



CYTOMORPHOLOGICAL SPECTRUM OF CERVICAL PAP SMEARS IN A TERTIARY CARE HOSPITAL IN COASTAL KARNATAKA

Pathology

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ABSTRACT

Background: Cervical cancer is the second most common cancer among women in India, primarily due to limited healthcare access and low awareness of screening tests. Papanicolaou (Pap) smear is a key method in cervical cancer screening. Effective prevention through HPV vaccination and regular screening has made cervical cancer highly preventable. **Objective:** 1. To study the spectrum of cervical smear patterns and clinical profile. 2. To correlate the Pap smear with histopathology wherever possible. **Materials And Methods:** This is a retrospective observational study conducted at the Department of Pathology, in the section of Cytology between 01-01-2023 and 31-08-2023 involving the examination of Papanicolaou (Pap) smears and histopathological correlation done wherever possible. The conventional method of Pap smears was employed, 2014 Bethesda System for reporting cervical cytology was used for reporting. **Results:** Over the study period of 8 months, 444 pap smears were examined in the age group 16-86 years. The most common age group was 40-60 years. The most common presentation was white discharge per vagina followed by bleeding PV. "Negative for intraepithelial lesion or malignancy" being the most common interpretation (61.8%). Epithelial cell abnormality was seen in 2.91% of cases. ASCUS (1.57%), ASC-H (0.22%), HSIL (1.12%), AGUS (0.22%) were seen. 31 cases were available for cyto-histopathological correlation. 67.7% were concordant with the cytology. **Conclusions:** The frequency of epithelial cell abnormality in our set up was relatively low overall, with ASCUS being the most common abnormality. Among the available histopathology cases, significant number were concordant with Pap smears.

KEYWORDS

Cervical Pap smears, Spectrum of Pap smears, Cyto-histopathology correlation.

INTRODUCTION:

Globally cervical cancer ranks as the fourth most frequently diagnosed cancer in females. It stands as a significant contributor to cancer-related deaths, holding the second position in India in terms of mortality rates (1). Human papillomavirus (HPV) is a well-known causative factor in cervical cancer development. Although about 90% of HPV infections clear up within two years, persistent infections heighten the risk of precancerous lesions, which can progress to invasive cancers over a period of 10 to 15 years. This interval provides numerous opportunities for early detection (2). Detecting cervical cancer at an early stage greatly improves the chances of successful treatment (3). Since the implementation of the cervical Papanicolaou (Pap) smear in the 1940s, there has been a notable decline in the occurrence and fatality rates linked to cervical cancer. Screening has led to not only the enhanced identification of early-stage invasive cancer but also the detection and subsequent treatment of precancerous lesions (4). Initially, the interpretation of Pap smears was subjective resulting in significant interobserver variability. Therefore, The Bethesda System for Reporting Cervical Cytopathology (TBSRCC) was introduced by a group of clinicians and cytopathologists to standardize reporting. Several revisions have been made to TBSRCC, with the latest occurring in 2014 (5). The standard practice worldwide for an abnormal Pap smear results is to confirm with a cervical biopsy. The agreement between Pap smear and cervical biopsy results can vary widely among pathologists, ranging from 40% to 95%, due to factors such as lesion regression, sampling or analytical errors. Conducting a study on cyto-histopathology correlation can aid in determining the level of agreement between Pap smear and cervical biopsy, thereby helping to establish the sensitivity of Pap smear testing (6).

Keeping all this in view, the present study was conducted to analyse cytomorphological spectrum, clinical profile of cervical lesions and correlate the pap smears with histopathology wherever possible.

Objective:

1. To study the spectrum of cervical smear pattern and clinical profile.
2. To correlate the Pap smear with histopathology wherever possible.

MATERIALS AND METHODS:

This retrospective observational study was conducted at Department of Pathology, in the section of cytology from January 1, 2023, to August 31, 2023 involving the examination of Pap smears. Details of each patient, clinical presentation and Pap smear report were extracted from the requisition forms and cytopathology reports.

Histopathological correlation was done wherever possible. Conventional method of Pap smears was employed and stained using Pap stain. The 2014 Bethesda System was employed for comprehensive reporting of cervical cytology.

Study Population: The study included all women aged 18 years and older who underwent cervical Pap smear examinations.

Data Analysis:

Data is tabulated in Microsoft excel and analysed using Jamovi software 2.3.28.

RESULTS:

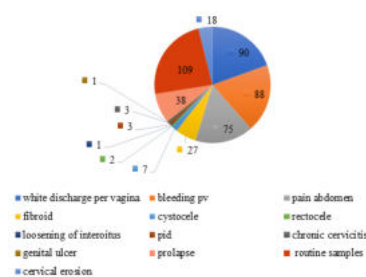
Four hundred and forty-four cervicovaginal Pap smear cases were identified during the study period. The age of the patients ranged from 18 to 80 years. The mean age was 42.4 years. The most prevalent age group was 40-60 years, comprising 49.5% (220 out of 444 cases), followed by 20-39 years (42.6%, 189 out of 444 cases) and more than 60 years (7.7%, 34 out of 444 cases). One case belonged to age less than 20 years (0.2%, 01 out of 444 cases) [Table 1].

Table 1

Age groups	Counts	% of total
Less than 20years	1	0.2 %
20-39 years	189	42.6 %
40-60 years	220	49.5 %
More than 60 years	34	7.7 %

Among the clinical presentation and examination findings, 24% cases were for routine examination (109 out of 444) followed by white discharge per vagina (90 out of 444, 20%) and bleeding per vagina (88 out of 444, 19%) and the least common presentation were loosening of introitus, chronic cervicitis, rectocele (Pie chart 1, table 2).

Clinical presentation



Pie chart – 1

Table 2

Clinical presentation	Age	Number
White discharge per vagina	less than 20years	0
	20-39 years	46
	40-60 years	40
	more than 60 years	4
bleeding per vagina	less than 20years	0
	20-39 years	37
	40-60 years	46
	more than 60 years	5
Pain abdomen	less than 20years	0
	20-39 years	34
	40-60 years	36
	more than 60 years	5
Fibroid	less than 20years	0
	20-39 years	8
	40-60 years	14
	more than 60 years	5

On microscopic examination, majority slides showed non neoplastic cellular changes (409 out of 444, 92%) and 13 out of 444 cases showed epithelial cell abnormalities (2.92%). 1 case showed atypical glandular cells of undetermined significance (0.22%). 21 cases were unsatisfactory for evaluation (4.7%).\

The most frequent diagnosis made was Negative for intra epithelial lesion or malignancy (NILM – 253 out of 409, 61.8%) followed by inflammatory smear (82 out of 409). 43 cases out of 409 are atrophic smear followed by reactive atypia (11 out of 409). The least common diagnosis was candidiasis (4 out of 409).

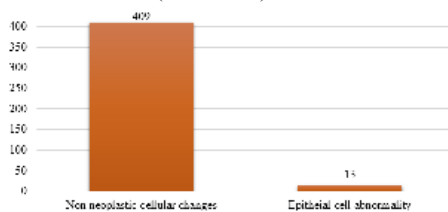


Chart 3

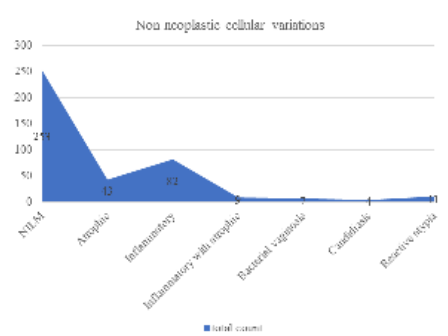


Chart 4

Chart 5 shows the distribution of cases with epithelial cell and glandular cell abnormalities among which, ASCUS (Image-1.1, Image 1.2) is the most common diagnosis (7 out of 14, 50%). Next most common case was HSIL (Image-2.1 and Image 2.2, 5 out of 14, 36%) followed by 1 case of ASC-H (Image 3.1 and image 3.2, 7%) and one case of atypical glandular cells of undetermined significance (Image-4.1 and image 4.2, 7%).

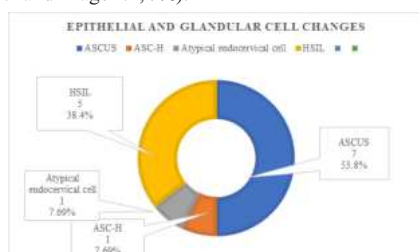


Chart 5

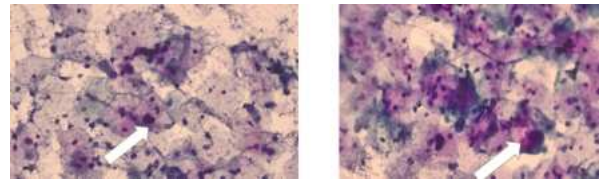


Image 1.1: ASCUS – arrow showing nuclear enlargement (2.5-3 times the nucleus of normal intermediate cell) (20x, Pap stain)

Image 1.2: ASCUS – arrow showing slightly increased N:C ratio with hyperchromatic nuclei (20x, Pap stain)

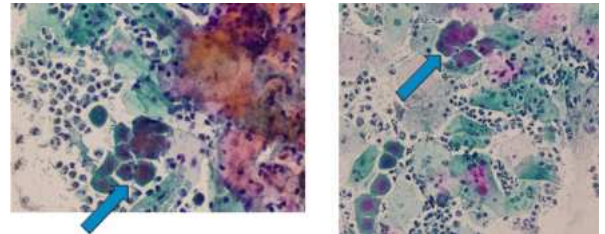


Image 2.1: ASC-H – arrow showing cells in small clusters having enlarged nuclei (20x, Pap stain)

Image 2.2: ASC-H – arrow showing increased N:C ratio with minimal nuclear membrane irregularity (20x, Pap stain)

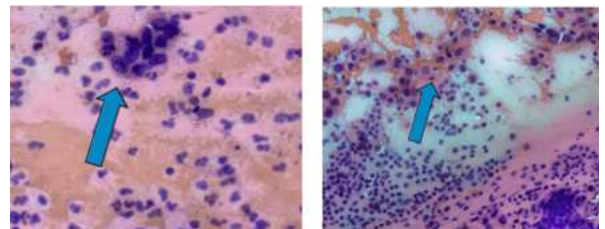


Image 3.1: HSIL - arrow showing cells with high N:C ratio, hyperchromatic nuclei, irregular nuclear membrane. (20x, Pap stain)

Image 3.2: HSIL - arrow showing cells in sheets, with fine granular chromatin. (20x, Pap stain)

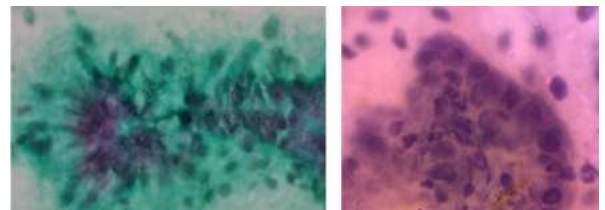


Image 4.1: Atypical glandular cells, NOS- Cells in sheets showing cell overlapping and focal feathering of clusters. (20x, Pap stain)

Image 4.2: Atypical glandular cells, NOS- Cells in sheets showing nuclear enlargement, hyperchromatic nuclei and raised N:C ratio. (20x, Pap stain)

During the study period, 31 cases were available for histopathological correlation. 21 cases were concordant with the Pap smears and 10 were discordant (chart 6, table 3). 2 cases of NILM were diagnosed as CIN-1, 1 case of HSIL was diagnosed as CIN-2 and 1 case of ASCUS was diagnosed as chronic polypoidal cervicitis.

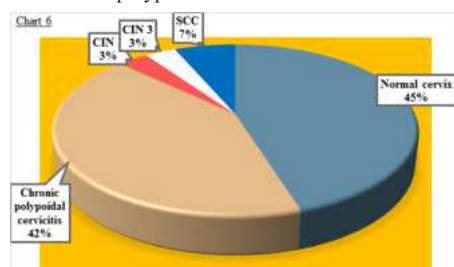


Table 3

CYTOLOGY DIAGNOSIS	HISTOPATHOLOGY DIAGNOSIS
NILM	Normal histology cervix (13)

	Chronic polypoidal cervicitis (6)
	CIN 1 (2)
INFLAMMATORY	Chronic polypoidal cervicitis (7)
HSIL	CIN 3 (1)
	SCC (1)
ASCUS	Chronic polypoidal cervicitis (1)

DISCUSSION

Cervical cancer is largely preventable with effective screening, diagnostic, and treatment methods. The early detection of cervical cancer, identifying it at pre-invasive stages was easier with the introduction of the Pap smear by Papanicolaou and Traut in 1944 thus significantly reducing morbidity and mortality. This highlights the immediate need for comprehensive cervical cancer control programs in developing countries. (7)

In the present study, the age of the patients ranged from 18 to 80 years. Similar to the study conducted by Gothwal et al, the mean age in our study population was 42.4 years, the median age was 41 years, and the mode was 42 years (3). The most prevalent age group was 40-60 years, comprising 49.5% (220 out of 444 cases).

Among the clinical presentation and examination findings, 76% cases were symptomatic, among which white discharge per vagina (90 out of 444, 20%) was the most common symptom and was seen frequently among the women aged 20-39 years followed by bleeding per vagina (88 out of 444, 19%) which was seen mostly among the women aged 40-60 years similar findings were noted by Sethy et al and Gothwal et al (1,3)

On microscopic examination, majority showed non neoplastic cellular changes (409 out of 444, 92%). The most frequent diagnosis made in our study was negative for intra epithelial lesion or malignancy (NILM – 253 out of 409, 61.8%) followed by inflammatory smear (82 out of 409, 20%) which was similar to the studies conducted by Sethy et al, Kanthimathy et al, Garg et al (1,2,5). A study conducted by Sachan et al shows 48.8% cases of NILM and 42.66% cases with inflammation. For case reported with inflammation, they recommended repeating the Pap smear after completing an appropriate course of antibiotics. (8)

13 out of 444 cases showed epithelial cell abnormalities (2.92%) similar to the study conducted by Garg et al (5) ASCUS is the most common diagnosis (7 out of 13, 53.8%) which was also seen in the study conducted by Agarwal et al (9). Next most common case was HSIL (5 out of 13, 38.4%) followed by 1 case of ASC-H (7.69%). One case of atypical glandular cell of undetermined significance was diagnosed (7%). These findings are similar to the observation by Malpani et al (10).

The prevalence of epithelial cell abnormalities varies significantly worldwide, ranging from 0.98% to 15.5% (11) In the United States, the percentage of these abnormalities has been between 2.3% and 6.6%, while in the Middle East it ranges from 1.6% to 7.9%, and in India, it ranges from 1.87% to 5.9%. This wide variation can be attributed to several factors, such as differing diagnostic criteria for lesions, variations in sample sizes, and differences in the prevalence of risk factors among the populations studied by various groups (12)

Study conducted by Laxmi et al, Vedavathi et al and Majumdar et al shows 10.06 % and 9.0 % prevalence of epithelial cell abnormality respectively, whereas our study shows prevalence of 3.29% which is comparable with studies conducted by Agrawal et al. (9,13–15)

In the present study, 21 cases were unsatisfactory for evaluation (4.7%) which is similar to the study conducted by Agrawal et al, whereas study by Umrani et al had 132 (9.3%) unsatisfactory smears for evaluation out of 1418 cases. (9,16)

31 cases for histopathology were available for correlation. 21 cases were concordant with the Pap smears and 10 were discordant. The correlation between Pap smear and histopathology results in our study was 67.7%, which falls within the range described in the study conducted by Gothwal et al (3). 2 cases of NILM were diagnosed as CIN-1, 1 case of HSIL was diagnosed as CIN-2 and 1 case if ASCUS was diagnosed as chronic polypoidal cervicitis. The observed discrepancies, such as NILM patients being identified as CIN-1 on biopsy and HSIL cases being diagnosed as CIN-2, underscore the difficulties in cytological interpretation and the importance of

histological confirmation. These variations may be caused by sampling errors, the subjective nature of cytological interpretation, and the possibility of lesion recurrence or advancement between the Pap smear and biopsy.

The discrepancies between Pap smear and histopathology results may be attributed to sampling errors, lesion regression or progression, and inherent differences in the sensitivity and specificity of cytology compared to histopathology (16).

The present study draws valuable comparisons with past research, establishing the prevalence of epithelial cell abnormalities in our area. It highlights the need for repeat Pap tests in inflammatory cases, improving patient follow-up. The study emphasizes the role of early detection in reducing cervical cancer morbidity and mortality, reinforcing the importance of regular screening programs such as Pap smears

It helps in understanding the common clinical presentations and most affected age groups which will help design targeted educational and screening interventions. The present study can initiate a health care policy and imbibe cervical Pap smears in routine screening as a part of cervical cancer prevention and management in our region The study included only those women who underwent cervical Pap smear examinations. Certain segments of women who do not seek regular medical care or asymptomatic individuals are less likely to be screened.

The study also lacked detailed follow-up data for all patients, particularly those with abnormal Pap smear results who did not undergo histopathological examination. This limited the ability to fully assess the progression of detected abnormalities.

The interpretation of Pap smears and histopathological results can be subjective and may vary between pathologists. Although the Bethesda System helps standardize reporting, inter-observer variability can still occur.

CONCLUSION

This study sheds light on the cytomorphological spectrum of cervical lesions and the relationship between Pap smear and histopathology results. The findings emphasize the significance of routine cervical screening and histological confirmation of cytological abnormalities. By addressing the limitations and identifying opportunities for future research, we can improve the efficacy of cervical cancer screening programs and, ultimately, lower the burden of this major public health concern.

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