Pattern of cervical pap smear cytology in a tertiary care hospital in northern India

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Abstract
Mortality due to cervical cancer can be reduced by early detection of the premalignant lesion of cervix using pap smear screening. Uterine cervix is ideal for screening due to easy accessibility for exfoliative cytology or pap smear test.**Objective:** To estimate frequency ofnon-neoplastic lesions, premalignant lesions and carcinoma cervix in patients presented with different clinical features in Gynaecology outpatient department. **Materials and methods-** This was a retrospective cross-sectional study. Cervical smears of patients (≥21 years) were studied in study duration of one year. Conventional Pap smears examined and interpretations noted. **Results-** Total 1969 cases with satisfactory smears (according to Bethesda system of reporting) were studied, 1880 cases (95.48%) showed benign and inflammatory lesion, while 89 cases (4.52%) were showing epithelial lesion (premalignant and malignant lesion). Among epithelial lesions, atypical squamous cells of undetermined significance (ASCUS) were most common(1.92%), followed by Low grade squamous intraepithelial lesion(LSIL)(1.06%), High grade squamous intraepithelial lesion(HSIL) (0.71%) and Squamous cell carcinoma(SCC)(0.40%) respectively. **Conclusion-** Cervical cancer is leading cause of cancer deaths among women. But also preventable through routine screening by pap smear test. Pap smear test is a cost-effective screening method and can be performed at primary health centre level.
Keywords-Cervical cancer, Pap smear, Bethesda system, epithelial abnormalities

Introduction
Papanicolaou (1928) first emphasised that invasive carcinoma is preceded by a preinvasive stage.In 1940s, it was widely recognised that preinvasive abnormalities of cervix precede invasive carcinoma often by several years, and can be detected by cervical smear examination [1] [2]Soon Papanicolaou (pap) smear became the standard screening test for cervical cancer and premalignant lesion [3] Cervical malignancy is the second most common malignancy among women in India. In 2020 GLOBOCAN estimated 1,23,907 new cases and 77,348 deaths. [4]Five-year relative survival rate is around 46%, which is much lower than other countries [5] and reason behind is that, cervical cancer is diagnosed at advanced stage in most of the cases (around 80%) [6] However, the mortality associated with cervical carcinoma can be reduced by early detection of precancerous lesions of cervix with proper implementation of cervical smear screening. So cervical cancer is easily detectable and readily preventable disease. [7]Conventional and liquid based cytology (LBC), both types of pap smear screening are considered acceptable methods of cervical cancer screening by the American College of Obstetricians and Gynaecologists(ACOG Committee on Practice Bulletins- Gynaecology, 2009) [8]

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Results

The overall sensitivity of pap smear test in detecting a high grade squamous intraepithelial lesion (HSIL) is 70-80%. [9] Pap smear test, when combined with human papilloma virus (HPV)-DNA testing, increases the sensitivity. Many studies showed that there is a reduction in incidence of invasive cervical cancer and mortality associated with it because of early detection of cervical intraepithelial lesion due to pap smear screening. [10,11]Aim of present study was to estimate frequency of non-neoplastic lesions, premalignant lesions and carcinoma cervix in patients in study duration.

Materials& Methods
This cross-sectional study was conducted in department of Pathology, GSVM Medical College Kanpur, Uttar Pradesh. Duration of study was one year (From July 2014 to June 2015). This was a descriptive retrospective study. All cervical smears(conventional Pap smears) had been collected in department of Gynaecology for routine screening. Patients of 21 years or above were included in the study, who presented in Gynaecology outpatient department(OPD) with complaints of vaginal discharge, post coital bleeding, intermenstrual bleeding, postmenopausal bleeding, abdominal pain etc. while patients with known case of carcinoma cervix or with treatment of carcinoma cervix were not included in the study. Pregnant patients were also not included. After applying these criteria, a total 2155 cases were included in this study. Cytology smears were fixed in 95% isopropyl alcohol and these slides were stained with Papanicolaou's method. Reporting of these smears had been done according to revised 2001 Bethesda system of reporting.

In this study, we had examined 2155 cases, out of which 186 cases were unsatisfactory due to scanty or inadequate material. So remaining 1969 cases were satisfactory according to Bethesda system of reporting. Total 1880 cases(95.48%) showed non-neoplastic pathology i.e., Negative for intraepithelial lesion or malignancy (NILM). Only 89 cases (4.52%) showed Intraepithelial lesion or malignancy. Table-1

Table 1: Pap smear interpretation/results

Pap results	No. of cases	Percentage of total no. of cases
NILM	1880	95.48%
Epithelial lesion	89	4.52%
Total	1969	100%

And in all epithelial lesion (total 89 cases), atypical squamous cells of undetermined significance (ASCUS) comprised of 38 cases (1.92%), Atypical glandular cells of undetermined significance (AGUS)or Atypical glandular cells not otherwise specified (AGC-NOS) comprised of total 7 cases (0.35%). While 21 cases(1.06%) showed features of low grade squamous intraepithelial lesion (LSIL) , 14 cases(0.71%) showed features of high grade squamous intraepithelial lesion(HSIL). Eight cases (0.40%) presented with cytologic features of squamous cell carcinoma (SCC) and 1 case(0.05%) with features of adenocarcinoma. Table-2

Table 2: Frequency of epithelial lesion

Pap results	No. of cases	Percentage among epithelial lesion (89 cases)	Percentage among all cases (1969 cases)
ASC-US	38	42.69%	1.92%
AGUS/AGC-NOS	07	7.86%	0.35%
LSIL	21	23.59%	1.06%
HSIL	14	15.73%	0.71%
SCC	08	8.98%	0.40%
Adenocarcinoma	01	1.12%	0.05%
Total no. of cases of epithelial lesion	89	100%	4.52%

In total 1880 cases of non neoplastic pathology i.e. Negative for intraepithelial lesion or malignancy (NILM) 748 cases(37.9%) showed non specific pathology, while 436 cases(22.14%) expressed features of bacterial vaginosis, 422 cases(21.43%) showed repair changes, 141 cases(7.16%) showed features of candida infection, 19 cases (0.96%)showed trichomonads, two cases(0.10%) showed microfilaria, 112 cases (5.68%) showed atrophic changes. [Table-3]

Table 3: Frequency of non-neoplastic pathology

Pap results	No. of cases	Percentage among non-neoplastic lesions (1880 cases)	Percentage among all cases (1969 cases)
Non-specific pathology	748	39.78%	37.9%
Bacterial vaginosis	436	23.19%	22.14%
Candida	141	7.50%	7.16%
Trichomonas	19	1.01%	0.96%
Microfilaria	02	0.10%	0.10%
Repair changes	422	22.44%	21.43%
Atrophic changes	112	5.95%	5.68%
Total no. of cases of NILM	1880	100%	95.48%

Out of total 89 cases of epithelial lesion, most of the cases belonged to 31-40 years age group(31.46%) then 41-50 years (28.08%). Most cases of HSIL and SCC were seen in age group of 41-50 years and51-60 years respectively Table-4

Table 4:Cervical epithelial lesion in relation with age group

Age group (years)	ASCUS	AGUS	LSIL	HSIL	SCC	Adeno carcinoma	Total	%
21-30	06	00	01	01	00	00	08	8.98%
31-40	14	01	08	04	01	00	28	31.46%
41-50	08	02	06	06	03	00	25	28.08%
51-60	05	03	04	01	04	00	17	19.10%
61-70	03	01	01	02	00	01	08	8.98%
>70	02	00	01	00	00	00	03	3.37%
Total	38	07	21	14	08	01	89	100%

In all NILM cases(1880 cases), younger age group mainly affected i.e. 21-30 years age group with 589 cases(31.32%), and in 31-40 years age group with 561 cases(29.84%). Table-5

Table 5:NILM cases in relation with age group

Age group (in years)	Non-specific pathology	Pathology associated with bacterial vaginosis, candida, Trichomonas and microfilaria	Repair changes	Atrophic changes	Total	%
21-30	261	253	75	00	589	31.32%
31-40	199	200	162	00	561	29.84%
41-50	125	69	67	28	289	15.37%
51-60	85	45	62	38	230	12.23%
61-70	53	21	54	36	164	8.72%
>70	25	10	02	10	47	2.50%
Total	748	598	422	112	1880	100%

Discussion

Carcinoma of uterine-cervix usually occurs between 40-50 years and its precursor lesion occurs 5-10 years earlier. [12] Uterine cervix is also ideal for screening due to easy accessibility for exfoliative cytology or pap smear test. [13]Role of HPV in development of cervical cancer is well known. So Pap smear testing associated with HPV-DNA increases the sensitivity to detect precancerous cervical epithelial lesions.Pap smear test is a cost-effective screening method can be performed at primary health centre level, while HPV-DNA can be done at higher centres. According to American Cancer Society, the pap smear test is a routine cancer screening test, and it should be done every 3 years. [14] In this study 1969 cases were found satisfactory to report according to Bethesda system. And among them 89 cases (4.52%) showed epithelial abnormalities. Similar observations were found by

+Balaha MH et al [15] Patel MM [16] and Bal MS et al [17] [Table-6] However no consistent pattern seen in various studies and a wide range of prevalence seen. The reasons of these variations may be due to differences in inclusion criteria, intrinsic differences of population, prevalence of risk factors etc. [18]

Table 6:comparing prevalence of epithelial abnormalities in different studies

Author	Total no. of patients	Prevalence of all epithelial abnormalities	Main epithelial abnormalities (% of all cases)			
			ASCUS	LSIL	HSIL	SCC
Balaha MH et al [15]	1171	4.95%	2.99	0.09	0.68	0.34
Patel MM et al [16]	995	5.52%	4.1	0.1	0.1	0.7
Bal MS et al [17]	300	5%	0.3	2.7	0.7	1.3
Nair GG et al [18]	2028	2.42%	0.15	1.58	0.49	0.20
Gupta K et al [13]	4703	3.2%	0.52	1.36	0.91	0.28
Usha M et al [19]	5464	3.01%	0.62	1.46	0.53	0.14
This study	1969	4.52%	1.92	1.06	0.71	0.40

In present study, the most common premalignant lesion detected was ASCUS (1.92%), followed by LSIL(1.06%) then HSIL(0.71%) while many studies show relative lower prevalence of ASCUS [13,17-19]. ASCUS progresses to LSIL, HSIL, and SCC. Study also showed 0.35% cases of AGUS and 0.05% case of Adenocarcinoma. AGUS progresses to adenocarcinoma. [16]In this study, epithelial abnormalities were more prevalent in age group of 31-40 years i.e. 31.46% [Table-4] followed by age group of 41-50 years and 51-60 years respectively(28.08%, and 19.10%). Most cases of SCC were seen in age group of 51-60 years age group. Which was comparable to other studies [16][19]. However Nair GG et al., found most epithelial abnormalities (44.9%) in postmenopausal age group (51-60 years) [18]In Non-neoplastic lesions, this study showed 22.14% cases of bacterial vaginosis, 0.96% cases of Trichomonas infection. Pathak R et al., in their study showed 17.2 % cases of bacterial vaginosis, and 8.9 % cases of Trichomonas infection. [20]

In this study,among NILM cases, majority of smears showed Non-specific pathology (37.9% cases) second most common findings was bacterial vaginosis (22.14% cases). Similar findings were noted by different studies by Malik SN et al, Vaghela BK et al and Hosamane S et al. [3][21][22].

Conclusion

Pap smear testing is a very useful tool for detecting precancerous cervical epithelial lesions. In present study, 89 cases of epithelial lesion included 80 premalignant lesion. So early detection and treatment can reduce mortality significantly.Pap smear test is a cost effective screening method can be performed at primary health centre level.

Acknowledgment

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