

ORIGINAL RESEARCH

Liquid-based cytology and conventional cytology for assessment of cervical pap smear

¹Dr Shailesh Patel, ²Dr Deepika Modi, ³Dr Jayesh Modi

^{1,2}Assistant Professor, Department of Pathology, Banas Medical College and Research Institute, Palanpur, Gujarat, India

³Professor, Department of Surgery, Banas Medical College and Research Institute, Palanpur, Gujarat, India

Correspondence:

Dr Deepika Modi

Assistant Professor, Department of Pathology, Banas Medical College and Research Institute, Palanpur, Gujarat, India

Email: dipikajmodi@gmail.com

ABSTRACT

Background: Cervical cancer worldwide is second only to breast cancer in incidence. The present study compared liquid-based cytology and conventional cytology for assessment of cervical pap smear.

Materials & Methods: 84 females aged 18- 60 years presenting with complaints of abnormal vaginal discharge etc. were enrolled and specimen was collected for both conventional pap smear (group I) and liquid based cytology (group II) then colposcopic guided biopsy was performed.

Results: P/S findings were normal in 52 and abnormal in 20 cases. It was erosion Cx in 4, hypertrophied Cx in 4, hypertrophied Cx in 3, ulcer Cx in 1 and papillary growth in 1.68 cases in group I were normal and 16 abnormal and in 72 cases in group II were normal and 12 were abnormal. Normal cases were 68 and 72, LSIL was 14 and 6, HSIL was 7 and 3 and invasive Cawas 5 and 3 in group I and group II respectively.

Conclusion: Liquid Based Cytology is better than Conventional Pap test in detecting preinvasive cervical lesions.

Key words: cervical lesions, Conventional Pap test, Liquid Based Cytology

INTRODUCTION

Cervical cancer worldwide is second only to breast cancer in incidence and approximately three-fourths of cases occur in the developing countries. Among Indian women, it is the most common form of genital malignancy.¹ Recurrence is seen in a significant number of cases despite advances in universal screening, early detection, surgical treatment and radiotherapy. Recurrence rates of 1.5 per cent for early small tumours and 20-40 per cent for more advanced tumours have been reported.²

The Pap smear technique is simple and inexpensive but the sensitivity of a single Pap test is limited which varies between 50 – 70%. The Pap test has high false–negative rate which is associated with several factors of both sampling and interpretation. Uneven cell distribution, overlapping cells, blood, or inflammation in conventional Pap smear makes its interpretation difficult.³

Liquid based cytology was developed as an alternative. For the liquid-based cytology, the cervical cells are collected with a traditional sampling device and rinsed into a vial with preservation solution rather than being smeared on a slide. Because only a representative

portion of the sample is used, the residual material in the vial may be used for ancillary testing such as reflex human papillomavirus (HPV) testing and other molecular tests.⁴The most important benefit of LBC consists of a probable increase in prediction of high – grade cervical intra epithelial neoplasia (CIN), reduction in the number of unsatisfactory smears, most of the collected cellular material is available for laboratory processing, and the residual specimens can be used for HPV DNA testing.⁵The present study compared liquid-based cytology and conventional cytology for assessment of cervical pap smear.

MATERIALS & METHODS

The present study comprised of 84 females aged 18- 60 years presenting with complaints of abnormal vaginal discharge, irregular periods, lower abdomen pain, post coital bleeding, or abnormal cervical findings on per speculum examination. The consent was obtained from all enrolled patients.

Data such as name, age etc. was recorded. Specimen was collected for both conventional pap smear (group I) and liquid based cytology (group II) then colposcopic guided biopsy was performed. By using biopsy proven CIN cases as the gold standard the sensitivity of both the cytology method was obtained. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution based on clinical features

P/S finding	Normal	Abnormal	P value
Normal	52	20	0.01
Erosion Cx	0	4	
Hypertrophied Cx	0	3	
Hypertrophied Cx	0	3	
Ulcer Cx	0	1	
Papillary growth	0	1	

Table I, graph I shows that P/S findings were normal in 52 and abnormal in 20 cases. It was erosion Cx in 4, hypertrophied Cx in 4, hypertrophied Cx in 3, ulcer Cx in 1 and papillary growth in 1. The difference was significant (P< 0.05).

Graph I Distribution based on clinical features

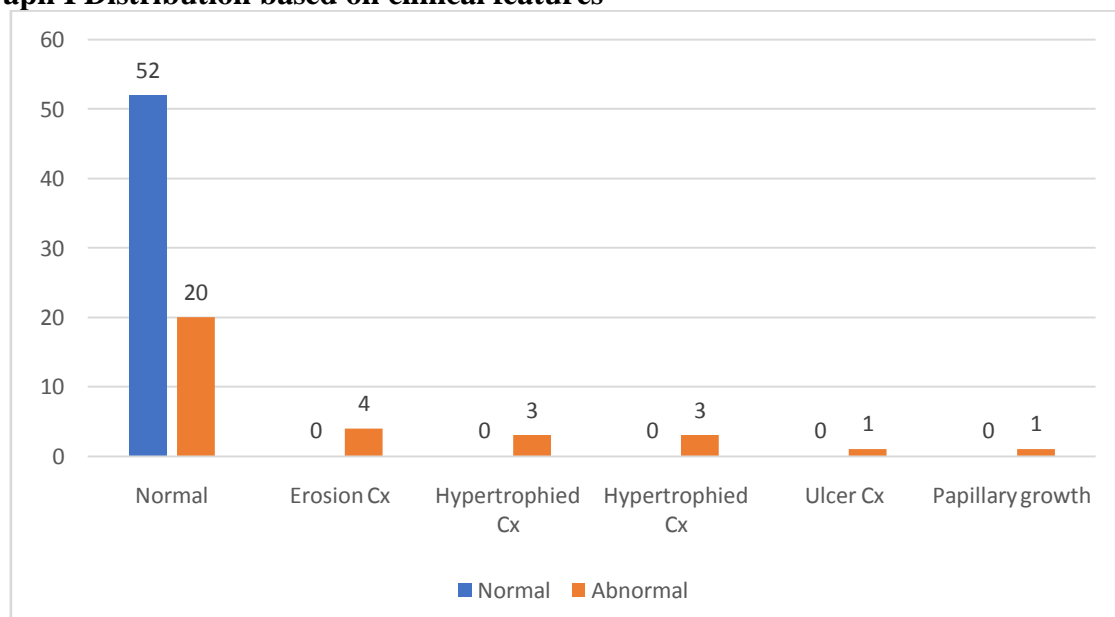


Table II Distribution based on methods used

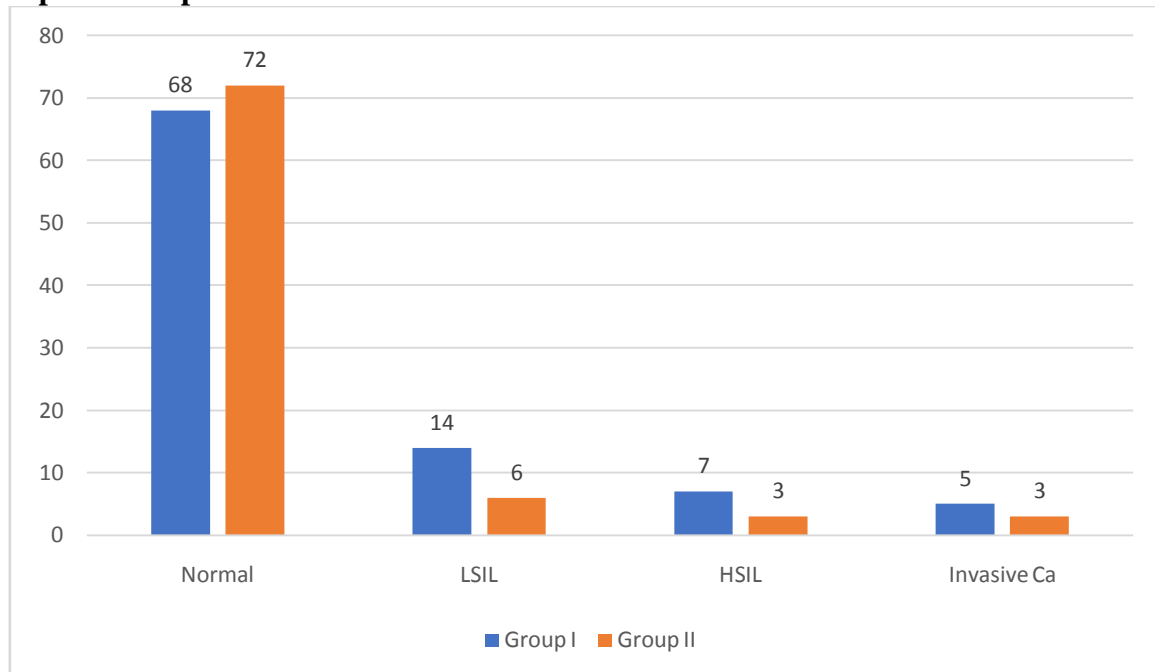
Groups	Normal	Abnormal	P value
Group I	68	16	0.01
Group II	72	12	

Table II shows that 68 cases in group I were normal and 16 abnormal and in 72 cases in group II were normal and 12 were abnormal. The difference was significant ($P < 0.05$).

Table III Comparison of LBC and PAP

Category	Group I	Group II	P value
Normal	68	72	0.04
LSIL	14	6	
HSIL	7	3	
Invasive Ca	5	3	

Table III, graph II shows that normal cases were 68 and 72, LSIL was 14 and 6, HSIL was 7 and 3 and invasive Ca was 5 and 3 in group I and group II respectively. The difference was significant ($P < 0.05$).

Graph II Comparison of LBC and PAP

DISCUSSION

Cervical cytology was introduced by George Papanicolaou into clinical practice in 1940. In 1945, the Papanicolaou smear received the endorsement of the American cancer society as an effective method for the prevention of cervical cancer.⁶ Center of cytology in Vancouver, British Columbia published data which confirmed that cytologic screening leads to a reduction in the rate of invasive cancer of the uterine cervix. Liquid based, thin layer technology was developed to address the limitation of Pap smear.⁷ More than 5,00,000 subjects have been studied with a preponderance of data indicating a significant benefit of liquid-based, thin layer technology in the detection of cervical cancer precursor lesions and in the improvement of specimen adequacy.⁸

We found that P/S findings were normal in 52 and abnormal in 20 cases. It was erosion Cx in 4, hypertrophied Cx in 4, hypertrophied Cx in 3, ulcer Cx in 1 and papillary growth in 1.

Singh et al⁹ assessed the efficacy of liquid-based cytology (LBC) as a method for cytological follow up and detection of recurrence in treated cases of cancer cervix and compared it with conventional Pap smear technique to find the best screening method for detection of recurrence in these patients. Pap smear and LBC were taken in all cases. Colposcopy and biopsy were done for those having epithelial cell abnormality in cytology report. Colposcopy and biopsy were taken as gold standard for diagnosis of cancer cervix recurrence. 94 treated patients of carcinoma cervix were studied. The diagnostic accuracy for detection of recurrence of conventional Pap smear was 79.16% and that of LBC was 97.6%. The difference between the two methods was significant ($P < 0.001$).

We found that 68 cases in group I were normal and 16 abnormal and in 72 cases in group II were normal and 12 were abnormal. Sherwani et al¹⁰ assessed liquid based cytology (Pap spin) and to compared the sensitivity of Pap spin with conventional Pap smear. Pap smears were taken from 160 patients with gynaecologic complaints with Ayre's spatula and endocervical cytobrush and slides prepared. Colposcopy was performed in patients with abnormal smears and biopsy was performed in suspected malignant or dysplastic cases. LSIL and HSIL was diagnosed in 27 (64.4%) cases, mostly between 21-40 years, Commonest presenting complaint was discharge per vaginum seen in 68 (42.5%) cases. Cytological abnormality was found in 42 cases (26.2%) by Pap spin method, whereas conventional Pap smear detected abnormality in only 24 cases (15%). 133 cases (83.1%) were satisfactory for evaluation on Pap spin and 51 cases (31.9%) on conventional Pap smear. The commonest atypical finding on colposcopy was acetowhite area in 14 cases (31.1%). Sensitivity of Pap spin and conventional Pap smear was 97.6% and 53.7% respectively and specificity was 50% in each. Pap spin is strongly advocated in the best interest of public health as it improves the sample quality and reduces the likelihood of false negative results.

We found that normal cases were 68 and 72, LSIL was 14 and 6, HSIL was 7 and 3 and invasive Cawas 5 and 3 in group I and group II respectively. Hutchinson et al¹¹ showed that fewer than 20% of cells collected by Pap smears were transferred on to the slide and thus explained the high prevalence of true false-negative rate. By rinsing the sampling device into a liquid fixture helps the entire sample to be captured into the vial. They reported a higher percentage of cases of LSIL on liquid based cytology (10.6%) than conventional Pap smear (9.0%). Diaz-Rosario et al¹² reported increased detection of premalignant precursors on liquid-based cytology as compared to conventional smear. They reported an increased percentage of cases of LSIL from 1.6% to 2.7% and of HSIL increased from 0.3% to 0.5%.

CONCLUSION

Authors found that Liquid Based Cytology is better than Conventional Pap test in detecting preinvasive cervical lesions.

REFERENCES

1. McNutt LA, Wu C, Xue X, Hafner JP. Estimating the relative risk in cohort studies and clinical trials of common outcomes. *Am J Epidemiol.* 2003;157 (10):940-943.
2. Greenland S. Model-based estimation of relative risks and other epidemiologic measures in studies of common outcomes and in case-control studies. *Am J Epidemiol.* 2004;160(4):301-305.
3. Hussein T, Desai M, Tomlinson A, Kitchener HC. The comparative diagnostic accuracy of conventional and liquid-based cytology in a colposcopic setting. *BJOG.* 2005;112(11):1542-1546.
4. Coste J, Cochand-Priollet B, de Cremoux P, et al; French Society of Clinical Cytology Study Group. Cross sectional study of conventional cervical smear; monolayer cytology,

- and human papillomavirus DNA testing for cervical cancer screening. *BMJ*. 2003;326(7392):733-736.
5. Masumoto N, Fujii T, Ishikawa M, et al. Papanicolaou tests and molecular analyses using new fluid-based specimen collection technology in 3000 Japanese women. *Br J Cancer*. 2003;88(12):1883- 1888.
 6. Malle D, Pateinakis P, Chakka E, Destouni C. Experience with a thin-layer, liquid-based cervical cytologic screening method. *Acta Cytol*. 2003;47(2): 129-134.
 7. Farnsworth A. Liquid-based cytology. *Cytopathology*. 2003;14(2):48-52. 22. Ferreccio C, Bratti MC, Sherman ME, et al. A comparison of single and combined visual, cytologic, and virologic test as screening strategies in a region at high risk of cervical cancer. *Cancer Epidemiol Biomarkers Prev*. 2003;12(9):815-823.
 8. Dupree WB, Suprun HZ, Beckwith DG, Shane JJ, Lucente V. The promise and risk of a new technology. *Cancer*. 1998;84(4):202-207.
 9. Singh U, Anjum SQ, Negi N, Singh N, Goel M, Srivastava K. Comparative study between liquid-based cytology & conventional Pap smear for cytological follow up of treated patients of cancer cervix. *The Indian journal of medical research*. 2018 Mar;147(3):263.
 10. Sherwani R K, Khan T, Akhtar K, Zeba A, Siddiqui F A, Rahman K, Afsan N. Conventional Pap smear and liquid based cytology for cervical cancer screening - A comparative study. *J Cytol* 2007;24:167-72.
 11. Hutchinson ML, Agarwal P, Denant T, Cibas E. A new look at cervical cytology: thin prep multicenter trial results. *Acta Cytol* 1992; 36: 499-54.
 12. Diaz Rosario LA, Kabawat SE. Performance of a fluid based thin layer Papanicolaou smear method in the clinical setting of an independent lab and outpatient screening of population in New England. *Arch Path Lab Med* 1999; 123: 817-21.