

## CERVICO-VAGINAL CYTOLOGY AND ADVANTAGES OF ITS CLASSIFICATION BY THE BETHESDA SYSTEM

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### ABSTRACT

**Objective(s):** To study the cervicovaginal cytology and advantages of its classification by The Bethesda System 2014. **Method(s):** A prospective study was carried out comprising 500 married women between the age of 25 to 65 years attending Gynaecology OPD at tertiary care hospital. These were subjected to pap's smear and classified according to The Bethesda System 2014. In selected cases, a cervical biopsy was done. The cytohistological correlation was obtained. **Results:** Out of 500 women subjected to cytological evaluation only 35 patients had epithelial cell abnormality and 84 patients showed infective organisms in pap's smear reporting. The cytohistological correlation was 84.23% with 84.61% sensitivity and 97.80% specificity. **Conclusion(s):** Classification of cervicovaginal cytology by The Bethesda System 2014 is of immense value as it categorises not only the premalignant and malignant lesions but also atypical, inflammatory and infectious lesions, so cost-effectiveness of cervicovaginal cytology is increased.

**Keywords:** The Bethesda System, cytology, histology

### INTRODUCTION

Cervical cancer is the fourth most frequent cancer in women with an estimated 5,70,000 new cases in 2018 representing 6.6% of all female cancers. Approximately 90% of deaths from cervical cancer occurred in low and middle-income countries. The high mortality from cervical cancer globally could be reduced through a comprehensive approach that includes prevention, early diagnosis, effective screening and treatment programmes (1).

India alone accounts for one-quarter of the worldwide burden of cervical cancer. It is one of the leading cause of cancer mortality, accounts for 17% of all cancer deaths among women aged between 30 and 69

years. It is estimated that cervical cancer will occur in approx. 1 in 53 Indian women during their lifetime compared with 1 in 100 women during their lifetime in the more developed region of the world (2, 3).

The historical landmark in the detection of preinvasive cervical cancer is the introduction of cytology in gynaecological practice by George Papanicolaou in 1943. Thereafter, multiple systems have been established for classification of cervical cytology including Papanicolaou classification, Walters and Regan classification, Recharts classification and WHO classification but, none of these was found satisfactory because of lack of uniformity and reproducibility, so

to overcome this controversial situation concerning nomenclature of pap's smear uniform classification system has developed in the form of The Bethesda System.

The Bethesda system (TBS) is a system for reporting cervical and vaginal cytologic diagnosis used for reporting Pap smear results (4). It was introduced in 1988 and revised in 1991, 2001, and 2014 (5, 6, 7, 8, 9). The name comes from the location (Bethesda Maryland ) of the conference that established the system4.

In the Bethesda system, 2014 cytology report is divided into

### **THE 2014 BETHESDA SYSTEM9**

#### **SPECIMEN TYPE:**

Indicate conventional smear (Pap smear) vs liquid-based preparation vs other.

#### **SPECIMEN ADEQUACY**

Satisfactory for evaluation (describe presence/absence of endocervical/transformation zone component and any other quality indicators, e.g., partially obscuring blood, inflammation, etc.)

Unsatisfactory for evaluation . . . (Specify reason)

Specimen rejected/not processed (Specify reason)

#### **GENERAL CATEGORIZATION (optional)**

#### **INTERPRETATION/RESULT**

#### **NEGATIVE FOR INTRAEPITHELIAL LESION OR MALIGNANCY**

#### **Non-Neoplastic Findings (optional to report)**

Non-neoplastic cellular variations

- Squamous metaplasia
- Keratotic changes
- Tubal metaplasia
- Atrophy
- Pregnancy-associated changes

Reactive cellular changes associated with:

- Inflammation
- Lymphocytic (follicular) cervicitis
- Radiation
- Intrauterine contraceptive device (IUD)

Glandular cells status post hysterectomy

#### **Organisms**

- Trichomonas vaginalis
- Fungal organisms are morphologically consistent with Candida spp.
- The shift in flora suggestive of bacterial vaginosis
- Bacteria are morphologically consistent with Actinomyces spp.
- Cellular changes consistent with herpes simplex virus
- Cellular changes consistent with cytomegalovirus

#### **OTHER**

Endometrial cells (in a woman 45 years of age) (Specify if “negative for squamous intraepithelial lesion”)

#### **EPITHELIAL CELL ABNORMALITIES**

##### **SQUAMOUS CELL**

Atypical squamous cells

- Of undetermined significance (ASC-US)
- cannot exclude HSIL (ASC-H)

Low-grade squamous intraepithelial lesion (LSIL)

(Encompassing: HPV/mild dysplasia/CIN 1)

High-grade squamous intraepithelial lesion (HSIL)

(Encompassing: moderate and severe dysplasia, CIS; CIN 2 and CIN 3)

With features suspicious for invasion (if the invasion is suspected)

Squamous cell carcinoma

##### **GLANDULAR CELL**

#### **MATERIALS & METHODS**

This study was conducted in Department of Obstetrics and Gynaecology at RNT medical college and attached hospitals, Udaipur for evaluating cervicovaginal cytology of 500 married female between the age of 25-65 years and then classified according to The Bethesda System 2014. Female who are pregnant or having menstrual bleeding were not included. Female is having a history of any surgical procedure on cervix within three months and confirmed cases of cervical carcinoma were also not included in the study.

After a thorough history and examination of patients, The Pap's smear was taken with the help of Ayre's

spatula, and smear was fixed in 95% alcohol for 20 minutes and stained and examined under microscopes. Pap's smear was classified according to The Bethesda System 2014. Patients with abnormal cytology and patients in the age group 35-65 years with inflammatory smear were chosen as a candidate for cervical biopsy. The cytohistological correlation was obtained after comparing cytology and histopathology report.

## RESULTS

Among 500 pap smear taken in our study 480 were found to be satisfactory for evaluation while 20 pap smear was found to be unsatisfactory for evaluation due to insufficient material or smear having dried up. These patients were subjected to repeat smears, and ultimately all could be studied satisfactorily. 465 patients were found Negative for intraepithelial lesions, and 35 were found to have epithelial cell abnormality. Among 465 patients in whom no intraepithelial lesion or malignancy was found, 216 patients had normal pap's smear, 165 patients had reactive cellular changes associated with Inflammation (160), IUCD (3) and atrophic changes (2). Among 84 patients in whom infective organisms were detected; 22 had Trichomonas vaginalis, 28 patients had fungal organism morphologically consistent with Candida species, and 34 patients had shifted in vaginal flora suggestive of Bacterial vaginosis.

Among 35 patients having epithelial cell abnormality 6 patients had ASC-US (Atypical Squamous Cells of Undetermined Significance), 1 had ASC-H (Atypical

Squamous Cells cannot exclude High-grade lesion), 16 has LSIL (Low-Grade Squamous Intraepithelial Lesion), 8 has HSIL (High-Grade Squamous Intraepithelial Lesion) and 4 patients had SCC (Squamous Cell Carcinoma). In 130 selected patients (in whom cytology revealed epithelial cell abnormality or inflammatory smears above 35 years) biopsy cervix was taken, and the results of cytopathology and histopathology were compared. In inflammation detected by cytology, out of 95 cases it was proved histologically in 89 cases. The remaining six patients showed epithelial cell abnormality in the form of atypical cell pattern (=3), mild dysplasia (=2) and moderate to severe dysplasia (=1). Out of 7 cases which were detected as atypical squamous cells by cytology, histopathology revealed chronic cervicitis in 2, atypical cell pattern in 1, mild dysplasia in 3 and moderate to severe dysplasia in one. Out of 16 cases diagnosed as LSIL histopathology revealed atypical cells in 2, mild dysplasia in 12 and moderate to severe dysplasia in 2 cases. Out of 8 cases showing HSIL on cytology, histopathology confirmed moderate to severe dysplasia in 6, while 2 cases were found to have invasive squamous cell carcinoma. All 4 cases showing squamous cell carcinoma in cytology were confirmed by biopsy.

Correlation of epithelial cell with higher age group was highly significant while it was significant with lower socioeconomic status, illiteracy, high parity and early age at first coitus. Abnormal cytology was more common in hypertrophied cervix and cervix that bleeds on touch.

**Table 1. Distribution of patients according to major complaints**

<b>complaints</b>	<b>No. of cases (n)</b>	<b>Percentage (%)</b>
<b>Excessive discharge per vaginum</b>	<b>225</b>	<b>45</b>
<b>Pain lower abdomen</b>	<b>177</b>	<b>35.4</b>
<b>Pruritus vulvae</b>	<b>25</b>	<b>5</b>
<b>Intermenstrual bleeding</b>	<b>25</b>	<b>5</b>
<b>Postcoital bleeding</b>	<b>12</b>	<b>2.4</b>
<b>Postmenopausal bleeding</b>	<b>50</b>	<b>10</b>
<b>Dyspareunia</b>	<b>38</b>	<b>7.6</b>
<b>Burning micturition</b>	<b>25</b>	<b>5</b>

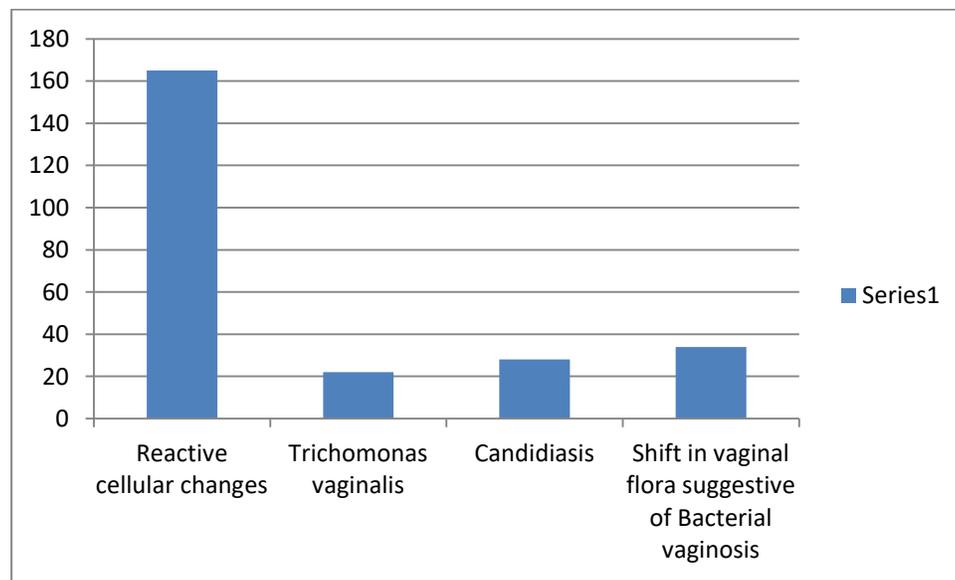
**Table 2. Distribution of patients according to the clinical appearance of the cervix (per speculum examination)**

The appearance of cervix on per speculum examination	No. of cases (n)	Percentage (%)
Healthy looking	160	32
Eroded	114	22.8
Red and inflamed	98	19.6
Hypertrophied	85	17
Bleeds on touch	30	6
Any visible growth	13	2.6
<b>Total</b>	<b>500</b>	<b>100</b>

**Table 3. Correlation Between Cytology and Histopathology**

Cytology	Total No. of Cases	Chronic Cervicitis	Atypical cells	Histopathology		
				Mild dysplasia CIN (LSIL)	Moderate to severe dysplasia CIN II, III, CIS (HSIL)	Invasive SCC
Inflammatory	95	89	3	2	1	-
ASCUS + ASC-H	(6 + 1)	2	1	3	1	-
LSIL	16	-	2	12	2	-
HSIL	8	-	-	-	6	2
SCC	4	-	-	-	-	4
<b>Total</b>	<b>130</b>	<b>91</b>	<b>6</b>	<b>17</b>	<b>10</b>	<b>6</b>

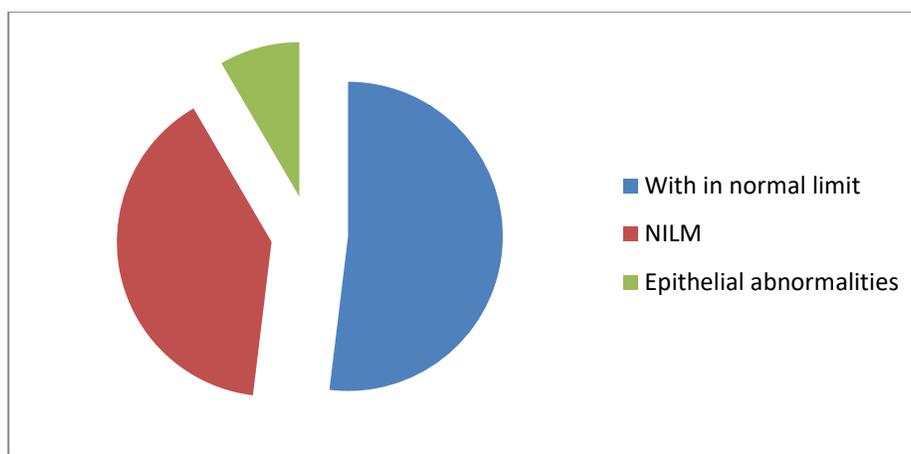
**Fig-1. Pattern of Cervical /vaginal lesions reported as NILM**



**Table4.Distribution of Patients According to The Bethesda System (2001) for Cytologic Diagnosis**

<b>Specimen Adequacy</b>	
Satisfactory for evaluation	480
Unsatisfactory for evaluation	20
<b>General Categorization</b>	
Negative for intra-epithelial lesion	465
Epithelial cell abnormality	35
Others	
<b>Interpretation / Result</b>	
<i>a) Negative for intra-epithelial lesion or malignancy</i>	
<b><u>I. Normal</u></b>	216
<b><u>II. Organisms</u></b>	84
<i>Trichomonas vaginalis</i>	22
<i>Fungal Organisms</i>	28
<i>The shift in flora suggestive of Bacterial Vaginosis</i>	34
<i>Actinomyces Species</i>	-
<i>HSV associated cellular changes</i>	-
<b><u>III. Other non-neoplastic findings</u></b>	-
<b><u>IV. Reactive cellular changes associated with</u></b>	
<i>I. Inflammation</i>	160
<i>II. Radiation</i>	-
<i>III. IUCD</i>	3
<i>IV. Glandular cell status post hysterectomy</i>	-
<i>V. Atrophy</i>	2
<i>b) Epithelial Cell abnormality</i>	
<i>I. Squamous cell abnormality</i>	
<i>II. Glandular cell abnormality</i>	35
	-

**Fig-2. Pattern of Cervical /vaginal lesions in pap smear**



## DISCUSSION

In present study out of 500 smears 96% were satisfactory for evaluation, similar findings were reported by Shrivastava M et al. in 2011 (91.02%), Vijay Kumar Bodal et al. in 2014 96% and Verma et al. in 2014 reported 97.6% of satisfactory smears. (10, 11, 12)

In this study non-specific inflammatory lesions show the highest percentage 33% in comparison of other authors Shrivastava M et al. in 2011, Vijay Kumar Bodal et al. in 2014 and Kishor H, Suryawanshi et al. in 2013. (10, 11, 13)

In the present study, candidiasis was reported in 2.4% of cases similar study reported by Shrivastava M et al. in 2014. (10)

In our study, the correlation between cytology and histology was 89.23% which was near to 88.25% in Jajoo Karuna et al. study. (14)

In comparison to histopathology for atypical cells sensitivity of cytology is 84.61% and specificity is 97.80%. For LSIL and above lesions sensitivity of cytology is 78.78% and specificity is 97.935. For HSIL and above lesions sensitivity of cytology is 75% and specificity is 100% and for detection of squamous cell carcinoma sensitivity of cytology is 66.66% while specificity is 100%.

Recent studies by the Agency for Healthcare and Policy Research (AFHCPR) concluded that the sensitivity of pap's smear was 51% which increased with three annual smears to 86.85. (15)

The multicentric study in India evaluated the accuracy of conventional cytology. The study considered three thresholds to define proclivity - ASCUS, LSIL and HSIL. The sensitivity was found to vary from 37.8 - 81.3% for ASCUS, 28.9 - 76.9% for LSIL and 24.4 - 72.3% for HSIL between the centres. (16)

## CONCLUSION

To conclude "The Bethesda System 2014" for the classification of cervicovaginal cytology is the vital link between cytologist, histopathologist and clinician for better communication in patient management. It

categorizes not only the premalignant and malignant lesion but also atypical, inflammatory and infectious lesions.

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