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Original Research Article

Spectrum of Pap smear cytology according to The Bethesda System 2014

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ABSTRACT

Background: Carcinoma of cervix is one of the leading cause of mortality in women across the world. Papanicolaou smear is a valuable screening tool for the neoplastic lesions of cervix. Present study was carried out to do clinicocytological correlation of cervical lesions and to find out the spectrum of cervical lesions in study population.

Materials and Methods: An observational study was conducted at Pathology department in Muzaffarnagar Medical College, Muzaffarnagar. Total 1,017 females were enrolled, scrape smears from the cervix were taken and processed using Papanicolaou's method of staining. These stained smears were examined under microscope and classified according to latest The Bethesda System 2014.

Results: Out of 1017 cases, 84.9% (863) smears were classified satisfactory according to 2014 The Bethesda System. Majority of cases (350 cases, 40.5%) belonged to age group of 31-40 years. NILM was the most common cytological finding seen in 340 females (39.3%). The epithelial abnormalities including Atypical Squamous Cells (ASCUS, ASC-H), Squamous Intraepithelial Lesion (LSIL, HSIL) and Squamous Cell Carcinoma were seen in 3.2% of total cases. LSIL found in 1.3% cases and HSIL formed 1.0%. Single case of SCC was detected.

Conclusion: Cervical epithelial abnormalities are common in Indian females. Pap smear is the most convenient and OPD test to detect epithelial abnormalities in early phase. Awareness regarding the Pap screening should be encouraged to lessen the morbidity and mortality caused by Carcinoma Cervix.

1. Introduction

Carcinoma cervix is one of the important cancer responsible for the mortality in females across the world.[1] Incidence of cervical cancer has now decreased markedly in developed countries because of the well operated and widely accepted screening programme but these cases are quite common in developing countries like India.[1]

World Cancer statistics says that carcinoma cervix is more prevalent in resource poor countries. It is because of lack of education and poor acceptance to screening programs operated by the government.[2] A large proportion of death caused by carcinoma cervix occur only in India. In India, 1,22,844 new cases of cervix cancer are diagnosed annually and 67,477 death occur in the patients suffering from this disease.[3] Chances of cervical carcinoma is about 60% in females around the 45 year of age which increases by 20% in females of more than 65 year age.[3]

Cervical cancer can be prevented through screening programs, designed to identify about 90% of the precancerous cytological abnormalities.[4] Cervical carcinoma has association with certain risk factors

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like marriage at early age scenario, early child birth and multiple sex partners. Human Papilloma Virus (HPV) is known to have a pivotal role in the pathogenesis of cervical carcinoma.[5] Carcinoma cervix is a curable as the preinvasive phase of it is very long and with the intensive screening, it is possible to diagnose and treat the cancer timely.[6] Those early epithelial changes of the cervix are detected with the help of Pap smear which is the primary cytologic screening test discovered for the identification of precancerous intraepithelial lesions and invasive cervical carcinoma.[1] It is the only screening tool employed to diagnose the cervical carcinoma in early phase.

In the Conventional Pap smear, cells are taken from transformation zone and are examined under microscope after staining. If the cytology reveals abnormal or atypical morphology of the cervix, colposcopy or colposcopic guided excisional biopsy is done.[7–9]

Initially the Pap smear interpretation was subjective and there is high inter-observer variation. To minimize this, a group of clinician and cytopathologists introduced The Bethesda System for Reporting Cervical Cytopathology (TBSRCC). Many amendments have been taken place in TBSRCC, latest included in 2014. This study was done to study the lesions of cervix which were examined microscopically and classified according to 2014 The Bethesda System and also to assess the current level of cervical screening by knowing the prevalence of the premalignant as well as malignant cervical lesions in the tertiary care hospital.

2. Materials and Methods

This Hospital based observational study was conducted for 18 month at cytology lab in Pathology department of Muzaffarnagar Medical College, Muzaffarnagar. Before the commencement of the study, institutional ethical committee clearance was taken (MMC/IEC/2021/201). All the women who were symptomatic and given consent for the Pap smear were included in the study while women undergone surgical treatment for cervical lesion, active bleeding per vaginum, women on hormone replacement therapy and pregnant women were excluded from the study.

2.1. Method of data collection / procedure

Number of enrolled cases was 1017. After taking informed consent, proper and thorough history and examination including per speculum and per vaginal examination was carried out. Cervical scrape smears were obtained using Ayre's spatula. Material was hastily spread on glass slide and fixed in 95% ethyl alcohol. Staining was done using Papanicolaou's method. Then the interpretation of these scrape smears was done using The Bethesda System 2014.[10] All data was tabulated and analyzed with help of SPSS version 17/20, Statcal 2 software and presented in percentage. Student t- test was applied whenever necessary.

3. Results

In this study, 1017 cases were examined out of which 863 smears (84.9%) were satisfactory according to The Bethesda System. In these 863 smears, 350 smears (40.5%) were found in 31-40 years age group and formed the major proportion followed by 21-30 year age group having 250 cases (28.9%). Mean age was 35 years. Majority of females (49.9%) were multi-para (parity 2-4). Most common complaint was vaginal discharge seen in 349 females (40.4%) followed by abdominal pain (28.9%). On cytological examination, NILM was found to be the most common finding seen in 340 females (39.3%) while epithelial cell abnormality was seen in 30 cases (32%). In these 30 cases, 6 cases (0.6%) were of ASCUS, 2 cases (0.2%) of ASC-H, 12 cases of LSIL (1.3%) and 9 were of HSIL (1%). Squamous Cell Carcinoma was found only in single case (0.1%). Vaginitis was seen in 139 cases (16.2%) and two cases of granulomatous cervicitis (0.2%) were also found. Granulomatous cervicitis is a rare entity but not uncommon in Indian scenario. (Table 1)

Majority of the LSIL cases (12 cases) were seen in 31-40 years age group while HSIL (9 cases) were common in more than 50 years of age group. Single case of Squamous Cell Carcinoma was seen in female of more than 50 year of age. (Table 2) The association of the epithelial abnormalities and carcinoma with symptoms is shown in Table 3. Among the various presenting symptoms, post coital bleeding and post menopausal bleeding were associated with higher proportion of dysplasia and this association was statistically significant.

Biopsies were received in only 3 cases of ASCUS (out of 6 cases reported in Pap smear) which on histopathology came out as Chronic Cervicitis.

Similarly in ASC-H, two biopsies were received which on histopathology showed one case of Chronic Cervicitis and one case of CIN I.

Out of 12 cases of LSIL reported on Pap smear, histopathology showed Cervicitis in 3 cases, CIN 1 was seen in 8 cases while single case was of CIN 2.

In 9 cases of HSIL on Pap smear, histopathology showed 6 cases of CIN 1&1 case of CIN 2 .SCC was seen in 2 cases. (Table 4)

Table 1: Distribution of patients according to cytological diagnosis

Cytological diagnosis	No. of patients (n)	Percentage (%)
NILM	340	39.3%
Non neoplastic finding		
Squamous metaplasia	86	10%
Keratotic changes	06	0.6%
NILM with inflammation	260	30.5%
Vaginitis	139	16.2%
Granulomatous cervicitis	02	0.2%
ASCUS	06	0.6%
ASC-H	02	0.2%
AGUS	00	0%
LSIL	12	1.3%
HSIL	09	1.0%
SCC	01	0.1%
Total	863	100

(NILM- Negative for Intraepithelial Lesion or Malignancy, ASCUS- Atypical Squamous cells of Undetermined Significance, ASC-H – Atypical Squamous Cells, cannot exclude HSIL, AGUS – Atypical Glandular Cells of Undetermined Significance, LSIL- Low Grade Squamous Intraepithelial Lesion, HSIL- High Grade Squamous intraepithelial lesion, SCC – squamous cell carcinoma).

Table 2: Association of Squamous Intraepithelial Lesion and Squamous Cell Carcinoma with age.

Age	Total cases (n-863)		Squamous intraepithelial lesion cases				SCC (n-01)	
			LSIL (n-12)		HSIL(n-9)			
	No.	%	No.	%	No.	%	No.	%
21-30	250	28.9%	01	0.4%	00	00	00	00
31-40	350	40.5%	07	2.0%	01	0.2%	00	00
41-50	190	22.0%	03	1.5%	03	1.5%	00	00
>50	73	8.6%	01	1.36%	05	6.8%	01	1.3%
Fisher exact test					5.71			
p value					0.28			

Table 3: Association of Squamous Intraepithelial Lesion and Squamous Cell Carcinoma with presenting complaints

Complaints	Total cases (n-863)		Squamous Intraepithelial Lesion				SCC (n-01)	
			LSIL (n-12)		HSIL(n-9)			
	No.	%	No.	%	No.	%	No.	%
Abdominal pain	250	28.9%	01	0.4%	02	0.8%	00	00
Vaginal discharge	349	40.4%	03	0.86%	01	0.28%	00	00
Dysuria	140	16.2%	01	0.71%	00	00	00	00
Pruritis	46	5.3%	02	6.2%	02	4.3%	00	00
Primary infertility	32	3.8%	01	3.12%	00	00	00	00
Post coital bleeding	32	3.8%	02	6.2%	02	6.2%	01	3.1
Something coming out of vagina	07	0.8%	00	00	00	00	00	00
Post-menopausal bleeding	07	0.8%	02	28.5%	02	28.5%	00	00
Fisher exact test					2.06			
p value					0.041*			

* Statistically significant

4. Discussion

Carcinoma cervix is a successfully treatable disease especially if it is detected early. It is associated with several factors. Majority of cases are related to the infection with HPV. Few strains are associated with the more chances of malignancy, hence called as high- risk types. Cervical carcinoma is associated with certain behavioural and medical risk factors that is responsible for the acquiring the HPV infection during some part of life. Regular screening by a health personal is the key to detect abnormal cell changes at an early stage. Screening with Pap smear, diagnosis of precancerous conditions of cervix and the timely management is the key to lessen the burden of the cancer especially in low income countries. [11]

In the present study, mean age of patient was 35 years. Majority of females (40.5%) were in 31-40 year age group.

Table 4: Correlation of cytology with histopathology

PAP Smear Findings	No. of cases in Pap smear	Histopathology CC	CIN-1	CIN – 2	CIN 3	SCC
Normal	05	05	0	0	0	0
Inflammation	43	43	0	0	0	0
ASCUS	03	03	0	0	0	0
ASC-H	02	01	01	0	0	0
LSIL	12	03	08	01	0	0
HSIL	09	0	06	01	0	02
Invasive carcinoma	0	0	0	0	0	0
Total	74	55	15	02	0	02
Kappa value				0.71		
p value				0.032*		

*: Statistically significant

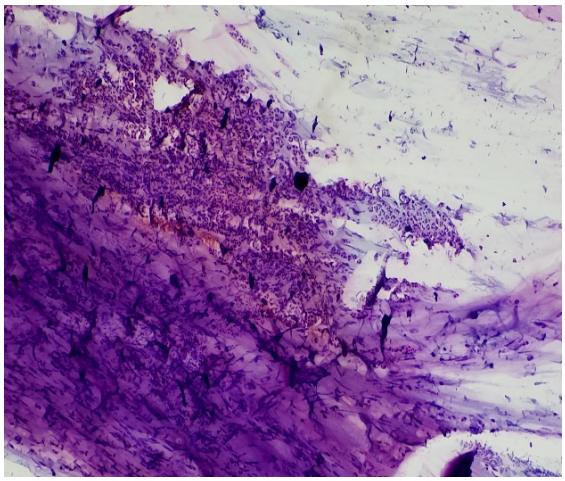

Fig. 1: Unsatisfactory smear showing large number of inflammatory cells (Papanicolaou stain, 400 X).

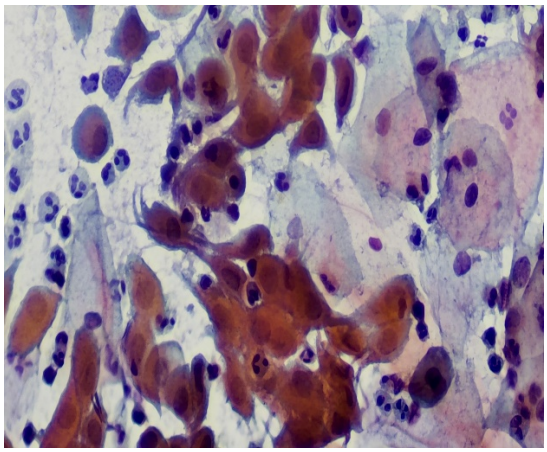

Fig. 2: Metaplastic cells (Papanicolaou stain, 400 X).

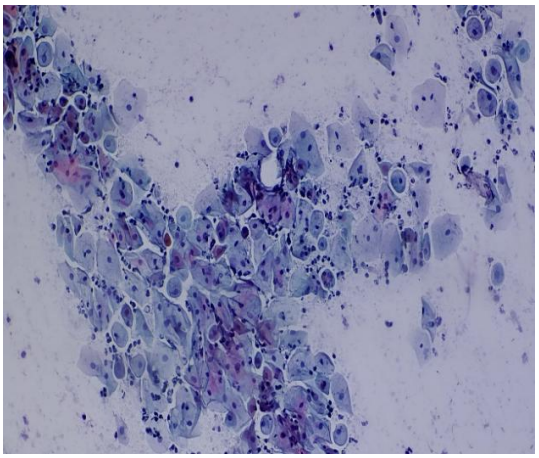

Fig. 3: Parabasal cells in a atrophic smear (Papanicolaou stain, 400 X).

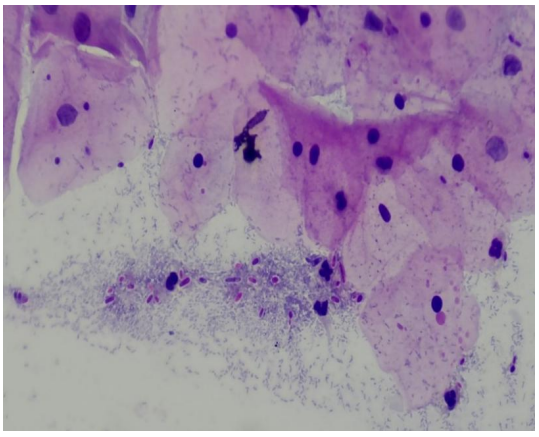

Fig. 4: Candidiasis (Papanicolaou stain, 400 X).

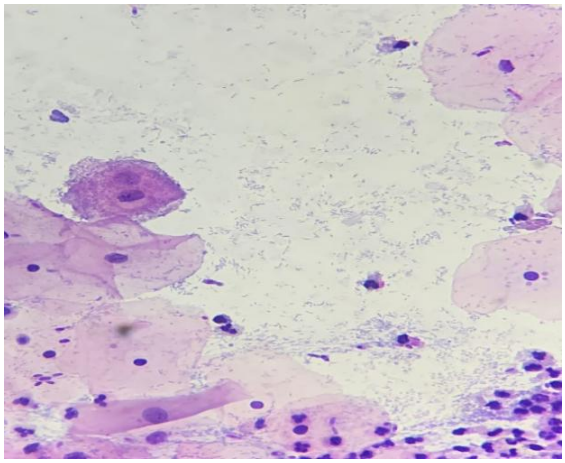

Fig. 5: Clue cell in bacterial vaginosis (Papanicolaou stain, 400 X).

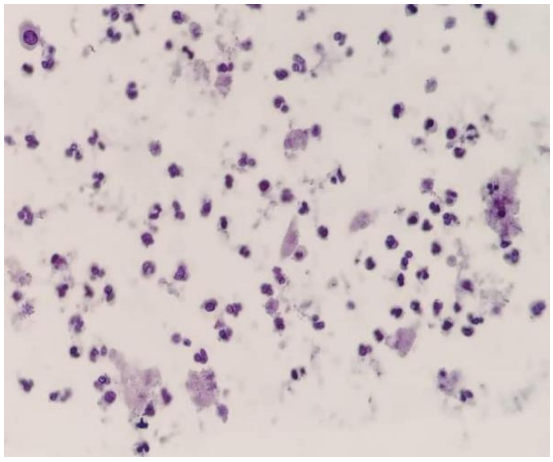

Fig. 6: Trichomonas vaginalis (Papanicolaou stain, 400X).

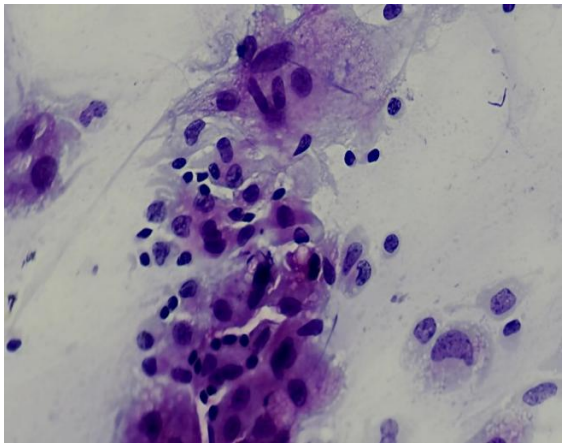

Fig. 7: Granulomatous cervicitis (Papanicolaou stain, 400 X).

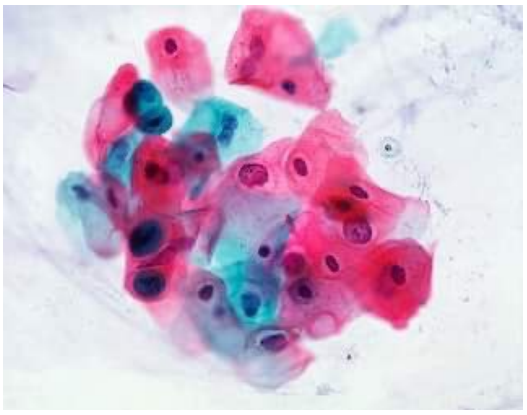

Fig. 8: Low-grade squamous Intraepithelial Lesion (Papanicolaou stain, × 400).

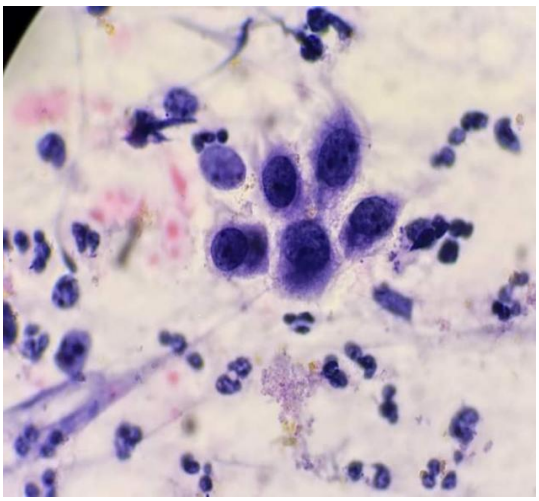

Fig. 9: High-grade Squamous Intraepithelial Lesion (Papanicolaou stain, × 400).

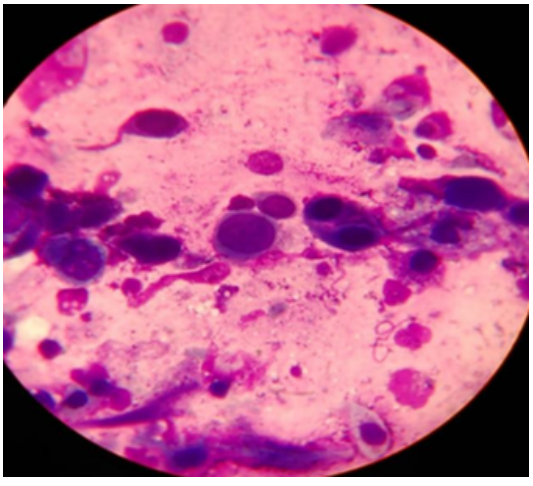

Fig. 10: Squamous cell carcinoma (Papanicolaou stain, × 400).

This is in concordance with the study done of Bal et al[12] (45.3% cases in 4th decade), Sachan PL et al[13] (mean age was 35 years), Dasari P et al[14] (with mean age of 37 years). Majority of the females (49.9%) were multi-para (2-4) with mean parity of 2.5 in this study. In studies by Sachan PL et al[13] and Ashmita D et al,[15] most females were multiparous. In this study, vaginal discharge was the found as common presenting symptom (40.4%) which was in concordance with the study by Sachan PL et al[13] and C Joshi[16], Thobbi VA et al.[17]

In the current study, total 1017 patients were included. On cytological examination, 863 (84%) were found satisfactory and 154 cases (15%) were unsatisfactory. This finding was in concordance with the study conducted by Sharma HB et al,[18] Gidwani RK et al.[19] NILM was the most common cytological finding, seen in 833 females (96.8%). Epithelial cell abnormality was seen in 30 cases (3.2%) included ASCUS in 0.6% cases, ASC-H in 0.2% cases, LSIL in 1.3% cases and HSIL in 1.0% case. SCC was seen only in one female (0.1%). Similar result was seen in study carried by Gupta K et al.[20] They diagnosed ASCUS in 0.52% cases, ASC-H in 0.05% cases, LSIL in 1.36%, HSIL in 0.91% and SCC in 0.28% cases.

Another Study done by Sharma HB et al[18] found 93.4% cases negative for malignancy. ASCUS was seen in 15 cases (3.3%), ASC-H (4 cases, 0.8%), AGUS (3 cases, 0.6%), LSIL (6 cases, 1.3%) and HSIL (2 cases, 0.4%). SCC cervix was seen in 1 case (0.2%).

Sachan PL et al[13] found that out of 1544 satisfactory cases, 91.5% were negative for malignancy. The epithelial cell abnormalities inclusive of ASCUS, LSIL as well as HSIL were detected in 2.90%, 5.09%, and 0.48% cases respectively.

In the present study, majority of the LSIL cases (12 cases, 1.3%) were seen in 31-40 years age group while HSIL (9 cases, 1.0%) was common in more than 50 years of age group. Single case of Squamous Cell Carcinoma was also seen in female of more than 50 year of age. The results are similar with the findings of Bal MS et al[12] ,Gupta K et al[20] and Gidwani RK et al[19] as they showed that maximum cases of LSIL was found in 40-49 year age group while HSIL and SCC was found in females above 50 years of age.

A statistically significant association was seen between cervical intraepithelial lesions and parity > 3 (p value=0.044). This was in concordance with the study done by Gawande V[21] and Munoz N et al.[22]

Among the various presenting symptoms, post coital bleeding and post menopausal bleeding was commonly associated with higher proportion of dysplasia in our study. Similar findings were seen in the study of Gupta K et al[20] who found that cases of LSIL was more in women with the history of post-coital bleed per vaginum but HSIL and cervical carcinoma was high in women of postmenopausal bleeding.

5. Conclusion

Carcinoma cervix is the major disease at fault carrying burden of morbidity and mortality in the low income countries. Pap smear is very effective method to lessen the burden of disease by diagnosing the cancer in its preinvasive phase. Also the use of vaccines against the HPV can be useful for prevention of the disease. Pap smear is very sensitive screening test to detect cervical lesions. Therefore health education about regular screening should be done as cervical cancer is a preventable and curable disease if diagnosed early. Awareness should be spread in women for regular Pap screening after the 21 years of age or after the beginning of sexual life. Educational talk is very helpful in providing the knowledge about Pap smear and it's significance so that this test is accepted at the root level. Text messages have also an impact among participants as now-a days, social media is very active and may have a contributing role in the uptake of Pap smear test.

6. Conflict of Interest

None.

7. Source of Funding

None.

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