

Prevalence of altered cervical cytological pattern: A retrospective study in females visiting tertiary care hospital

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Abstract

Background: Cervical cancer is one of the major causes of morbidity and mortality in India. Pap smear is a simple, non-invasive, cost-effective and sensitive tool to detect various non-neoplastic and neoplastic lesions of cervix. The objective of this study was to estimate the prevalence of cervical cytological pattern in a tertiary care centre; by using conventional Papanicolaou (Pap) smears for the screening of inflammatory, premalignant and malignant lesions of the cervix. **Methods:** This cross-sectional study is based on 574 patients who attended the out-patient Department of Obstetrics and Gynecology, during the period between Jan 2015 to Feb 2017. Pap smears were prepared from patients presenting with complaints like vaginal discharge, post-coital bleeding, inter-menstrual bleeding, dyspareunia, and pain in lower abdomen. Conventional Papanicolaou stained smears were classified as per Bethesda 2001 nomenclature. **Results:** Prevalence of altered cervical cytological pattern was 75.59% amongst females visiting hospital. A total of 574 cervical pap smears were studied, out of which 66 were inadequate. Out of 508 cases, 448 cases were of NILM [including 324 (63.78%) inflammatory lesions and 124 (24.41%) normal smears] and 60 (11.81%) cases of epithelial lesions. The epithelial lesions prevalence rate was ASCUS (5.7%), LSIL (1.4%) and HSIL (1.4%), AGUS (0.78%), SCC (0.6%) and endometrial carcinoma (0.2%). **Conclusions:** This study shows relatively high prevalence of epithelial abnormalities with increasing age, parity, women with clinical lesions on per speculum findings. Malignancy was more common in sixth and seventh decade and intraepithelial lesions/dysplasia was seen mostly in fourth and fifth decade. Inflammatory lesions were more common in younger age group. Pap smear should be advised as a routine screening procedure; as it is a simple, cheap, safe and practical diagnostic tool for early detection of cervical cancer in high risk group population. It also helps in diagnosis of inflammatory lesions including the identification of causative organism and atrophic changes.

Keywords: Bethesda system, Papanicolaou smear, Cervical screening, Squamousintraepithelial lesion (SIL)

Introduction

Cervical cancer is the most common cancer among women after breast and colorectal cancer in the world, but in India and other developing countries cervical cancer is the leading cause of mortality and morbidity [1]. The identified risk factors are persistent infection with Human Papilloma virus, early age at marriage, multi parity, less spacing between pregnancies, low socio-economic status, prolonged use of oral contraceptives and smoking [2]. Gynaecological health issues being a socially sensitive health issue, it affects health seeking behaviour of patients. Women in

developing countries usually present to the clinic only when they have symptoms such as pain, discharge per vaginum, and abnormal bleeding per vaginum [1]. The Papanicolaou (Pap) test is a screening test performed using the cells from the uterine cervix. This test was introduced by George Papanicolaou as a cervical pathology screening test in 1941[3]. Pap smear is a simple, non-invasive, cost-effective and sensitive tool available to detect various non-neoplastic and neoplastic lesions of cervix [4].

Papanicolaou cytological testing (Pap smear) permits cervical lesions to be detected before they become cancerous, effectively reducing the incidence of cervical

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Original Research Article

cancer by 75% - 90%. Cancer of cervix is readily preventable, by early detection and appropriate timely treatment of its precursor lesions by simple Pap screening test. Though Pap smear is a routine screening test, the overall sensitivity in detection of high grade squamous intraepithelial lesion (HSIL) is 70 - 80% [2].

Though pap test plays a stellar role in detection of carcinoma and precancerous lesions, its role in diagnosis of infective inflammatory conditions including the identification of causative organisms, hormone related benign epithelial changes and changes due to therapeutic agents is no less successful.

Originally, the term Pap smear was used for smears made out of posterior fornix material for purpose of detection of cancer and precancerous lesions. But

presently, the term is used for smears made from material collected from vagina, endocervical canal, ectocervix or vaginal vault [5].

The risk of cervical cancer remains high among patients visiting clinics and it will be an opportunity to diagnose them early with simple screening tool like Pap smear. Early detection of epithelial abnormalities helps in early treatment of dysplastic epithelial changes and can prevent invasive cervical carcinoma.

The objective of this study was to estimate the prevalence of cervical cytological pattern in females visiting tertiary care hospital. Another objective was to categorize the cytological pattern for the screening of inflammatory, premalignant and malignant lesions of the cervix.

Methodology

Place of study: Tertiary health care hospital attached with Government Medical College, in Central Gujarat; on patients who attended the outpatient department (OPD) of Obstetrics and Gynaecology (OBGY).

Type of study: This cross-sectional study is based on 574 patients who attended the outpatient Department of Obstetrics and Gynaecology, during the period between Jan 2015 to Feb 2017.

Sampling methods and collection: A detailed history and symptoms along with parity and last menstrual period were recorded by the concerned gynecologist and local examination was done to check any lesion.

After obtaining informed consent while maintaining privacy, smears were collected by consultants of gynecology department. Samples were collected from ectocervix as well as endocervix.

Two smears were prepared for each case, properly labeled, fixed in 95% ethyl alcohol immediately and sent to pathology department for Pap staining.

The smears were stained by Papanicolaou method; screened and reported by two pathologists independently according to Bethesda system, 2001 [6].

The results given by two pathologists were matched and if any discrepancy was found, it was again sent to two pathologists independently for final match of results.

Inclusion criteria: Pap smears were collected from patients presenting with complaints like leucorrhoea, post-coital bleeding, inter-menstrual bleeding, dyspareunia and pain in lower abdomen; as well as those who had no complaints and had come for routine cervical screening.

Exclusion criteria: Total 66 "inadequate or unsatisfactory smears for evaluation" cases were excluded from the study.

Reporting of smears: The Pap smears were screened and reported by two pathologists independently according to Bethesda system, 2001 [6].

The results given by two pathologists were matched and if any discrepancy was found, it was again sent to two pathologists independently for final match of results.

Evaluation of the cervical cells was done using the Bethesda System, 2001 as follows:

Specimen adequacy

- Satisfactory for evaluation
- Presence or absence of endocervical or transformation zone components or
- Other quality indicators such as partially obscuring blood or inflammation
- Unsatisfactory for evaluation (specify reason)

General categorization(optional)

- Negative for intraepithelial lesion or malignancy
- Epithelial cell abnormality
- Other

Interpretation/result

- Negative for intraepithelial lesion or malignancy
- Organisms
 - Trichomonas vaginalis
 - Fungal organisms morphologically consistent with Candida spp.
 - Shift in flora suggestive of bacterial vaginosis
 - Bacteria morphologically consistent with Actinomyces spp.
 - Cellular changes consistent with Herpes simplex virus.
- Other non-neoplastic findings
 - Reactive cellular changes
 - Glandular cells status post hysterectomy
 - Atrophy
- Epithelial cell abnormalities
 - Squamous cell
 - Atypical squamous cells (ASC)
 - Atypical squamous cells of undetermined significance (ASC-US)
 - ASC, cannot exclude High grade squamous intraepithelial lesion(ASC-H)
 - Low grade squamous intraepithelial lesion (LSIL) encompassing: human papilloma virus (HPV)/mild dysplasia/CIN 1
 - High grade squamous intraepithelial lesion (HSIL) encompassing: moderate and severe dysplasia, CIS/CIN 2 and CIN3 with features suspicious for invasion (if invasion is suspected)
 - Squamous cell carcinoma
 - Glandular cell
 - Atypical glandular cells (AGC)
 - Atypical glandular cells, favour neoplastic
 - Endocervical adenocarcinoma in situ (AIS)
 - Adenocarcinoma
- Other malignant neoplasms

Statistical methods: Age, clinical presentation and pathological diagnoses of each case were recorded. The data was entered in MS Office 2007 and analyzed.

Results

A total of 574 smears were studied during the duration between January 2015 to Feb 2017, out of these, 66 smears were inadequate or unsatisfactory due to blood/mucus and were excluded from our study. Out of 508 Pap smears studied there were 448 cases of NILM [including 324 (63.78%) Inflammatory Lesions and 124 (24.41%) normal smears] and 60 (11.81%) cases of epithelial lesions.

Among patients with abnormal Pap findings, cervical erosion, leucorrhoea, inter-menstrual bleeding, vaginitis and cervical hypertrophy were the most common clinical findings observed.

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Table-1: Distribution of participants according to Cytological findings (n =508).

Sr No	Cytological findings	Frequency no (%)
1	NILM	
	Normal smears	124(24.41%)
	Inflammatory Lesions	324(63.78%)
2	Epithelial lesions	60(11.81%)
	Total	508(100%)

Based on cytological findings, more than half 324 (63.78%) cases were inflammatory lesions, 124 (24.41%) were normal smears and 60 (11.81%) cases were of epithelial lesions. (Table 1)

Table-2: Age wise distribution of various inflammatory and epithelial lesions of cervix (n=508).

Cytological findings	Age group (Years)						Total (%)
	15-30	31-40	41-50	51-60	61-70	≥71	
Cervicitis	95	138	63	12	2	0	310(60.22%)
Trichomonas Vaginalis	2	2	1	0	0	0	5(0.98%)
Atrophy	0	0	1	1	3	2	7(1.4%)
Bacterial vaginosis	0	1	0	0	0	0	1(0.2%)
Herpes simplex	1	0	0	0	0	0	1(0.2%)
Normal smears	37	55	22	7	2	1	124(24.409%)
ASCUS	3	8	15	1	2	0	29(5.7%)
AGUS	0	1	3	0	0	0	4(0.78%)
ASCUS/LSIL	3	1	1	1	0	0	6(1.18%)
LSIL	2	3	1	1	0	0	7(1.4%)
HSIL	0	2	1	2	2	0	7(1.4%)
SCC	0	2	2	1	0	0	5(1%)
Adenocarcinoma	0	0	0	0	0	0	0(0%)
HSIL/SCC	0	1	0	0	0	0	1(0.2%)
Endometrial Ca	0	1	0	0	0	0	1(0.2%)
Total	143	215	110	26	11	3	508(100%)
Range: 22- 77 years							

As stated in Table 2, inflammatory lesions were most of the time found among women of age group 15 to 50 years of age. More than half (60.22%), of inflammatory lesions were diagnosed as nonspecific cervicitis, followed by atrophic changes (1.4%), Trichomonas vaginalis (0.98%), Herpes simplex (0.2%) and bacterial vaginosis (0.2%). More than one fifth of patients (24.41%) were categorized into normal smears, and epithelial lesions were reported as ASCUS (5.7% of patients), LSIL (1.4% of patients) and HSIL (1.4% of patients), AGUS (0.78% of patients), SCC (0.6% of patients) and endometrial carcinoma (0.2% of patients).

Discussion

Cancer of cervix is readily preventable when effective programmes are conducted to detect and treat its precursor lesions. There is a long latent phase which precedes the invasive malignancy; during this period premalignant lesions can be detected. This gives the benefit of conducting screening for carcinoma cervix in

early stages [4]. Early detection of epithelial abnormalities helps in early treatment of dysplastic epithelial changes, which can prevent invasive cervical carcinoma [7]. The incidence of cervical cancer has decreased more than 50% in the past 30 years because of widespread screening with cervical cytology. The role

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of HPV in development of cervical cancer is proved beyond doubt. If Pap screening is associated with HPV-DNA testing than we can increase the sensitivity. World Health Organization (1992) recommended screening every woman once in her lifetime at 40 years [8,9]. In countries like India with predominant rural population, having low socioeconomic status, marriage at an early age and poor medical facility; it is a major challenge to formulate a screening program that is easily available, within existing resources, to a large section of society [8].

We have studied a total of 574 smears during the duration between January 2015 to Feb 2017; out of these, 66 smears were inadequate or unsatisfactory due to blood/mucus. Proportion of inadequate samples were 11.5% in our set up while two separate studies done by Rawat K et al (16.1%) and Gupta S et al reports similar findings. [10,11]. The unsatisfactory rate is an important quality assurance indicator in cervical cytology as it identifies women who are being inadequately screened. Sampling technique skills, storage or transportation could be the reason for higher inadequate smear proportion. Regular training of healthcare personnel about proper preparation of pap smears and feed back is necessary, in our setup.

The age of patients ranged from 22 to 77 years in our study. Our study showed maximum number of patients in the 4th decade (42.32%), followed by 2nd decade (28.14%), and 5th decade (21.65%). Similar findings were documented in other studies. Babu et al found 32.57% of the study population in 5th decade, followed by 28.55% in 4th decade and 20.14% in 3rd decade. Bal et al found maximum number of cases in the 4th decade (45.3%), followed by 33.3% in 3rd decade, 17.7% in 5th decade. Bamanikar et al found maximum number of cases in the 4th decade (32.68%) [1,4,12].

Our study shows that most common clinical complaints were cervical erosion followed by leucorrhoea, intermenstrual bleeding, vaginitis and cervical hypertrophy. Similar pattern of findings were reported by Sharma P, et al. in a community based study on cervical cancer screening program among women of Delhi [13]. Another study done by Sandhya Rani et al among 500 women showed similar clinical findings [7]. Present study emphasized the significance of vaginal discharge and its association with neoplastic changes in the cervix. The results correspond with many previous studies [1,4].

Out of 508 Pap smears studied, 324 (63.78%) smears were inflammatory; among inflammatory smears

nonspecific cervicitis (non-specific inflammation) (60.22%) was the pre-dominant finding. Pap smears of inflammatory lesions showed only neutrophils and bacteria on the slide with no atypical cells or dysplasia, indicating the importance of proper hygiene maintenance in prevention of cervical epithelial lesions.

Another important observation of our study was presence of *Trichomonas vaginalis* infection in 5 (0.98%) cases and Herpes simplex in one case. It suggests that in all cases of inflammatory smears, full microbiological workup should be done. Study done by Babu et al found 28.47% cases had non-specific inflammation, 15.51% had *Trichomonas vaginalis* infection and 4.2% had bacterial vaginosis.

Bamanikar et al found 68.93% non-specific inflammation, 0.54% *Trichomonas vaginalis*. The study by Bal et al [8] showed 71.3% non-specific inflammation and 0.3% *Trichomonas* infection. *Trichomonas* infection is a sexually transmitted infection. Presence of sexually transmitted diseases (STD) is an established risk factor for cervical carcinoma. This emphasizes the necessity of follow up of these patients and periodic PAP smear screening [1,4,12].

Epithelial cell abnormalities, that is the total of ASCUS, LSIL, HSIL and SCC were seen in 60 (11.81%) cases in our study as compared to other studies where the proportion of epithelial abnormality varies between 1.5 – 12% [1, 8, 10, 14,15]. Our study documents 5.7% of patients as ASCUS, to be the most common epithelial cell abnormality. Results from other studies done by Saha D et al (1.74%) and by Rawat et al (1.3%) documents lower proportions [8,10]. Smears showing LSIL and HSIL were low (1.4%) in current study, similarly it was seen in lower proportion in other studies [1,4]. AGUS was rare finding (0.78%), which was similar rare finding in other studies [9,10,11].

In current study, LSIL was commonly found in 4th and 5th decade, and HSIL in 5th, 6th and 7th decade and SCC in 5th and 6th decade. The incidence of HSIL and SCC was increased in the above 50 years age group indicating the gradually increasing incidence of malignancy with age. These results are in accordance with the studies of Bal et al, Gupta et al and Rawat et al [4,10,11]. We also compared the results obtained in this study with few other studies.

Conclusions

Prevalence of altered cervical cytological pattern was 75.59% amongst females visiting hospital. This study

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shows relatively high prevalence of epithelial abnormalities with increasing age, parity, women with clinical lesions on per speculum findings. Malignancy was more common in sixth and seventh decade and intraepithelial lesions/dysplasia was seen mostly in fourth and fifth decade. Papsmear also has a greater role in diagnosis of inflammatory lesions including the identification of causative organisms and atrophic changes. We propose that larger studies are required to estimate the pattern of cervical cytological abnormalities along with detection of common HPV strains in cervical cancer in Indian population, as this knowledge would be useful for prevention of HPV infection either by vaccines or future targeted therapy.

Recommendations: Microbiological investigations are also recommended for all inflammatory cervical lesions. More effective systems for sample collection and transport could be developed to decrease inadequate smear proportion. There is definite scope of future research to measure socio-demographic associations with altered cytological patterns among females.

Contribution of this study: This study contributes to assessing current levels of cervical screening in our tertiary care hospital. Though PAP smear examination is primarily aimed at diagnosing the premalignant conditions of cervix, we can diagnose various infective and non-infective benign lesions of cervix also. Most of these benign lesions are easily treatable. This study will help to know epidemiology of patients attending our hospital and thus would be helpful to form local preventive measures.

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