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Evaluation of cytological pattern of cervical Papanicolaou smears

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Abstract
Background and Objective: Cervical cancer is one of the most common cancers in India and leading cause of morbidity and mortality. Cervical cancer is preventable, and can be diagnosed at the pre-invasive stage with adequate and repetitive cytological screening with Papanicolaou (Pap) smears. This is a prospective study aimed to evaluate all the cervical smears examined at our institute during one year period.
Methods: Detailed clinical data and Pap smear cytology were obtained from August 2013 to July 2014. After doing Pap stain, all cases were reported as per the 2001 Bethesda system.
Results: A total of 450 Pap smears were examined. Maximum number of patients was in the age group of fourth decade. There were 40 unsatisfactory or inadequate samples (8.6%). A total of 388 smears were reported as Negative for Intraepithelial Lesion or Malignancy (NILM), of which 80(17.8%) showed normal cytological findings and 308(68.5%) were inflammatory. Out of a total of 330(73.4%) abnormal Pap smears, only 22(4.9%) cases were reported to have epithelial cell abnormality. The 22 abnormal cases comprised of 10 cases with ASC-US, 6 cases of LSIL, 3 cases of HSIL and 3 cases of Invasive Squamous Cell Carcinoma.
Conclusion: Pap smear is an easy and economical screening method to detect premalignant and malignant lesions of cervix which help in proper treatment. It also suggests a need for further evaluation and follow-up.

Keywords: Cervical cytology, pap smear, epithelial cell abnormality

Introduction

Cervical cancer is the most common cancer among women in 2 out of the 12 Population Based Cancer Registries (PBCRs) in India, and has the second highest incidence rate after breast cancer in the rest of the PBCRs [1]. If diagnosed and treated early, morbidity may be reduced by 70% and mortality by 80%. Sexual habits such as number of sexual partners, age of first sexual intercourse, and infection by human papilloma virus (HPV) play an important role in the pathogenesis of cervical cancer [2]. India has the largest burden of cervical cancer patients in the world and one of every five cervical cancer patients belongs to this country [3]. There is an urgent need for initiation of community screening and educational programs for the control and prevention of cervical cancer in India [4]. The role of the pap smear as a cancer screening tool for the cervix at an early stage has been substantiated by several studies in the last 50 years and it is widely used in developed countries by which there is a decrease in incidence and mortality of cervical cancer [5-9].

The Papanicolaou (Pap) test is a screening test used for cervical cancer. The Pap test was introduced by George Papanicolaou as a cervical pathology screening test in 1941 [10]. Usually Pap smear screening test is recommended starting around 21 years of age until the age of 65 years. Can be repeated at three years interval [11]. Cancer of cervix is preventable by early detection of its precursor lesions by Pap screening test [12]. The objective of this study is to detect prevalence and pattern of cervical cytological changes of study population by using conventional Papanicolaou (Pap) smear for the screening of inflammatory, premalignant and malignant lesions of the cervix. The Bethesda System (TBS) for reporting the results of cervical cytology was developed as a uniform system of terminology that could provide clear guidance for clinical management [13].

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Methods

This study was conducted in Department of Pathology, Government Medical College, Miraj over a period of one year (August 2013 to July 2014). Smears were taken of all patients who presented with complaints of vaginal discharge, post-coital bleeding, unhealthy cervix and pain in lower abdomen. Smears were reported as per the Bethesda system. Smears were taken from both ectocervix and endocervix for conventional Pap smear. Slides were prepared, labeled, fixed in 95% ethyl alcohol immediately, and subsequently stained by Papanicolaou stain. Specimen adequacy was assessed based on the presence of adequate number of squamous epithelial cells; an adequate conventional smear should contain minimum of approximately 8000 to 12,000 well-preserved and well-visualized squamous epithelial cells [14]. Slides were reported as normal smear, inflammatory smear and assigned a category according to the Bethesda system 2001 [13]. All abnormal epithelial lesions ie Squamous Intraepithelial Lesion (SIL) were categorized under: Atypical Squamous Cell of Undetermined Significance (ASCUS), Low-grade Squamous Intraepithelial Lesion (LSIL), Atypical Squamous Cell (ASCH) cannot exclude High-grade Squamous Intraepithelial Lesion, High-grade Squamous Intraepithelial Lesion (HSIL), Atypical Glandular Cells of Undetermined Significance (AGUS) and other atypical cells not otherwise specified. The malignant categories were Squamous Cell Carcinoma (SCC), Adenocarcinoma and other malignancy not otherwise specified.

Results

A total of 450 cases of cervical Pap smears were studied over a period of one year. Maximum number of patients (32.68 %) were in the age group of 31 – 40 years (fourth decade). As per as the patients presenting complain was concerned, vaginal discharge was commonest (51.4%) followed by lower abdominal pain (35.6%), unhealthy cervix (7.8%) and post-menopausal bleeding (5.2%).

The cytological findings broadly classified into unsatisfactory smears, normal and abnormal smears with respect to age. There were 330 (73.4%) abnormal Pap smears (benign cellular changes of inflammation as well as Epithelial Cell Abnormalities (ECA), with 80(17.8%) normal cases and 40 (8.8%) unsatisfactory or inadequate samples. Of the 330 abnormal cases, only 22 cases were reported to have epithelial cell abnormality. The age range of patients with epithelial cell abnormality was 20 to 75 years and the mean age was 38.7 years.

The diagnosis of the 22 abnormal cases revealed 10 cases with ASC-US (Fig. 1), 6 cases of LSIL (Fig. 2), 3 of HSIL (Fig. 3) and 3 cases of Invasive Squamous Cell Carcinoma (Fig. 4). Out of the 388 smears reported as Negative for Intraepithelial Lesion or Malignancy (NILM), 80 (17.8%) showed normal cytological findings and 308(68.5%) were inflammatory (Fig. 5).

Out of 308 inflammatory smears, 295 (65.5%) showed non-specific inflammation, 10(2.2 %) had features of Candida infection, and 3 cases (0.7%) had evidence of Trichomonas infection.

Table 1: Cytological findings in all Pap smears with respect to age

Different cytological findings	Age (Mean Age)	No. of cases	% in total
Unsatisfactory smears	20-80 (36.4)	40	8.8
Inadequate sample		28	
Obscured with blood		12	
Normal smears	20-65 (33.5)	80	17.8
Abnormal smears	20-75(38.7)	330	73.4
Total		450	

Table 2: Distribution of cases according to complaints

Complaints	No. of cases
Vaginal discharge	231
Lower abdominal pain	160
Unhealthy cervix	35
Postmenopausal bleeding	24
Total	450

Table 3: Distribution of cases under various diagnostic categories in Pap smears

Cytodiagnosis		No. of cases	% of total
NILM		388	86.2
	Normal	80	17.8
Inflammatory			
	Non Specific	295	65.5
	Candida	10	2.2
	Trichomonas	3	0.7
ASCUS		10	2.2
ASCH		0	0
SIL	LSIL	6	1.3
	HSIL	3	0.7
AGUS			
Carcinoma	SCC	3	0.7
	ADC	0	0
Unsatisfactory / Inadequate		40	8.8
		450	

NILM-Negative for intraepithelial lesion or malignancy; ASCUS-Atypical squamous cell of undetermined significance; SIL-Squamous intraepithelial lesion; LSIL-Low-grade squamous intraepithelial lesion; ASCH- Atypical squamous cell cannot exclude high grade squamous intraepithelial lesion; HSIL-High grade squamous intraepithelial lesion; AGUS-Atypical glandular cells of undetermined significance; SCC- Squamous cell carcinoma; ADC-Adenocarcinoma.
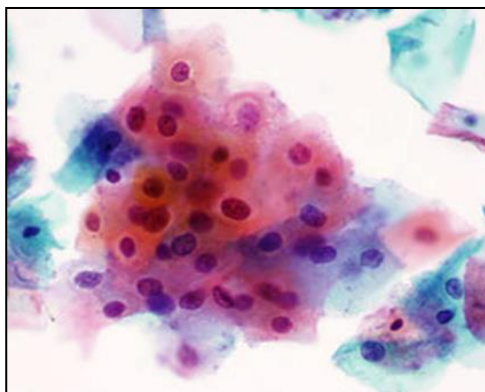
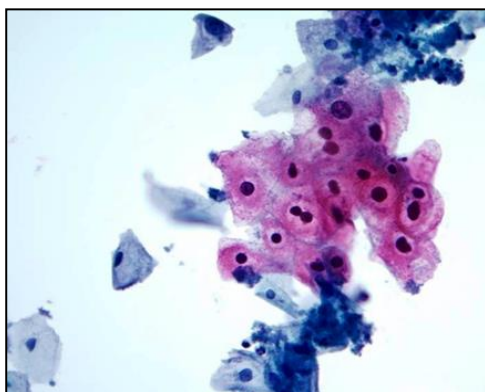**Fig 1:** Photomicrograph showing ASCUS-atypical squamous cells of undetermined significance (Pap stain, 400×)

Fig 2: Photomicrograph showing LSIL- Low grade Squamous Intraepithelial Lesion (Pap stain, 400×)

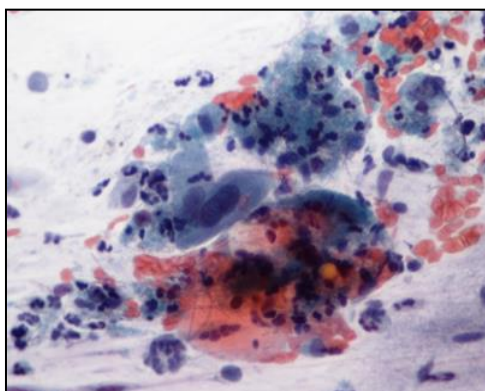**Fig 3:** Photomicrograph showing HSIL- High grade Squamous Intraepithelial Lesion (Pap stain, 400×)

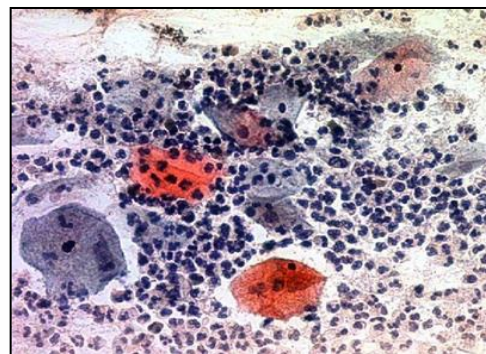**Fig 4:** Photomicrograph showing Squamous Cell Carcinoma (Pap stain, 400×)

Fig 5: Photomicrograph showing Inflammatory Pap smear (Pap stain, 100×)

Discussion

Cervical cytology is currently widely used as the most effective cancer screening modality. This study contributes to assessing current levels of cervical screening in our institute. In our study, the mean age of patients with abnormal smears was 38.7 years. Similar finding was detected by other studies [15]. Vaginal discharge was the most common presenting complaint in our study. Other studies also reported similar findings [15, 16].

This study determines 388 cases (86.2%) of Negative for any Intraepithelial Lesion or malignancy with non-specific inflammation 295 cases (65.5%) as the pre-dominant one. Other studies revealed 95% and 74.3% cases of NILM respectively [15, 17].

The Epithelial Cell Abnormality (ECA) rate, that is the total of ASCUS, ASC-H, LSIL, HSIL, AGC and carcinoma diagnosis varied between 1.5 and 12.60% in various studies. The ECA rate of 4.9% in our study was comparable to those reported in literature [18, 19]. Our study revealed ASCUS (2.2%) to be the most common epithelial cell abnormality. Similar results were obtained in other studies which also concluded ASCUS to be the most common epithelial cell abnormality [19, 20]. Of the 2% SIL, 1.3% had Low-grade Squamous Intraepithelial Lesion (LSILs), and 0.7% had High-grade Squamous Intraepithelial Lesions (HSILs). In contrast, study from Saudi Arabia had varied results, 4.9% of cases were diagnosed with SIL. This owes to possible religious factors and lack of awareness and screening programmes [21].

Our study thus elucidates the importance of Papanicolaou cervical screening test. Community health awareness campaigns and large scale Pap screening programmes for women should be undertaken.

Conclusion

This study emphasized the importance of Pap smears screening for early detection of premalignant and malignant lesions of cervix. The Papanicolaou (Pap) test is a cost–effective and easy screening method for the detection of cervical cancer. Early detection of possibility of malignancy helps in prompt treatment at early stage and prolongation of life expectancy of many women and reduce the mortality and morbidity of Cancer Cervix. Nowadays, many new technologies have been utilized in diagnosing various lesions of cervix, which are costly and cannot be easily implemented in our population due to the low socioeconomic level of our patient population; conventional Pap smears still remain valuable for screening and diagnosing cervical carcinoma.

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