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An Analysis of Various Cytopathological Patterns on Papanicolaou smears-Cervical Cytology: A Study in Tertiary Care Hospital

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Abstract
Background: Exfoliative cervicovaginal cytology-Papanicolaou (Pap) smear has been regarded as the gold standard for cervical cancer screening. Cervical cancer is the third most common cancer in women after breast and colon cancer. The main objective of the study is to analyse various spectrum of cytopathological abnormalities of both symptomatic and asymptomatic women on cervical Pap smears in the department of Pathology in a tertiary care hospital.
Methods: This is a retrospective study which is conducted in department of Pathology in a tertiary health care centre for a period of 2 years during June 2017 to June 2019. We evaluated total 1800 reported pap smears during the study period and analysed for the prevalence of various cytopathological abnormalities.
Results: Out of 1800 patients, 79 cases were found to be having epithelial abnormalities. Non neoplastic cytological diagnosis was made in 1677 cases (93.18%). The commonest epithelial abnormality was Low grade squamous intraepithelial lesion (LSIL) (32 cases, 1.77%), followed by High grade squamous intraepithelial lesion (HSIL) (27 cases, 1.50%).
Conclusion: In developing countries like India, Cervical cancer is one of the commonest Cancers in women. We strongly recommend Cervicovaginal cytology screening by Conventional/Liquid based Pap cytology which are simple, non-invasive, sensitive, less expensive, reproducible procedure at periodic interval for early detection and treatment of premalignant, malignant and inflammatory conditions to reduce the overall morbidity and mortality associated with cervical cancer.

Keywords: Papanicolaou smear, Cervical screening, Epithelial abnormalities, Squamous intraepithelial lesions

Introduction

Cervical cancer is a major cause of cancer mortality in women and more than a quarter of its global burden is contributed by developing countries like India. In India, Cervical cancer contributes to approximately 6.29% of all cancers in women [1]. Cancer cervix is the third most common cancer following breast and colorectal cancers and fourth leading cause of cancer death in women Worldwide [2]. Cervical intra epithelial neoplasia (CIN) is a term used for the dysplasia or precancerous condition that starts in cervix.

Transformation zone is the commonest zone where intra epithelial lesions starts [3]. These intraepithelial lesions may progress to in situ carcinoma and invasive cancer. Early detection of CIN is curable. Routine study of cervical cytology plays an important role in detection of cervical cancer at precancerous stage [4]. Though pap smear is a routine screening test, the overall sensitivity in detection of HSIL is 70-80% [5].

Cervical cancer screening and preventive measures are carried out in a stepwise fashion. Recommendation for the frequency of Pap smear screening vary, but in general the first smear should be at the age 21 years or within 3 years of onset of sexual activity and thereafter every 3 years. After age 30, women who have had normal cytology results and are negative for Human papilloma virus (HPV) may be screened every 5 years. Women with a normal cytology results, but test positive for high risk HPV DNA, should have cervical cytology repeated every 6 to 12 months [8, 9].

Present study is intended to analyse and evaluate various cytopathological patterns of Pap smear cytology.

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Materials and Methods
This was a retrospective study conducted on 1800 patients, who previously attended OPD of Department of Obstetrics and Gynaecology between the period of June 2017 to June 2019 at Akash Institute of Medical Science and Research Centre in a rural area of Bengaluru. All the patients were above the age of 21 years, who have undergone Pap smear test during this period were included in the study. Pap smears were taken from both symptomatic and asymptomatic patients who had come for routine cervical screening.
Conventional Pap smears were taken with the help of Ayre's spatula from the squamo columnar junction. Two separate smears from ectocervix and endocervix were made on two separate slides. Slides were immediately fixed in 95% ethanol and stained by rapid Pap stain and mounted with DPX, labelled and then reported according to Bethesda system 2014.

Result
Total number of 1800 patients' cervical smears were analysed retrospectively. Table 1 revealed age wise distribution of patients with epithelial abnormalities. Maximum number of patients who underwent cervical screening were in the age group of 31 years to 60 years.
Epithelial abnormalities were noted commonly in the age group of 41 years to 60years. LSIL was the commonest epithelial abnormality noted in 32 cases (1.77%) with majority of them in the age group of 41 years to 60 years. 2 cases (0.1%) who were above the age of 50 years were diagnosed to have Squamous cell carcinoma (SCC). Total of 27 cases (1.50%) were diagnosed to have HSIL. 1677 cases (93.16%) were diagnosed as Negative for intraepithelial lesion/malignancy (NILM) (Table 2).
Non neoplastic cytological diagnosis was made in 1677 cases (93.16%) (Table 3). Bacterial vaginosis is the commonest infection seen in 122 cases (7.27%) followed by vaginal candidiasis in 20 cases (1.19%). Unsatisfactory smears were noted in 44 cases (2.44%) (Table 3).

Discussion
Cytologic cervical cancer screening has significantly reduced mortality from cervical cancer.
In the countries where such screening is not widely practiced, cervical cancer continues to exact a high toll. The reason that cytologic screening is so effective in preventing cervical cancer is that most cancers arise from precursor lesion over the course of years. These lesions shed abnormal cells that can be detected on cytologic examination [10].
The screening tests for Cervical cancer are many, Pap smear -Conventional Pap smear and liquid based Pap cytology, automated image analysers, HPV DNA test, Visual examination of cervix manually after application of acetic acid, Lugol's iodine, speculoscopy and cervicography. But exfoliative cytology by conventional Pap smear and liquid Pap cytology is regarded as gold standard for cervical screening. Various lesions of cervix both neoplastic and nonneoplastic can be screened by Pap smears which is a simple, cost effective, reproducible, painless and sensitive test [7].
Majority of cases of Pap smears in our study were of nonneoplastic cytologic diagnosis (93.18%), which was in accordance with earlier studies done by Ranabhat et al (95%) [12], Whereas Atilgan et al and Bamaniker et al reported 74.3% and 88.93% [13, 16].
In our study epithelial cell abnormalities were noted in 79 cases out of 1800 cases (4.3%), Which was comparable with the study done by Bamanikar et al (5.36%) [16], where as it was 1.89%,2% and 8.18% in studies by Tailor et al, Malpani et al and Banik et al respectively [7, 14, 11].
LSIL was the commonest epithelial cell abnormality in our study (1.77%), which was in accordance with studies done by Bamanikar et al [16] and Malpani et al [14]. HSIL was seen in 1.50% cases and seen more commonly above the age of 40 years.
Rate of Squamous cell carcinoma in our study was 0.11%, other studies reported a higher rates of malignancy [15, 16, 11]. In our study Squamous cell carcinoma (SCC) was diagnosed in women above the age of 50 years.
Nonspecific inflammation was the most common diagnosed condition among all the NILM cases (21.38%). Atrophy was noted in 7.99% cases. Bacterial vaginosis is the commonest infection noted (7.27%) followed by vaginal Candidiasis (1.19%) and Trichomoniasis (0.29%).

**Table 1:** Age wise distribution of cases

Age group in years	ASC-US	LSIL	HSIL	SCC	Total number of cases	Percentage
21-30	01	-	-	-	01	1.26%
31-40	02	01	04	-	07	8.86%
41-50	07	12	07	-	26	32.91%
51-60	05	17	10	01	33	41.79%
>60	03	02	06	01	12	15.18%

Table 2: Pap smear results

Pap smear result	Number of cases	Percentage
Unsatisfactory	44	2.44%
ASC-US	18	1.00%
LSIL	32	1.77%
HSIL	27	1.50%
SCC	02	0.11%
NILM	1677	93.18%

Table 3: Non neoplastic cytological diagnosis

Pap smear results	Number of cases	Percentage
Atrophy	134	7.99%
Nonspecific inflammation	362	21.58%
Bacterial vaginosis	122	7.27%
Candidiasis	20	1.19%
Trichomoniasis	05	0.29%
Reactive cellular changes	98	5.84%
No other changes	936	55.84%
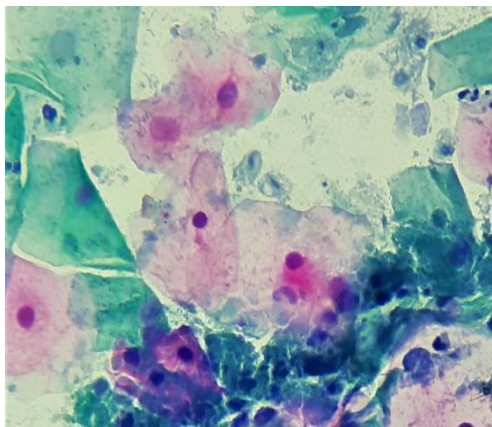
Fig 1: Photomicrograph showing Trichomonas vaginalis (Pap stain, 400x)
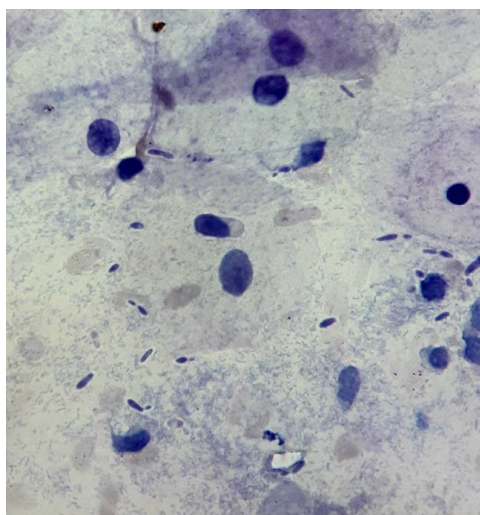
Fig 2: Photomicrograph showing Candida Albicans (Pap stain, 400x)
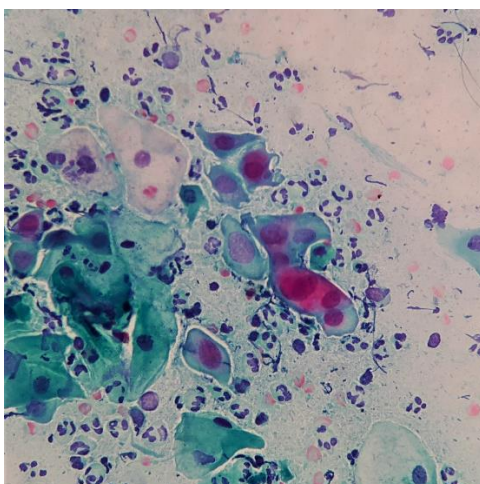
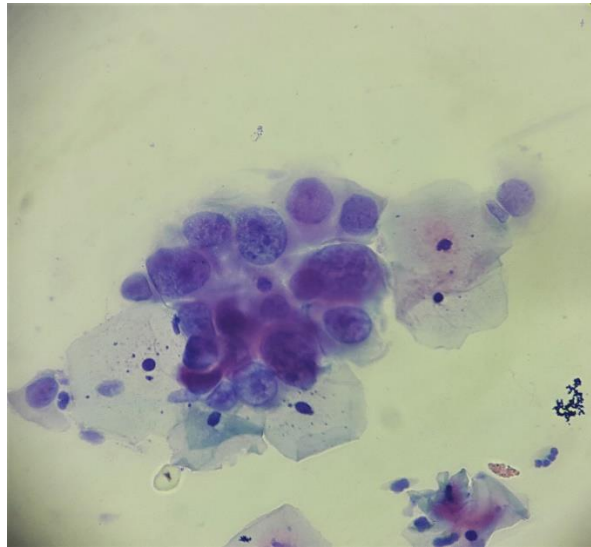**Fig 3:** Photomicrograph showing Atypical squamous cells of undetermined significance (ASC-US) (Pap stain, 400x)

Fig 4: Photomicrograph showing High Grade Squamous Intraepithelial Lesion (HSIL) (Pap stain, 400x)

Conclusion
In developing countries like India, Cervical cancer is one of the commonest cancers in women. We strongly recommend Cervicovaginal cytology screening by Conventional/Liquid based Pap cytology which are the simple, non-invasive, sensitive, less expensive, reproducible procedure at periodic interval for early detection and treatment of premalignant, malignant and inflammatory conditions to reduce the overall morbidity and mortality associated with Cervical cancer.

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