

Analysis of Methods of Screening of Cervical Cancer -Liquid Base Cytology Versus Conventional Pap Smear

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Abstract:

Background: Cervical cancer continues to be the most common genital cancer among females in India. The universal application of PAP smears in western countries has led to drastic decline in invasive cervical cancer. In developing countries like India its incidence is still high due to lack of effective screening Programs. In this study the efficacy of LBC was compared with CPS for screening of cervical cancer.

Aims & Objectives: The aims and objectives of our study is to evaluate the sensitivity and specificity of conventional Pap smear versus LBC for Screening of Cervical cancer and find out a better option.

Material and Method: The study was done in the Department of Obstetrics and Gynecology, Nalanda medical college and Hospital Patna from May 2022 to April 2023 (one year). Total 200 women were included in the study. Samples collected were divided into two parts by split sample technique. Cervical biopsy was done with abnormal cells in either conventional Pap smear or LBC samples and results were compared and analyzed.

Result: Liquid Base Cytology was found to be more sensitive than CPS (79% Vs 66.5%) with similar specificity (98.25% Vs 97.5%). Samples were satisfactory in 94% in LBC Versus 92% in CPS.

Conclusion: Liquid base cytology has higher sensitivity with similar specificity in comparison to CPS in the screening of cervical cancer. LBC can be used as a better option in the screening of cervical cancer.

Keywords: LBC (liquid base cytology), CPS (conventional pap smear), Satisfactory Samples.

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Introduction

Cervical cancer is a major public health problem.[1] Cervical cancer ranks as the fourth leading cause of cancer in women worldwide. Almost 70% of the global burden of cervical cancer falls on developing countries. More than one-fifth of all new cases are diagnosed in India. Cervical cancer continues to be the most common genital cancer in women in India. It is mainly caused by HPV.[2] The universal application of PAP smears in western countries has led to drastic decline in the cases of invasive cervical cancer. In developing countries like India its incidence is still high due to lack of effective screening Program. Liquid base cytology (LBC) was introduced in mid 1990's as an alternative to Pap smear.[4] LBC is proposed to have many benefits over conventional Pap smear like lesser unsatisfactory smear, higher rate of detection of high grade squamous intraepithelial lesions.[6] Residual sample of LBC can be used for HPV DNA testing. The present study was undertaken to compare the sensitivity and specificity of two

popularly used methods for Screening of Cervical cancer.[8]

Material and Method

The present study was conducted in the department of Obstetrics and Gynecology Nalanda Medical College and Hospital Patna, Bihar from May 2022 to April 2023, over a period of one year. A total of 200 women were included in the study who came to Gynae OPD with gynecological complaint. The samples were taken with cytobrush and divided into two parts by split sample technique. First a CPS was prepared and was immediately fixed with alcohol and after that the same brush head was detached and suspended in LBC vial containing preservative liquid. Both samples were sent to the Pathologist. Cervical samples were compared on the basis of cellular character, satisfactory smear, sensitivity and specificity for detection of epithelial abnormalities as per Bethesda system-2021. Cervical biopsy was done with abnormal cells in either conventional Pap smear or LBC samples. Considering Cervical biopsy

as gold standard both CPS and LBC results were compared and analyzed.

Inclusion criteria: Women attending Gynae OPD with gynecological problems between 30-65 years of age.

Exclusion criteria: Post hysterectomy patients and known cases of carcinoma were excluded from the study.

Result

Most common clinical presentation was discharge per vaginum(64%). Other presentation were pain lower abdomen, Irregular bleeding p/v, Post-menopausal bleeding, post coital bleeding etc. In

this study it was seen that 94% smears were satisfactory for evaluation in LBC while in CPS only 92% smears were satisfactory for evaluation. Rate of detection of High grade Squamous Intraepithelial Lesion (HSIL) was more with LBC (06 cases, 3%) compared to that of CPS (5 cases 2,5%). It was seen that sensitivity of LBC was higher than CPS in detecting LSIL and HSIL, but the specificity was similar. Liquid Base Cytology was found to be more sensitive (84 %) than CPS(71%) for detection of LSIL but specificity was similar in both cases (98% vs 97%). In detection of HSIL, sensitivity of CPS and LBC were 62% and 74% respectively while specificity of CPS and LBC were similar(98% & 98.5% respectively).

Table 1: Comparison of satisfactory smear

Study variable	CPS (no.-200)	LBC (no.-200)
Satisfactory smear	184(92%)	188(94%)

As shown in the above table that in LBC 94% smears were satisfactory for evaluation while in CPS only 92% smears were satisfactory for evaluation.

Table 2: Showing clinical presentation of patient

Clinical presentation	Number of patients	Percentage of patient
Discharge per vaginum	128	64
Pain lower abdomen	44	22
Irregular bleeding p/v	12	06
Post-menopausal bleeding	04	02
Post coital bleeding	02	01
miscellaneous	10	05

As the above table shows the most common complaint was discharge per vaginum (64%). Other presentation were pain lower abdomen, Irregular bleeding p/v, Post-menopausal bleeding, post coital bleeding etc.

Table 3: Showing microscopic features-

Microscopic feature	CPS (no.-200)	LBC (no.-200)
Negative for intraepithelial lesion or malignancy	126(63%)	123(61.5%)
Epithelial abnormalities	15(7.5%)	17(8.5%)
ASCUS	12(06%)	14(07%)
LSIL	13(6.5%)	16(08%)
HSIL	05(2.5%)	06(03%)
Invasive cancer	01(0.5%)	01(0.5%)
Inflammatory	28 (14%)	23(11.5%)

As shown in the table -3 that LBC could detect 11% cases of cervical intra epithelial lesion while CPS was able to detect 9% cases of CIN(when LSIL & HSIL were included). NILM was reported in 126(63%) smears in CPS versus 123(61.5%) in LBC. In conventional pap smear 28(14%) smears were inflammatory while 23 (11.5%) smears were inflammatory by LBC technique

Table 4: Showing Sensitivity and specificity in LSIL

	CPS	LBC
sensitivity	71%	84%
specificity	97%	98%

For detection of LSIL Liquid Base Cytology was found to be more sensitive 84 percent Vs 71 percent in CPS but specificity was similar in both cases (98% vs 97%)

Table 5: Showing Sensitivity and specificity in HSIL

	CPS	LBC
sensitivity	62%	74%
specificity	98%	98.5%

In detection of HSIL, sensitivity of CPS and LBC were 62% and 74% respectively while specificity of CPS and LBC were similar (98.5% vs 98%).

Discussion

Undoubtedly, Pap smear is an effective and affordable screening method for early detection precancerous lesions of cervix.[4] Liquid Based Cytology is an alternate but better technique, as there is consistently reduced rates of unsatisfactory results, improved sample processing, clarity of microscopy etc. Furthermore, residual sample of LBC can be used for HPV DNA testing. HPV testing is being used in screening programme for triaging low-grade abnormalities, co-testing with cytology, and as a primary cervical cancer screening tool.[3] it was seen that smears prepared by LBC technique had clear background, well preserved cytomorphological details, less mucous, blood and inflammatory cell infiltrate as compared to CPS technique. Atypical cells or abnormal cells were better studied by LBC as compared to CPS.

Conclusion

Our study confirmed that liquid based cytology technique has advantages over conventional Pap smear. The residual sample of LBC can be used for HPV DNA testing. However, cost of LBC is an obstacle in the wide spread use of LBC in developing countries like India.

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