

Conventional Cytological Smear Versus Liquid Based Preparation (E-Prep) in Thyroid Lesions.

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Abstract:

Background and Objective

Fine needle cytology (FNC) has gained tremendous popularity in recent times among clinicians and pathologist. Liquid based cytology is a new technology for fine needle aspiration samples. It is used for mainly for cervical cancer screening, now also used for non gynaecological samples. In this study thyroid lesions (30 cases) are compared with both techniques of FNAC Conventional preparation and Liquid based preparation (E-PREP)

Materials and Methods

This study is a prospective study conducted at Government Mohan Kumaramangalam Medical College, Salem during the year 2017. This study included samples obtained from 30 patients who attended cytology department for FNAC of thyroid lesions. Collection of clinical data of patients attending the cytology department for FNAC for thyroid lesions and preparing conventional smears (CS) & Liquid Based Preparation (LBP).

Results

On analysing and comparing average score obtained by both methods (CS & LBP) in thyroid lesions and the P value calculated by Pearson Chi-Square test, the difference was found to be statistically insignificant $P > 0.05$.

Conclusion

The decision to make, use either Conventional method or LBP may depend on basis of nature of the lesion (solid or cystic) and other ancillary tests to perform in the sample & each method has its own advantages and disadvantages and both methods can be combined to obtain a superior quality smears and lower the failure rates.

Keywords: Conventional smear, liquid based preparation, Thyroid

Date of Submission: 04-01-2019

Date of acceptance: 19-01-2019

I. Introduction

The FNAC initially used to confirm a clinically suspicious cases of malignancy and local recurrence of carcinomas without further surgical intervention. Clinical use of FNAC not only for neoplastic condition also used for non neoplastic conditions like inflammatory and degenerative lesions.⁽¹⁾

Liquid based cytology is a new technology for fine needle aspiration samples. It is used mainly for cervical cancer screening, now also used for non gynecological samples. The basic principle of LBC is to collect specimen into the fixative solution and then make a monolayer of cells after staining. LBC preservation of cells are excellent and reduces the bloody background.⁽²⁾

E-PREP system is a Liquid based cytology processor with patent dual membrane filters. In this method able to collect large number of cells and make a monolayer preparation of cells with good cytological details. The quality of the smear is excellent due to application of both filtration & precipitation methods. Hence the method is more accurate. E-PREP also facilitates preparation of more number of slides 150 slides / hr.⁽³⁾ In this prospective study, 30 cases of thyroid lesions were analysed and attempted to compare both techniques FNAC and Liquid based preparation (E-PREP) with references to diagnostic adequacy and accuracy.

Aim

To compare the efficacy of E-PREP for non gynaecological samples (Thyroid) and to compare the advantages and disadvantages of E-PREP for non gynaecological samples

II. Materials and Methods:

This study is a prospective study conducted at Government Mohan Kumaramangalam Medical College, Salem during the year 2017. This study included samples obtained from 30 patients who attended cytology department for FNAC of thyroid lesions. Collection of clinical data of patients attending the cytology department for FNAC of thyroid lesions and preparing CSs & LBP.

According to scoring system of **Mair et al**⁽⁴⁾ quality of cytological aspirate samples analysed. The smears are compared with following parameters which are Cellularity, Retention of appropriate architecture, Blood or clot obscuring the background elements, Degree of trauma and Degree of cellular degeneration

On the basis of five parameters tabulated for each case, a cumulative score was obtained, then categorized as one of the 3 following categories, Unsuitable for cytological diagnosis – (0-2), Diagnostically Adequate – (3-6) and Diagnostically Superior – (7-10)

Table1: Scoring system developed by Mair et al to classify quality of cytological aspirate

Criterion	Qualitative description	Point 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 to absent; diagnosis not possible	0
	Sufficient for diagnosis	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 impossible	0
	Moderate; diagnosis possible	1
	Minimal; diagnosis obvious	2
Retention of appropriate architecture	Minimal to absent; non-diagnostic	0
	Moderate; some preservation of, for example follicles	1
	Excellent architectural display closely reflecting histology; diagnosis obvious	2

III. Observation and Results

Among the 30 cases of thyroid swelling, there were 6 males and 24 females out of which 19 cases of Nodular colloid goitre, 8 cases of Autoimmune thyroiditis (Hashimoto's thyroiditis and Lymphocytic thyroiditis), and Papillary carcinoma thyroid, Cystic colloid nodule and Colloid goitre with thyroiditis each 1 case.

The smears obtained by CS and LBC were scored and graded accordingly to background blood or clot, cellularity, degree of cellular trauma, degree of cellular degeneration, retention of appropriate cellular architecture.

In our study, it was found that number of diagnostically adequate smears were more from Conventional smear technique than LBC (CS- 25 cases, LBC-23) and diagnostically superior smears were from LBC more than Conventional method (CS-4 cases, LBC-6 cases) and diagnostically unsuitable smears were equal in both techniques (CS-1 case, LBC-1 case).

On comparing the number of adequate smears, superior smears and unsuitable smears obtained by Conventional smears and LBP, it was found that CS produced more adequate

smears(52.1%), LBP produced more superior smears (60%) and diagnostically unsuitable smears produced by both techniques were equal(50%).

The average score for each parameter in Conventional smear and LBP of thyroid lesion was calculated and it was found that the average score of background blood was numerically higher in LBP technique (Mean-1.633)

The mean value of cellularity numerically higher in Conventional smears. (Mean-1.533)The mean value of degree of cellular trauma numerically higher in LBP technique. (Mean-1.266). The mean value of degree of cellular degeneration was numerically higher in Conventional method (Mean-0.933). The mean value of retention of architecture was numerically higher in Conventional method (Mean-1.133). Total average score was analysed between two techniques it was found that average score was equal for both methods. (Mean-5.500).The average mean difference between both techniques (CS-5.500and LBP-5.500) calculated as 0.00001 . The P value of average scores of each techniques calculated by t- test and the P value =1.

The P value of each parameter was calculated by Pearson Chi-Square test.

- P value of background blood and clot score P= 0.01
- P value of parameter of cellularity score P=0.012
- P value of degree of cellular trauma score P=0.565
- P value of degree of cellular degeneration score P=0.471
- P value of retention of architecture score P=0.033

On Comparison of Conventional smears and LBP in thyroid lesions, the P value was calculated by using Pearson Chi-Square test and the P value was 0.785.

IV. Discussion

In our study , on considering all observations and results of each technique (Conventional method and LBP) in thyroid swelling , number of diagnostically adequate smears, diagnostically superior smears and unsuitable smears, average score of each parameters, mean score, P value are calculated and analysed.

In our study, it was found that number of diagnostically adequate smears were more from Conventional smear technique than LBC (CS- 25 cases, LBC-23) and diagnostically superior smears were from LBC more than Conventional method (CS-4 cases, LBC-6 cases) and diagnostically unsuitable smears were equal in both techniques (CS-1 case, LBC-1case).

On comparing the number of adequate smears, superior smears and unsuitable smears obtained by Conventional smears and LBP, it was found that CS produced more adequate smears(52.1%), LBP produced more superior smears (60%) and diagnostically unsuitable smears produced by both techniques were equal(50%).

Total average score analysed between two techniques it was found that average score was equal for both methods. (Mean-5.500) The average mean difference between both techniques (CS-5.500and LBP-5.500) calculated as 0.00001 . The P value of average scores of each techniques calculated by t- test and the P value = 1 . The difference was found to be statistically insignificant P>0.05.

The P value of each parameters were calculated by Pearson Chi-Square test. P value of background blood and clot score P= 0.01, the difference was found to be statistically significant P<0.05.

P value of parameter of cellularity score P=0.0012, the difference was found to be statistically significant P<0.05.

P value of degree of cellular trauma score P=0.565, the difference was found to be statistically insignificant P>0.05.

P value of degree of cellular degeneration score P=0.471 the difference was found to be statistically insignificant P>0.05.,

P value of retention of architecture score P=0.033 , the difference was found to be statistically significant P<0.05.

Comparison of Conventional smears and LBP in thyroid lesions , the P value was calculated by using Pearson Chi-Square test and the P value =0.785 the difference was found to be statistically insignificant P>0.05.

According to N.Mygdakos et al,⁽⁵⁾ they compare the CS and LBP in nongynecological samples. The samples were compared on basis of following parameters such as cellularity , background blood or cell debris, informative background (colloid, stromal fragments, mucus), presence of monolayer arrangement, cytoplasmic and nuclear details by a semi quantitative scoring system. By using Wilcoxon signed rank test on statistical analysis was made.

Adequate diagnostic cells in all smears were higher in LBPs than CS regarding in absence of background blood or clot, presence of monolayers and well defined nuclear and cytoplasmic details P< 0.05

and other parameters like cellularity, retention of cellular architecture and informative background equal to CSs and statistically insignificant differences $P > 0.05$.

Overall P value of in our study 0.785, the differences found to be statistically insignificant ($P > 0.05$). The diagnostically inadequate smears were obtained by our study compared with other studies. In our study diagnostically unsuitable smears obtained by both methods show equal percentage.

Although this study showed statistically insignificant difference between Conventional and Liquid based preparation with respect to average scores, retention of cellular architecture, degree of cellular trauma and degeneration, some practical considerations have emerged. In Colloid goitre, cystic degeneration in nodular colloid goitre and colloid nodule LBP preferred because of few thyroid follicular cells in colloid material are well preserved in these methods.

V. Conclusion

Comparing Liquid based cytology on non gynecological samples with the gynaecological samples, increased number of satisfactory results were more in gynecological samples than non gynaecological samples in many studies.

In current study, on analysing and comparing average score obtained by both methods (Conventional smears and LBP) in nongynecological samples thyroid swellings, the P value calculated by Pearson Chi-Square test, the difference was found to be statistically insignificant $P > 0.05$. The decision to make, use either Conventional method or LBP may depend on basis of nature of the lesion (solid or cystic) and other ancillary tests to perform in the sample.

In conclusion each method has its own advantages and disadvantages and both methods can be combined to obtain a superior quality smears and lower the failure rates. Comparing Liquid based cytology on non gynecological samples with the gynaecological samples, increased number of satisfactory results more in gynecological samples than non gynaecological samples in many studies. The decision to make, use either Conventional method or LBP may depend on basis of nature of the lesion (solid or cystic) and other ancillary tests to perform in the sample.

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Dr. J. Maheswari." Conventional Cytological Smear Versus Liquid Based Preparation (E-Prep) in Thyroid Lesions." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 1, 2019, pp 09-12.