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Original Research Article

Role of Liquid Based Cytology in Cervical Cancer Screening and Its Clinical Correlation in a Tertiary Care Centre

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Conflict of interest: Nil

Abstract:

Background: In India, cervical cancer is the most common gynaecological cancer and accounts for about 1.8 per 100000 populations. Pap smear examination is a sensitive test for the detection of cervical malignancy. It is recommended between 21-65 years of age. The timely introduction of Liquid-based cytology (LBC) aimed to improve the efficiency of gynaecological cytology by improving sensitivity, specificity, standardizing procedures, improving sample quality, assisting with screening, and concurrent HPV DNA testing.

Aim: To determine the prevalence of abnormal cervical smears on LBC and its clinical correlation.

Materials and Methods: This was a retrospective observational study conducted over a period of 6 months between January 2023- July 2023 among the women visiting the outpatient department (OPD) of Obstetrics and Gynecology in KIMS hospital, Bengaluru – a tertiary care center. A total of 676 between the age group of 21-65 years meeting the inclusion and exclusion criteria were selected for the study.

Results: All cervical smears were evaluated. Commonest age group undergoing test was 41-50 years. Of 676 women, 59.2% were multipara & 37.9% women had cancer cervix awareness. Most common presenting complaint among patients was chronic white discharge per vagina (16.6%). Most common vaginal infection was Bacterial vaginosis. Maximum women across all age groups had a non-specific inflammatory smear (41.3%). The most common epithelial cell abnormality in the present study was Low grade squamous intraepithelial lesion.

Conclusion: The value of exfoliative vaginal cytology is undisputed today. Pap smear test is the most affordable, simple, cost effective and practical method to evaluate cervical cancer and other lesions on cervix. Especially the LBC technique provides a clear background for epithelial cell abnormality identification. By universal screening of all women, the cervical cancer mortality and morbidity can be decreased to a large extent. There is need for strengthening the mass health education campaign and spread cancer screening programs to help prevent mortality and morbidity due to cervical cancer.

Keywords: Cervical cytology, Pap smear, Liquid based cytology, Cancer cervix

Introduction

Pap smear examination is a sensitive test for the detection of cervical malignancy. Cervical cancer ranks fourth among all malignancies for women worldwide and it is the most common gynaecological cancer in women worldwide. [1] In India, cervical cancer is the most common gynaecological cancer and accounts for about 1.8 per 100000 populations. If diagnosed and treated early, morbidity may be reduced by 70% and mortality by 80% in cancer cervix. [2] For screening of cancer cervix, Pap smear evaluation with Ayer's spatula was routinely employed. To address the limitations of conventional Pap smear, Liquid-based cytology (LBC), thin layer technology was later developed. [3] The timely introduction of LBC aimed to improve the efficiency of gynaecological cytology by improving sensitivity, specificity, standardizing procedures, improving sample quality, assisting with screening, and concurrent HPV DNA testing. Pap smear test combined with HPV DNA testing has sensitivity of up to 95% in detection of pathology. [4] Advantages of LBC compared to conventional pap smear test are improved cell collection and preparation quality. Even distribution of abnormal cells that makes easy detection with LBC. This avoids the risk of false-positive, false-negative or unsatisfactory smears.

Usually, Pap smear screening test is recommended between 21-65 years of age. [9] Hence our study aimed to determine the prevalence of abnormal cervical smears on LBC and its clinical correlation.

Aim

To determine the prevalence of abnormal cervical smears on LBC and its clinical correlation.

Materials and Methods

This was a retrospective observational study conducted over a period of 6 months between January 2023- July 2023 among the women visiting the outpatient department (OPD) of Obstetrics and Gynecology in KIMS hospital, Bengaluru – a tertiary care center.

A total of 676 between the age group of 21-65 years meeting the inclusion and exclusion criteria were selected for the study.

Inclusion criteria

- women who consent for the study
- sexually active women between 21-65years of age
- women presenting with complaints of white discharge per vagina, postmenopausal bleeding

Exclusion criteria

- women on their menstrual cycles
- women without sexual exposure
- women who are on follow up for a prior positive cervical smear
- women with acute pelvic inflammatory disease
- women with known premalignant/malignant cervical lesion
- pregnant women

Procedure

Each patient was briefed about the study. OPD records were studied for the details of demographic data, parity, clinical presentation, risk factors, examination findings, LBC report & mode of management of abnormal LBC report. This information was recorded in the pre-structured proforma.

Cervical smear was taken using the endocervical brush and the brush was then immersed in thin prep solutions and sent to cytopathological lab in our hospital and was processed as per the prescribed protocol for EziPrep (EP) technique.

Each sample was then evaluated using Bethseda System for reporting cervical cytology 2014. The LBC reports mainly noted were:

- Sample inadequate (IA)
- Negative for intraepithelial lesion or malignancy (NIEL/M)
- Candidiasis (VC)
- Bacterial vaginosis (BV)
- Trichomonas vaginalis (TV)
- Nonspecific inflammatory smear (NSIS)
- Atrophic smear (AS)
- Atypical squamous cells of undetermined significance (ASCUS)
- Atypical glandular cells of undetermined significance (AGUS)
- Low Grade Squamous intraepithelial invasion (LSIL)
- High Grade Squamous intraepithelial invasion (HSIL)
- Squamous cell carcinoma (SCC)

Statistical Analysis: The data was collected and entered in Microsoft Excel sheet. Further analysis was done using SPSS software version 21. Data was summarized and presented in percentage.

Results

In our study we analyzed the LBC reports of 676 patients who had come to the OPD and fulfilled inclusion criteria. In this study (Table 1), 86 women belonged to 21-30 years of age, 216 were between 31-40 years, 253 between 41-50 years of age. Among the 51-60 years age group, we had 82 women, 29 were between 61-65 years and 10 were aged more than 65 years. Of 676 women, 80 were nulliparous, 196 primipara and 400 multipara.

Amongst all, 392 women were from rural area & 284 from urban area. With respect to the educational status, 594 of 676 women were literate. Of 676 subjects, 12 were unmarried and 664 were married. Amongst all, 256 women had cancer cervix awareness.

The distribution of patients based on symptoms was noted (Table 2). Most of the patients – 115 underwent routine LBC as part of screening. Most common presenting complaint among patients was chronic white discharge per vagina (112 patients).

Other complaints noted were pain abdomen in 78 patients, intermenstrual bleeding in 67, abnormal uterine bleeding in 61, postmenopausal bleeding in 45, urinary symptoms in 50, post coital bleeding in 39 patients, those with lower back ache were 36, unhealthy cervix in 35, those with dyspareunia were 22 & mass per vagina in 16 women.

Based on clinical examination findings, 188 women had white discharge per vagina, cervix was hypertrophied in 84 women, 104 had cervical erosions and cervix bled on touch in 58 women. The LBC results were noted and categorized according to the age (Table 3). In the 21-30 years age group, 42 subjects had a non-specific inflammatory smear, 27 had NIEL/M, 4 had candidiasis, 8 had BV, and one had ASCUS and one LSIL. Sample was inadequate in 3 women. In the 31-40 years age group, 95 patients had a non-specific inflammatory smear, 69 had NIEL/M, 28 patients had BV, 9 had TV, 7 had candidiasis, 2 had ASCUS and HSIL each, one had

AGUS and sample was inadequate in 2 women, with one having an atrophic smear. Among the subjects between ages 41-50 years, 104 patients had a non-specific inflammatory smear, 76 had NIEL/M, 10 had candidiasis, 28 had BV,11 subjects had TV, 4 had atrophic smear, 4 had ASCUS, 2 had AGUS, 6 had LSIL, 3 had HSIL, and one had SCC and sample was inadequate in 4 women.

In the 51-60 years age group, 28 women had a non-specific inflammatory smear, 24 had NIEL/M, 4 had BV, 3 had TV, 2 had candidiasis, 8 had atrophic smear, 2 had ASCUS, 1 had AGUS, 6 had LSIL, with one HSIL and one SCC and sample was not adequate in 2.

Among those in 61-65 years of age, 8 women had a non-specific inflammatory smear, 5 had NIEL/M, 2 had candidiasis, 7 had atrophic smear, 2 had AS-CUS, 2 had LSIL, 1 had HSIL and 2 had SCC.

In those patients aged more than 65 years, 2 patients had a non-specific inflammatory smear, 6 had NIEL/M, 1 patient had atrophic smear, 1 had AS-CUS.

Maximum women across all age groups i.e. 279 had a non-specific inflammatory smear. In those patients with inadequate sample repeat sample (at usually 2-4months) was taken according to the protocol. Patients with NIEL/M were advised routine follow up. Those with vaginal candidiasis, BV, TV were treated with appropriate medications. Most common infection was BV. Patients with ASCUS were advised repeat smear after 1 year/ HPV testing. In those with LSIL, HSIL or SCC, patients were advised colposcopy guided biopsy.

Table 1: Age based distribution of LBC report

Age group (in years)	No. of patients (%)
21-30	86(12.7)
31-40	216(32)
41-50	253(37.4)
51-60	82(12.1)
61-65	29(4.3)
>65	10(1.5)
Total	**676**

Table 2: Distribution based on presentation

Main symptom	No. of patients (%)
Routine LBC	115(17)
Unhealthy cervix	35(5.2)
Pain abdomen	78(11.5)
Lower back ache	36(5.3)
Intermenstrual bleed	67(9.9)
Post coital bleed	39(5.8)
Post-menopausal bleed	45(6.7)
Dyspareunia	22(3.3)
Mass per vagina	16(2.4)
Urinary symptoms	50(7.4)
Abnormal uterine bleeding	61(9)
Chronic white discharge per vagina	112(16.6)
Total	**676**

Table 3: Distribution of LBC report based on age and cytology

Age group (in years)	IA	NIEL/M	VC	TV	BV	NSIS	AS	AS-CUS	AGUS	LSIL	HSIL	SCC	Total
21-30	3	27	4	0	8	42	0	1	0	1	0	0	86
31-40	2	69	7	9	28	95	1	2	1	0	2	0	216
41-50	4	76	10	11	28	104	4	4	2	6	3	1	253
51-60	2	24	2	3	4	28	8	2	1	6	1	1	82
61-65	0	5	2	0	0	8	7	2	0	2	1	2	29
>65	0	6	0	0	0	2	1	1	0	0	0	0	10
Total (%)	11 (1.6)	207 (30.6)	25 (3.7)	23 (3.4)	68 (10)	279 (41.3)	21 (3.1)	12 (1.8)	4 (0.6)	15 (2.2)	7 (1)	4 (0.6)	**676**

Discussion

Cervical cancer is multifactorial and screening is one way to approach cancer control. [7] It is accepted worldwide that precancerous lesions can be detected early by cytological examination of cervix by Pap smears. [3] Early detection can help prompt treatment at an early stage. Besides being a tool for cancer screening, it is also useful for detection of infections and inflammatory changes in the cervix. [8] So there is a need for effective mass screening programme for early detection of precancerous conditions especially in the high-risk age group early treatment to reduce mortality and morbidity. [6] In this study maximum number of patients were between 41-50 years of age where as in few other studies it was 30-45 years [6,8,9,11] and most of the women were multiparous like our other mentioned studies. [6,7,8,9,11]

Most common report noted was non-specific inflammatory smear followed by smear negative for intraepithelial lesion/malignancy. Most common infection noted was bacterial vaginosis. Most common epithelial cell abnormality noted were LSIL, which is similar to a study done by Malpani G et.al. [6] We have compared our study with other similar studies and tabulated in Table 4.

Table 4: Comparison of cervical epithelial lesions with other studies

Cervical lesion	Present study (n:676)	Malpani G et al [6] (n:7127)	Umarani MK et al [8] (n:1418)	Pratapan P et al [10] (n:200)	Khade M et al [9] (n:1904)
Inflammatory	279	5190	1164	20	1063
Infections	116	777	14	13	13
ASCUS	12	30	77	8	17
AGUS	4	-	-	-	-
LSIL	15	40	23	5	24
HSIL	7	38	9	4	5
SCC	4	34	4	1	3

The limitation of the study was that it was conducted among a small group in a hospital which may not be a true reflection of the population. Implementation of careful screening of Pap smear programme in the target age population can reduce mortality due to cervical cancer by early diagnosis at premalignant stage and cure can be achieved by proper treatment. It is recommended that before 45 years of age, women should have at least one Pap smear examination. [9]

Conclusion

The value of exfoliative vaginal cytology is undisputed today. Pap smear test is the most affordable, simple, cost effective and practical method to evaluate cervical cancer and other lesions on cervix. Especially the LBC technique provides a clear background for epithelial cell abnormality identification. By universal screening of all women, the cervical cancer mortality and morbidity can be decreased to a large extent. Knowledge regarding Pap smear screening test is very low in our society, especially in rural areas untouched by healthcare facilities. Low socioeconomic status, poverty & illiteracy is high in these regions. So, by the time patients seek medical advice, it's too late. Hence the need for strengthening the mass health education campaign and spread cancer screening programs to help prevent mortality and morbidity due to cervical cancer.

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