate; some preservation of e.g. follicles, papillae, acini, flat sheets, syncytia or single cell pattern	1
	Excellent architectural display closely reflecting histology, obvious diagnosis	2

The total score for each case by both techniques was calculated and the smears were divided into 3 categories based on the total score.

1. Unsuitable for cytological diagnosis (score 0-2)
2. Diagnostically adequate (score 3-6)
3. Diagnostically superior (score 7-10)

The average score for each parameter by the two techniques was also calculated. All the values were interpreted statistically using student ‘t’ test. Statistical significance was considered at a level of P=0.5.

Observation

140 breast lesions were sampled by both the techniques. The lesions included 28 inflammatory, 89 benign proliferative lesions and 21 malignant while 2 were inconclusive by both the techniques.

Table 1: Performance of FNAC and FNNAC in Total Cases

Result/Performance	FNAC	FNNAC
Diagnostically superior	76 (54.3%)	87(62.1%)
Diagnostically adequate	55 (39.3%)	39(27.9%)
Unsuitable for cytological diagnosis	09 (6.4%)	14(10.0%)

These observations show that FNNAC is more likely to produce diagnostically superior quality material; however it also produces a greater number of unsuitable smears. FNAC was diagnostic in 93.6% cases, while FNNAC was diagnostic in 90% cases.

Table 2: Performance of FNAC and FNNAC in Inflammatory Lesions

Result/Performance	FNAC	FNNAC
Diagnostically superior	15	15
Diagnostically adequate	12	11
Unsuitable for cytological diagnosis	01	02

Both FNAC and FNNAC give comparable results in inflammatory lesions

Table 3: Performance of FNAC and FNNAC in Benign Proliferative Lesions

Result/Performance	FNAC	FNNAC
Diagnostically superior	49	55
Diagnostically adequate	35	24
Unsuitable for cytological diagnosis	05	10

FNNAC is more likely to produce diagnostically superior quality material; however it also produces an increased number of inadequate smears. FNAC was diagnostic in 94.4% cases, while FNNAC was diagnostic in 88.8% cases.

Table 4: Performance of FNAC and FNNAC in Malignant Lesions

Result/Performance	FNAC	FNNAC
Diagnostically superior	12	17
Diagnostically adequate	08	04
Unsuitable for cytological diagnosis	01	00

FNNAC is more likely to produce diagnostically superior quality material. No unsuitable smears

were seen by FNNAC compared to one by FNAC. The unsuitable smear was due to large amount of blood and low cellularity.

Table 5: Average Score for Each Parameter (Total Cases)

S.N.	CRITERION	FNAC	FNNAC
1	Background blood or clot	1.157	1.292
2	Amount of cellular material	1.307	1.300
3	Degree of cellular trauma	1.292	1.328
4	Degree of cellular trauma	1.171	1.192
5	Retention of appropriate architecture	1.149	1.164

These observations show that the average score was better by FNNAC compared to FNAC for all parameters except amount of cellular material which was slightly higher for FNAC. In individual groups similar results were obtained except the cellular yield was better in malignant lesions. The difference between the scores of the parameter 'Background blood or clot' by the two techniques was found to be statistically significant at $p = 0.05$. The difference between the scores of the remaining four parameters by the two techniques showed no statistical significance.

Table 6: Average of Total Score in Each Category

	FNAC	FNNAC
TOTAL CASES	6.15	6.35
INFLAMMATORY	6.21	6.50
BENIGN PROLIFERATIVE	6.22	6.34
MALIGNANT	6.285	6.76

Average score per case on a total score of 10 was also better by FNNAC. Similar results were seen in individual groups also.

Discussion

The aim of the present study was to compare the conventional Fine needle aspiration technique with the Fine needle non aspiration technique in various breast lesions. In the present study it was observed that FNNAC gave greater number of diagnostically superior smears as compared to FNAC, however diagnostically adequate smears were more frequently obtained by FNAC as compared to FNNAC. The number of unsatisfactory smears was also more by FNNAC.

These observations were in agreement with several prior studies.

Mair et al² and Savage et al³ also noted that FNNAC gave superior quality smears, although conventional FNAC was diagnostic in greater number of cases, but this difference was not statistically significant. The study by Ghosh et al⁴ also showed similar results. The difference in their study was found to be statistically significant. Baksh et al⁵ in their study of 145 breast lesions obtained more diagnostically superior smears by FNNAC, and more diagnostically adequate smears by FNAC. This difference was statistically significant. These findings were similar to the findings of the present study; however the difference in our study was not statistically significant.

The study by Zajdela et al¹ on mammary lesions gave insufficient cellular yield with fine needle alone in 5.5% of the lesion. The same incidence (6%) was recorded with aspiration techniques. The present study gave smears unsatisfactory for cytological diagnosis in 6.4% of cases by aspiration technique and 10% by non aspiration technique. They also noted that the trauma to the cells is reduced by non aspiration technique, which was similar to the findings of our study.

In the present study the lesions were categorized into inflammatory lesion, benign proliferative lesions and malignant lesions. The inflammatory lesions showed almost similar results by both the techniques. In the benign proliferative lesions FNNAC gave greater number of diagnostically superior smears (FNAC-49, FNNAC-55), diagnostically adequate smears were more by FNAC (FNAC-35, FNNAC-24) and diagnostically unsatisfactory smears were more by FNNAC (FNAC-05, FNNAC-10). In the malignant lesions again, FNNAC gave greater number of diagnostically superior smears (FNAC-12, FNNAC-17). Greater number of diagnostically adequate smears was obtained by FNAC than by FNNAC (FNAC-8, FNNAC-4). There was one unsatisfactory smear by FNAC (This was due to

large amount of blood and low cellularity) compared to none by FNNAC.

In the study by Raghuvver et al⁶, of the 27 breast cases FNS (FNNAC) yielded diagnostic material in 70.38% cases while FNA was diagnostic in 85.19%, thus establishing definite superiority. However FNS seemed to be better for diagnosing malignant lesions while FNA appeared better for diagnosing benign ones. The present study also shows better results with FNAC for benign lesions while the non aspiration technique gave better results for malignant lesions

Ciatto S et al⁷ found that the inadequacy rate was the same in 166 cancers (6.6%), whereas a significant difference was recorded in favour of aspiration (13.6 versus 24.4%) in 368 benign masses. When inadequate results were excluded, the accuracy of the two modalities was almost the same. The present study also shows greater number of inadequate smears by FNNAC in benign lesions.

Bharathi K et al⁸ also noted that the diagnostic adequacy was more by FNAC, but this difference was not statistically significant. They also noted that FNAC was the best choice for fibrous and cystic lesions, while in malignant lesions both the techniques were comparable and yielded adequate material. These findings were similar to our study. However according to their study FNAC technique also gave diagnostically superior quality smears, while in our study FNNAC gave more superior quality smears.

On comparing the average score for each parameter, higher average scores were seen with FNNAC for all parameters except for amount of cellular material which was higher for FNAC. The difference between the scores for the parameter background blood was found to be statistically significant. None of the differences for other scores were found to show statistical significance. In individual groups, the average score for the parameter- amount of cellular material was higher in malignant lesions.

In the studies conducted by Mair et al², there was no statistically significant difference between the

efficacies of the two sampling techniques for any of the parameters studied. Baksh et al⁵ in their study on breast lesions, also found the differences between all the individual parameters as observed in FNAC and FNNAC smears to be insignificant. Ghosh et al⁴ found statistically significant better results by FNA for the parameter amount of cellular material for breast lesions only. This difference in scores was not significant in our study.

Kamal et al⁹ in their study on thyroid lesions, concluded that smears prepared by FNC (FNNAC) displayed cellular material which was more concentrated, less damaged and less likely to be obscured by blood. A statistically significant difference in favour of FNC was observed for the parameter amount of cellular material.

Kumarsinghe et al¹⁰ in their study found that though discomfort felt and contamination with blood was less by non aspiration technique, the overall cellular yield was unsatisfactory for breast lesions. The cellular yield was, however comparable for malignant breast lesions by both the techniques. Our study gave comparable cellular yield by both the techniques, with slightly better cellular yield by FNAC. Higher inadequate smears were seen by FNNAC in some benign lesions.

The average score (on adding scores of all parameters) for each case by FNAC and FNNAC were also calculated. Better average score for the total series was: FNAC-6.15, FNNAC-6.35. In individual groups also FNNAC gave better scores.

Conclusion

All the above observations lead to the conclusion that FNNAC is a qualitatively superior technique. Quantitatively, also it is at par with FNAC except in cases of benign lesions, where it gives greater number of inadequate smears. This is usually seen in cases with low cellularity and cystic lesions. FNNAC is especially useful in sampling of malignant lesions. On a subjective level, FNNAC allows greater ease of lesion sampling. There is a better control of hand during the procedure and so

the method is extremely useful in sampling small lesions. The operator also gets a better perception of the consistency of the lesion. On the whole FNNAC is a good alternative to FNAC. Using either of the two techniques, depending on the lesion, or double sampling using both techniques will give superior quality smears with decreased number of inadequate samples.

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