

SPECTRUM OF CYTOLOGICAL PATTERNS IN CERVICAL PAP SMEARS WITH APPLICATION OF THE BETHESDA SYSTEM AT A TERTIARY CARE HOSPITAL

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Abstract

Background: Cervical cancer is one of the commonest invasive cancers of the female genital tract in India causing widespread morbidity and mortality. Detection in early stage prevents progression of the disease and can thus help to initiate early treatment and improve longevity and quality of life. **Objectives:** 1. To study the spectrum of cervical Pap smears. 2. Application of The Bethesda System for categorization of Pap smears. **Materials and Methods:** The cervical smears of female patients visiting Gynaecology OPD between June 2022 to May 2023 were evaluated in the Department of Pathology at a tertiary care hospital in Maharashtra. This study was conducted retrospectively for the age group of 18-80 years using conventional Pap smears. Reporting of these smears was done by using The Bethesda System. **Result:** Out of 490 cases studied between the age group of ≤ 20 -80 years, majority of cases were in the age group of 31-40 years comprising 157 cases (32.09%). Satisfactory smears were observed in 448 cases (91.43%), with 166 cases (33.88%) of inflammatory smears, 5 cases (1.03%) of LSIL, 4 cases (0.81%) of HSIL and 1 case (0.20%) of SCC. In the remaining 42 cases (8.57%), smears were unsatisfactory. **Conclusion:** Application of The Bethesda System for reporting of the cervical smears helps in accurate diagnosis and classification of the lesions into infective, inflammatory and neoplastic categories. This aids in determining the prognosis and appropriate treatment protocol.

INTRODUCTION

Cervical carcinoma is one of the most common cancers among Indian women and has also been a common cause of mortality. In India 1,22,844 women are diagnosed with cervical cancer every year out of which 67,477 women die from the disease.^[1] Due to cervical screening programs, incidence and mortality from cervical cancer is decreased but in developing countries like India, the burden of mortality is still high.^[2] Majority of cervical cancer cases and deaths occur among the women who are not properly screened and treated.^[3] If there is an early identification in the pre-cancerous stages then it can be treated before its progression to invasive cancer.^[4]

In 1940, cervical cytology was introduced into clinical practice by George Papanicolaou.^[5] The introduction of 'The Bethesda System' for reporting

cervical cytology has resulted in a standardised reporting pattern and it was revised in 2014.^[6] Women continue to die of carcinoma of cervix, in spite of Pap smear test being the most successful cervical cancer screening test, because of ignorance and lack of awareness.^[7] Pap smear is a simple, safe, non-invasive, outdoor and effective method for detection of lesions of the cervix. On the other hand, cervical biopsy is a gold standard but an invasive technique.^[8]

Human papilloma virus plays a very important role in the development of cervical cancer.^[9] HPV is a sexually transmitted oncogenic virus, certain subtypes of which interact with cervical cells and can lead to cancer of the cervix.^[10] The burden of the disease can be reduced by targeting the women in the vulnerable age group for HPV vaccination before the exposure to the virus, regular screening using Pap cytology and by educating general public regarding safe sexual practices.^[11]

Objectives:

1. To study the spectrum of cervical Pap smears.
2. Application of The Bethesda System for categorization of Pap smears.

MATERIALS AND METHODS

The cervical smears of female patients visiting Gynaecology OPD between June 2022 to May 2023 were evaluated in the department of Pathology at Ashwini Rural Medical College, Hospital and Research Centre, Kumbhari, Solapur, Maharashtra. This study was conducted retrospectively for 490 females in the age group of 18 to 80 years using conventional Pap smears. Reporting of these smears was done by using The Bethesda System. Data was analyzed using Microsoft excel.

Inclusion Criteria

All female patients between 18-80 years were included in this study.

Exclusion Criteria

Improperly collected samples were excluded from the study.

RESULTS

A total of 490 cases were studied between the age group of ≤ 20 -80 years. Youngest patient was 18 years and the oldest was 78 years old. Majority of cases were in the age group of 31-40 years with 157 cases (32.04%), closely followed by the age group of 41-50 cases with 135 cases (27.55 %) while the least cases were in the age group of 71-80 years with 11 cases (2.24%).

Out of 490 cases, 42 cases (8.57%) were unsatisfactory either due to inadequate sample (11 cases) or due to dense inflammation obscuring the smears (31 cases). Remaining 448 cases (91.43%) were satisfactory, out of which most common lesion was inflammatory smear [Figure 1] in 166 cases (33.88%) followed by 32 cases (6.53%) of infections [Figure 2 & 3]. Remainder included 5 cases (1.03%) of LSIL [Figure 4], 4 cases (0.81%) of HSIL [Figure 5], 1 case (0.20%) of SCC [Figure 6] and 1 case (0.20%) of AGUS [Figure 7]. The age group of 31-40 years showed maximum of inflammatory smears with 54 cases (11.02%).

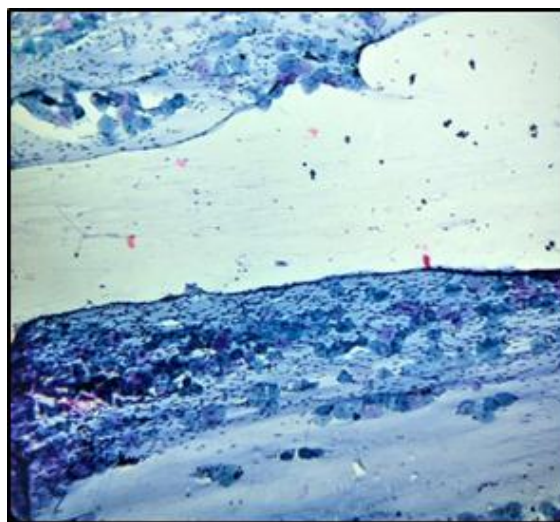


Figure 1: Inflammatory Smear (4x)

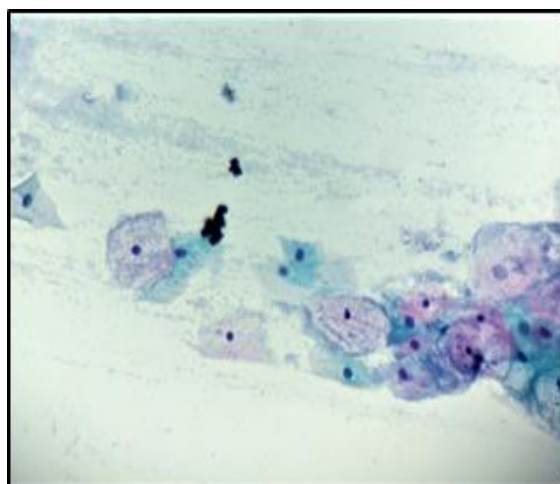


Figure 2: Bacterial Vaginosis (10x)

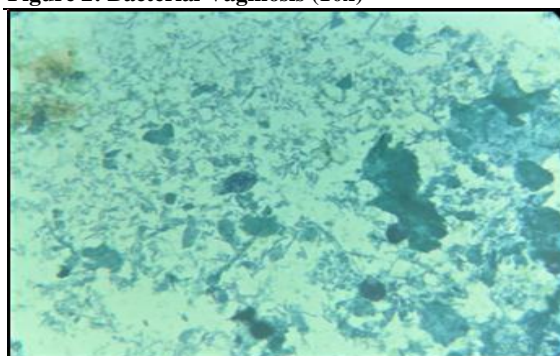


Figure 3: Trichomonas Vaginalis (40x)

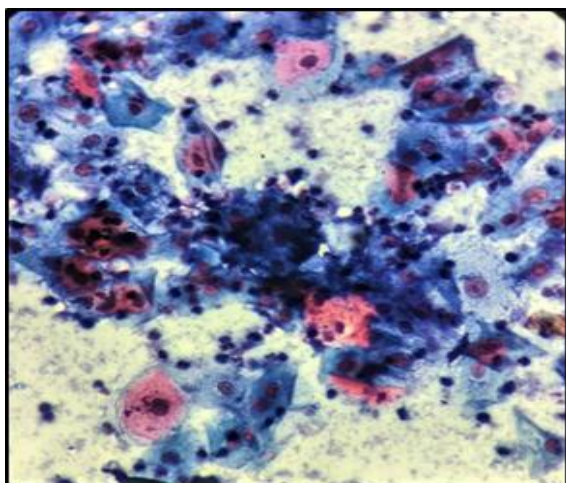


Figure 4: LSIL (40x)

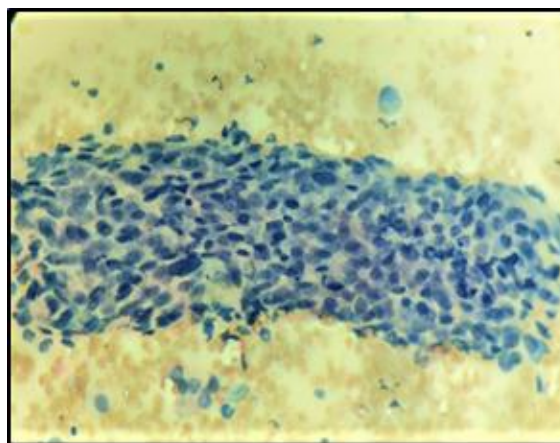


Figure 6: SCC (40x)

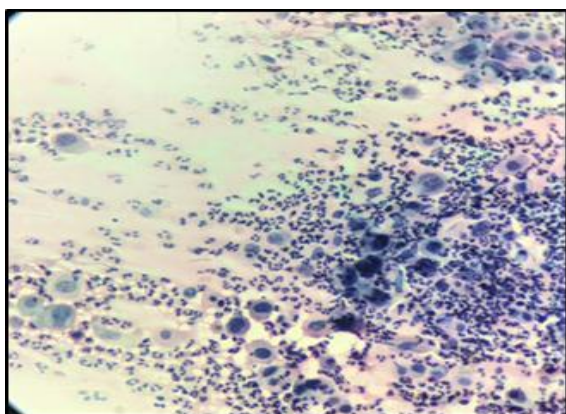


Figure 5: HSIL (40x)

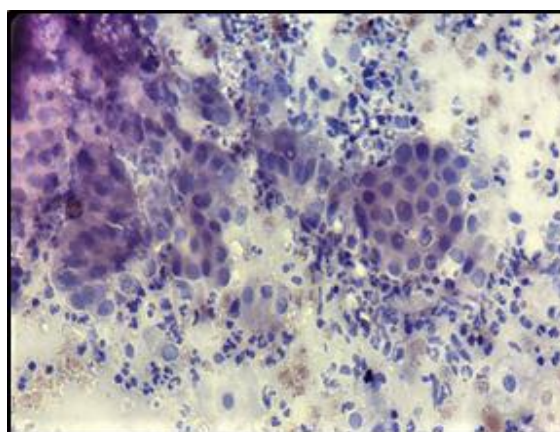


Figure 7: AGUS (40x)

Table 1: Distribution of cases according to age

Age Group	No. Of Cases	Percentage (%)
<= 20 years	12	2.44
21-30 years	129	26.32
31-40 years	157	32.04
41-50 years	135	27.55
51-60 years	34	6.93
61-70 years	12	2.44
71-80 years	11	2.24
TOTAL	490	100

Table 2: Distribution of cases according to category

Sr. No	Main Category	Sub category	Number of cases	Percentage (%)
I	Unsatisfactory		42	8.57
II	Satisfactory			
	NILM	Only NILM	153	31.22
		Inflammatory	166	33.88
		Reactive due to inflammation	51	10.41
		Bacterial vaginosis	25	5.1
A		Candidiasis	6	1.22
		Trichomonas vaginalis	1	0.2
		Atrophy	4	0.82
		Atrophic vaginitis	2	0.41
B	Epithelial cell abnormalities			
	Squamouscell abnormalities	ASC-US	26	5.31
		ASC-H	3	0.61
1		LSIL	5	1.02
		HSIL	4	0.82
		SCC	1	0.2
2	Glandular cell abnormalities	AGUS	1	0.2
	Total		490	100

Table 3: Distribution of cases in numbers according to category and age.

Sr. No	Main category	Sub category	Age group (in years)							Total
			<=20 years	21-30 years	31-40 years	41-50 years	51-60 years	61-70 years	71-80 years	
I	Unsatisfactory		1	9	11	9	7	2	3	42
II	Satisfactory									
A	NILM	Only NILM	6	46	56	40	3	2	0	153
		Inflammatory	3	45	54	50	9	3	2	166
		Reactive due to inflammation	1	17	16	13	2	0	2	51
		Bacterial vaginosis	0	6	13	6	0	0	0	25
		Candidiasis	0	2	2	1	1	0	0	6
		Trichomonas vaginalis	1	0	0	0	0	0	0	1
		Atrophy	0	0	0	0	1	1	2	4
		Atrophic vaginitis	0	0	0	0	1	0	1	2
B	Epithelial cell abnormalities									
1	Squamous cell abnormalities	ASC-US	0	1	3	14	5	2	1	26
		ASC-H	0	1	0	1	1	0	0	3
		LSIL	0	1	1	0	2	1	0	5
		HSIL	0	1	1	1	1	0	0	4
		SCC	0	0	0	0	0	1	0	1
2	Glandular cell abnormalities	AGUS	0	0	0	0	1	0	0	1
	Total	12	129	157	135	34	12	11	490	

Table 4: Distribution of cases in percentage according to category and age.

Sr. No	Main category	Sub category	Age group							Total
			<=20 years	21-30 years	31-40 years	41-50 years	51-60 years	61-70 years	71-80 years	
I	Unsatisfactory		0.20%	1.84%	2.24%	1.84%	1.43%	0.40%	0.61%	8.57%
II	Satisfactory									
A	NILM	Only NILM	1.22%	9.38%	11.42%	8.16%	0.61%	0.40%	0	31.25%
		Inflammatory	0.61%	9.18%	11.02%	10.20%	1.84%	0.61%	0.40%	33.87%
		Reactive due to inflammation	0.20%	3.47%	3.26%	2.65%	0.40%	0	0.40%	10.40%
		Bacterial vaginosis	0	1.22%	2.65%	1.22%	0	0	0	5.13%
		Candidiasis	0	0.40%	0.40%	0.20%	0.20%	0	0	1.22%
		Trichomonas vaginalis	0.20%	0	0	0	0	0	0	0.20%
		Atrophy	0	0	0	0	0.20%	0.20%	0.40%	0.81%
		Atrophic vaginitis	0	0	0	0	0.20%	0	0.20%	0.40%
B	Epithelial cell abnormalities									
1	Squamous cell abnormalities	ASC-US	0	0.20%	0.61%	2.85%	1.02%	0.40%	0.20%	5.30%
		ASC-H	0	0.20%	0	0.20%	0.20%	0	0	0.61%
		LSIL	0	0.20%	0.20%	0	0.40%	0.20%	0	1.03%
		HSIL	0	0.20%	0.20%	0.20%	0.20%	0	0	0.81%
		SCC	0	0	0	0	0	0.20%	0	0.20%
2	Glandular Cell Abnormalities	AGUS	0	0	0	0	0.20%	0	0	0.20%
	Total	2.45%	26.32%	32.05%	27.55%	6.93%	2.45%	2.25%	100%	

DISCUSSION

Papanicolaou staining of cervical smears was introduced in the 1940's and was the major reason for the decrease in rate of cervical cancer associated morbidity and mortality in developed countries during the last half of the 20th century.^[12]

NCRP (National cancer registry program) of India reports breast and uterine cervical cancer as the leading cause of malignancies in Indian women.^[13]

In India cervical cancer is the third largest cause of cancer mortality accounting for nearly 10% of all cancer related deaths in the country.^[14]

Pap smear is a very effective screening method to detect cervical cancer.^[2] Pap smear with HPV DNA is proposed as a screening method every 5 years according to the American Cancer society 2012.^[15] Pap smears using standardized reporting criteria 'The Bethesda system 2014' greatly aids in directing appropriate management by identifying precursor lesions at an early stage.^[16,17]

In our study, majority of the patients were in the age group of 31-40 years (32.04%) and similar age group was seen in the study done by Valiya LG et al (34.11%) and Thushara K et al.^[18,20] Total unsatisfactory smears accounted for 8.57% similar to the study done by Lahari NA et al.^[20] Negative for intraepithelial lesions or malignancy (NILM) without nonspecific inflammation was seen in 31.25% and NILM with inflammation was seen in 33.87%, the latter similar to the study done by Valiya LG et al (33.82%).^[18]

Reactive changes due to inflammation were seen in 10.40% which was slightly higher in comparison to the study done by Zubair AA et al.^[21]

Majority of the cases of NILM and inflammatory smears were seen in the age group of 31-40 years which is comparable to the study done by Thushara K et al^[19] and Das D et al.^[22] Cases of NILM with atrophic smears were seen in 0.4% of cases in our study similar to the study done by Valiya LG et al,^[18] and those associated with inflammation were seen in 0.8% cases which is lesser compared to the study done by Indu Verma et al,^[23] and Valiya LG et al.^[18]

The epithelial cell abnormalities in our study were 8.16% similar to the findings of Elhakem et al,^[24] (7.9%) and Sachan et al.^[2]

In the present study ASC-US was the predominant type of epithelial cell abnormality constituting about 5.3%, similar to the study of Bamanikar et al,^[25] (2.32%) and it was mostly seen in the age group of 41-50 years (2.85%) similar to the study done by Das D et al,^[22] and Thushara K et al.^[19]

The second most common epithelial cell abnormality seen was LSIL (1.03%) comparable to the observations of Vassilakos et al,^[26] and was most commonly represented in the age group of 51-60 years (0.4%) in accordance with the study done by Purohit et al.^[27]

The representation of ASC-H (0.6%), HSIL (0.81%), SCC (0.2%), in our study compares with the study done by Valiya LG et al,^[18] Verma et al,^[23] and Edelman et al respectively.^[28]

According to the various studies, carcinoma of cervix commonly occurs in the 5th decade, but precursor lesions develop 5-10 years before the onset of invasive malignancy.^[29] Our study showed HSIL to be more common in the age group of 51-60 years which is similar to the study done by Thushara K et al (0.76%) and Das D et al.^[19,22]

Our study showed only 1 case of SCC between 61-70 years while the study done by Purohit et al showed equal distribution in both 51-60 years and 61-70 years age groups.

In our study, occurrence of AGUS (0.2%) was slightly higher compared to the findings of Maleki et al (0.1%).^[30] The most common age group for AGUS was 61-70 years similar to the study done by Thushara k et al.^[19]

CONCLUSION

Application of The Bethesda System for reporting of the cervical smears helps in accurate diagnosis and classification of the lesions into inflammatory, infective and neoplastic categories. This aids in instituting early and appropriate treatment protocols and determining the prognosis.

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