

Cytological Pattern of Cervical Smears in Leukorrhea

Sanjay N Parate¹, Arushi Gupta², Ashwini Wadadekar³

¹Professor and MD, Department of Pathology, Government Medical College and Super Specialty Hospital, Nagpur, Maharashtra, India, ²Senior Resident and MD, Department of Pathology, Government Medical College, Nagpur, Maharashtra, India, ³Resident, Department of Pathology, Government Medical College, Nagpur, Maharashtra, India

Abstract

Introduction: Leukorrhea, one of the major problems in gynecological practice, can be “physiological” or “pathological.” Common pathological causes are vaginitis, cervicitis, and cancers.

Purpose: To study the spectrum of cytological changes in leukorrhea according to The Bethesda System 2001; and to evaluate the role of cytology in early detection of cervical intraepithelial lesions and malignancies in patients of leukorrhea.

Materials and Methods: A total of 2544 cases were studied. Cervical scrape smears were taken and reported according to The Bethesda system, 2001.

Results: Out of 2544 cases, 2430 (95.52%) smears were adequate. A majority of 2216 (91.19%) were “Negative for intraepithelial lesion or malignancy” and 1402 (57.70%) smears revealed “Reactive cellular changes associated with inflammation” (RCCI). Specific infections were diagnosed in 392 (16.13%) smears. *Trichomonas vaginalis* was found to be the most common infectious agent 251 (10.33%) cases. 326 (13.41%) smears were “within normal limits.” “Epithelial cell abnormalities” were detected in 212 (8.73%) smears. Of these, low-grade squamous intraepithelial lesion was most common 108 (4.44%). Atypical squamous cells of undetermined significance, high-grade squamous intraepithelial lesion, and squamous cell carcinoma were diagnosed in 6 (0.25%), 23 (0.94%), and 50 (2.06%) smears, respectively.

Conclusions: The Bethesda System of Classification, 2001, was found to be very useful. The most common finding in leukorrhea was RCCI. Infectious agents were identified in 16.13% cases and *T. vaginalis* was found to be the most common agent. Pap smear provided a simple and inexpensive tool for screening the patients of leukorrhea and helped in early institution of specific treatment.

Key words: Leukorrhea, Pap smear, The Bethesda System 2001

INTRODUCTION

One of the major problems in gynecological practice is “running of white substance in excess amounts” or leukorrhea. Its causes are physiological response, vaginitis, cervicitis, foreign bodies, or carcinoma. In Indian women poor genital hygiene is a major cause. Screening of all symptomatic women complaining of

leukorrhea is necessary to detect cause and to pick up any cervical epithelial abnormalities, as precursor lesions of cancer cervix largely remain asymptomatic. Pap smear screening for cervical cancer and precancerous conditions has been proved to be very effective in cervical cancer prevention and in reducing mortality.¹ It is reliable and inexpensive.

Any diagnostic terminology should enable effective communication with the referring physician about the interpretation of the specimen. The report apart from being scientifically accurate should be easily understood by the treating physicians. The Bethesda System 2001 has clearly mentioned criteria and fixed terminologies making it easy for physician to understand and plan the treatment accordingly.²

Access this article online	
 www.ijss-sn.com	Month of Submission : 11-2016 Month of Peer Review : 12-2016 Month of Acceptance : 12-2016 Month of Publishing : 01-2017

Corresponding Author: Dr. Arushi Gupta, B-103, Maxx Pride, Besides VT Convent, Beltarodi Road, Nagpur - 440 037, Maharashtra, India.
E-mail: dr.arushi1987@gmail.com

The objective of our study was to study the spectrum of cytological changes in leukorrhea according to The Bethesda System 2001 for reporting cervical cytology, and to evaluate the role of cytology in early detection of cervical squamous intraepithelial lesions and cervical malignancy in patients of leukorrhea.

MATERIALS AND METHODS

This study was carried out in a tertiary care institute over a period of 2 years. Total 2544 cases with complaint of leukorrhea were included, irrespective of their age.

Methods

With the patient in lithotomy position, a nonlubricated speculum was introduced in vagina to visualize the cervix. Longer portion of the bifid end of Ayre's spatula was inserted into the external os and rotated 360° maintaining firm pressure so that material is obtained from whole circumference of cervix. The spatula was withdrawn carefully without touching the vaginal wall and material was quickly spread on clean prelabeled slide in circular movements to cause uniform spreading of cells taking care that material from both sides of spatula was spread on the slide. The smear was fixed immediately within 10 s in 95% ethyl alcohol and fixed for a minimum of 30 min.

Smears were stained by the Papanicolaou method of staining.³

All smears were reported as per The Bethesda System 2001 for reporting cervical cytology which consists of four elements as follows:²

- Specimen type
- Specimen adequacy
- General categorization (optional)
- Interpretation/result.

RESULTS

In this study, according to parity, 58 cases (2.28%) were nullipara, 183 cases (7.19%) were para 1, 621 cases (24.41%) were para 2, and maximum cases 1682 (66.12%) were para 3 and above.

Of the total 2544 patients, maximum number of females 2106 (82.78%) had no other associated complaints apart from leukorrhea. 107 women (4.21%) complained of itching, 92 (3.63%) felt something coming out of vagina, 53 (2.08%) had lower backache, 47 (1.84%) had pain in abdomen, 42 (1.65%) had burning micturition, 38 (1.49%) with postmenopausal bleeding, 31 (1.22%) with postcoital

bleeding, 28 women (1.10%) had associated bleeding per vaginam.

Table 1 shows age distribution of the cases in our study. Maximum cases (40.25%) were of 31-40 years of age and minimum cases (0.86%) were of <20 years age.

Out of 2544 smears, 2430 smears (95.52%) were satisfactory for evaluation and 114 smears (4.48%) were unsatisfactory.

Table 2 shows the general categorization of patients into negative for intraepithelial lesion malignancy (NILM), others and epithelial cell abnormalities. Table 3a and b shows complete categorization of smears into further subcategories according to The Bethesda System 2001.² A varied spectrum of organisms was seen in the cervical smears including some common ones like Bacterial vaginosis (Figure 1a), Trichomonas vaginalis (Figure 1b) and candida, and few less common organisms like Herpes Simplex Virus (Figure 1c), Actinomycetes and Microfilaria. We also encountered one case each of cysts of parasites, i.e. *Entamoeba histolytica* and *Enterobius vermicularis* which were later confirmed on stool examination of the respective patient.

DISCUSSION

Since the advent of Pap smear, the incidence of cervical cancers and also the mortality associated with it has greatly decreased due to widespread screening and early detection of epithelial abnormalities. Apart from cancer detection, Pap smear can also be used for detection of certain infections such as candida, trichomonas, herpes, HPV, and actinomycetes.

Table 1: Age distribution of cases

Age group (years)	Number of cases (%)
<20	22 (0.86)
21-30	789 (31.02)
31-40	1024 (40.25)
41-50	429 (16.86)
>50	280 (11.01)
Total	2544 (100.00)

Table 2: General categorization of smears according to The Bethesda System (2001)

General category	Number of smears (%)
NILM	2216 (91.19)
Other	02 (00.08)
Epithelial cell abnormality	212 (08.73)
Total	2430 (100.00)

NILM: Negative for intraepithelial lesion or malignancy

In this study, leukorrhea was the most common complaint among the women screened. Nikumbh *et al.*⁴ and Misra *et al.*⁵ also found leukorrhea to be the most common gynecological complaint. In our study, pruritus vulvae was the most common associated symptom along with leukorrhea while Panda *et al.*⁶ found lower abdominal and lower back pain to be the most common associated symptom and pruritus vulvae the second common associated symptom.

Table 1 shows age distribution of the cases in our study. Maximum cases (40.25%) were of 31-40 years of age and minimum cases (0.86%) were of <20 years age. Nikumbh *et al.*⁴ also found maximum cases (36.5%) to be in 31-40 years of age group. Similarly, Panda *et al.*⁶ also found maximum cases (34%) of age group 31-35 years and minimum cases (4%) of age group 16-20 years.

It was noted that the majority of the women were multiparous, maximum (66.12%) being para 3 and above. Similarly, Nikumbh *et al.*⁴ and Panda *et al.*⁶ also noted maximum cases of para 3 and above, 48% and 71.78%, respectively.

In our study, adequacy was also fairly correlating with other studies. 95.52% smears were satisfactory in our study. Kapila *et al.*,⁷ Misra *et al.*,⁸ Mulay *et al.*,⁹ and Wasti *et al.*¹⁰ had 96.09%, 95.08%, 99.25%, and 99.75% satisfactory smears, respectively.

Table 2 shows general categorization of patients according to The Bethesda System 2001,² into NILM, others and epithelial cell abnormalities, out of which 91.19% were NILM and 8.73% had epithelial cell abnormalities. Similar results were obtained by Banik *et al.*,¹¹ where 91.81% were NILM and 8.19% had epithelial cell abnormalities. Other studies showed slightly less cases of epithelial cell abnormalities. Nikumbh *et al.*⁴ found 94.20% NILM and 5.8% cases of epithelial cell abnormalities. Ghazal-Aswad *et al.*¹² and Ranabhat *et al.*¹³ found 5% and 1.7% cases with epithelial cell abnormalities, respectively.

Table 3 shows complete categorization of smears into different categories according to The Bethesda System 2001. In our study, organisms were seen in 16.13% smears which were much higher than those of Nikumbh *et al.*⁴ 1.93% and Mulay *et al.*⁹ 6.05%.

Among organisms, trichomonas, and candida are the most consistently found organisms in other studies also. They are compared in Table 4.

Finding ova of parasites in cervical smears are also documented earlier in many studies. Martínez-Girón *et al.*¹⁴

Table 3a: Distribution of NILM smears into different categories as per The Bethesda System 2001

S. No.	Category (under NILM)	Number of cases (%)
1.	Normal	326 (13.41)
2.	Organisms	392 (16.13)
	Shift in flora suggestive of bacterial vaginosis	68 (2.80)
	Fungal organisms morphologically consistent with <i>Candida</i> spp.	45 (1.85)
	<i>T. vaginalis</i>	251 (10.33)
	Bacteria morphologically consistent with <i>Actinomyces</i> spp.	2 (0.08)
	Cellular changes consistent with herpes simplex virus	6 (0.25)
	Organisms morphologically consistent with <i>Leptothrix</i>	4 (0.16)
	Organism morphologically consistent with <i>Microfilaria</i>	1 (0.04)
	Organism morphologically consistent with <i>E. histolytica</i>	1 (0.04)
	Organism morphologically consistent with <i>E. vermicularis</i>	1 (0.04)
3.	Other nonneoplastic findings	1498 (61.65)
	Reactive cellular changes associated with Inflammation (includes typical repair)	1402 (57.70)
	Radiation	8 (0.34)
	Intrauterine contraceptive device (IUD)	43 (1.76)
	Glandular cells status posthysterectomy	-
	Atrophy	45 (1.85)
	Total	2216 (91.19)

NILM: Negative for intraepithelial lesion or malignancy, *T. vaginalis*: *Trichomonas vaginalis*, *E. histolytica*: *Entamoeba histolytica*, *E. vermicularis*: *Enterobius vermicularis*

Table 3b: Distribution of smears with epithelial cell abnormalities into different categories according to The Bethesda System 2001

S. No.	Epithelial cell abnormality	Number of cases (%)
A.	Squamous cell abnormalities	
1.	ASCUS*	6 (0.25)
2.	ASC-H**	-
3.	LSIL ***	108 (4.44)
4.	HSIL ****	23 (0.94)
5.	Squamous cell carcinoma	50 (2.06)
B.	Glandular cell abnormalities	
1.	AGUS†	24 (0.99)
2.	Adenocarcinoma in situ	-
3.	Adenocarcinoma	1 (0.04)
	Total	212 (8.73)

*ASCUS: Atypical squamous cells of undetermined significance, **ASC-H: Atypical squamous cells cannot rule out high-grade lesion, ***LSIL: Low-grade squamous intraepithelial lesion, ****HSIL: High-grade squamous intraepithelial lesion, †AGUS: Atypical glandular cells of undetermined significance

and Shetty *et al.*¹⁵ encountered ova of *E. vermicularis* in cervical smears. Similarly, Walter.¹⁶ has reported *Entamoeba* in cervical smears. Although the presence of these parasites is mostly due to contamination, it helps in diagnosis of the stool infection and starting specific therapy for it.

In our study, 61.65% smears were categorized as having “Other nonneoplastic findings.” Whereas according to

Table 4: Comparison of prevalence of *Trichomonas* and *Candida* infection with other studies

Organism	Panda et al. (2013)	Nikumbh et al. (2012)	Mulay et al. (2009)	Wasti et al. (2004)	Misra et al. (1999)	Present study
<i>Trichomonas</i> (%)	6	0.98	0.35	0.61	3.1	10.33
<i>Candida</i> (%)	52	0.66	3.02	3.85	1.2	1.81

Table 5: Comparison of prevalence of epithelial cell abnormalities with other studies

???	Banik et al. (2011)	Balaha et al. (2011)	Nikumbh et al. (2012)	Mulay et al. (2009)	Kapila et al. (2006)	Present study
ASCUS* (%)	0.18	2.99	0.96	0.64	2.2	0.25
ASC-H** (%)	-	0.6	-	-	-	0
LSIL*** (%)	6.36	0.09	0.96	0.216	1	4.44
HSIL† (%)	1.18	0.68	1.98	0.16	0.2	0.94
SCC†† (%)		0.34	1.6		0.05	2.06
AGUS††† (%)	0.12	0.09	0.4	0.316	0.8	0.99
Adenocarcinoma		-	0		-	0.04

*ASCUS: Atypical squamous cells of undetermined significance, **ASC-H: Atypical squamous cells cannot rule out high-grade lesion, ***LSIL: Low-grade squamous intraepithelial lesion, †HSIL: High grade squamous intraepithelial lesion, ††SCC: Squamous cell carcinoma, †††AGUS: Atypical glandular cells of undetermined significance

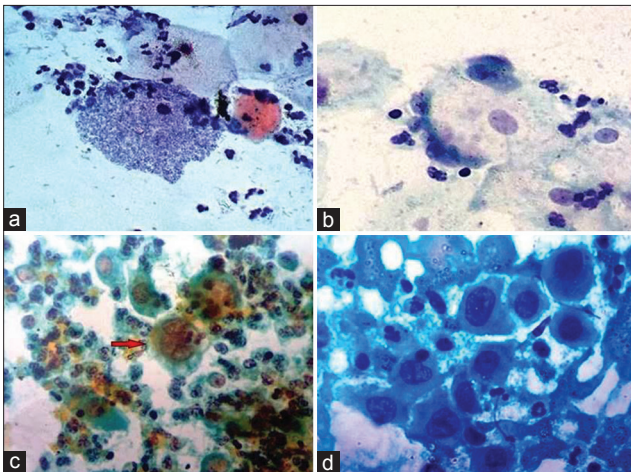


Figure 1: (a) Clue cell; (b) *Trichomonas vaginalis*, sticking to the edges of the squamous cell; (c) cellular changes of herpes simplex virus showing multinucleation, intranuclear inclusions, nuclear molding and margination of chromatin; (d) high-grade squamous intraepithelial lesion

Nikumbh et al.⁴ and Mulay et al.,⁹ 92.36% and 43.02%, respectively, showed “Other nonneoplastic findings.”

Reactive cellular changes of inflammation or nonspecific inflammation were present in 57.70% smears in our study which was similar to findings of Wasti et al.¹⁰ as 59.3%. Nikumbh et al.,⁴ and Mulay et al.⁹ had different findings from ours, 86.19% and 19.61%, respectively.

1.85% smears showed changes of atrophy in our study. Similarly, Balaha et al.¹⁷ and Nikumbh et al.⁴ found 0.34% and 3.29% of cases with changes of atrophy which correlates with our results.

Epithelial cell abnormalities were also further classified as given in Table 3b. A comparison of our study with other studies is shown in Table 5.

CONCLUSION

The Bethesda System 2001 was found to be a very useful diagnostic tool as well as for classification and reporting of cervical smears. The most common cause of leukorrhoea was “Reactive cellular changes associated with inflammation” in 57.70%. Infectious agents were identified in 16.13% among which *T. vaginalis* was found to be the most common. Cervical “epithelial cell abnormalities” were diagnosed in 8.73% cases of leukorrhoea and their prevalence correlated with increasing parity.

Pap smear provided a simple and inexpensive tool for screening the patients of leukorrhoea. Early detection of “Epithelial Cell Abnormalities” and various common as well as uncommon infections helped in early institution of specific treatment, and thus reducing the risk of progression of dysplasia to malignancies.

REFERENCES

- Mukhopadhyay S, Ray S, Dhar S, Bandyopadhyay R, Sinha SK. Evaluation of the category high-grade squamous intraepithelial lesion in the Bethesda system for reporting cervical cytology. *J Cytol* 2013;30:33-5.
- Solomon D, Davey D, Kurman R, Moriarty A, O'Connor D, Prey M, et al. The 2001 Bethesda system: Terminology for reporting results of cervical cytology. *JAMA* 2002;287:2114-9.
- Bales CE. Laboratory techniques. In: Koss LG, editor. *Koss' Diagnostic Cytology and its Histopathological Bases*. 5th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006. p. 1592-8.
- Nikumbh DB, Nikumbh RD, Dombale VD, Jagtap SV, Desai SR. Cervicovaginal cytology: Clinicopathological and social aspect of cervical cancer screening in rural (Maharashtra) India. *Int J Health Sci Res* 2012;1:125-32.
- Misra JS, Das K, Harish A. Cytological studies in women complaining of leucorrhoea. *J Cytol* 1997;14:11-3.
- Panda S, Nagamanasa P, Panda SS, Ramani TV. Incidence of candidiasis and trichomoniasis in leucorrhoea patients. *Int J Curr Res Rev* 2013;5:92-6.
- Kapila K, George SS, Al-Shaheen A, Al-Ottibi MS, Pathan SK, Sheikh ZA, et al. Changing spectrum of squamous cell abnormalities observed on

- Papanicolaou smears in Mubarak Al-Kabeer Hospital, Kuwait, over a 13-year period. *Med Princ Pract* 2006;15:253-9.
8. Misra JS, Das K, Chandrawati. Interpretation of findings of a cytological screening programme according to Bethesda system of classification. *J Cytol* 1999;16:37-42.
 9. Mulay K, Swain M, Patra S, Gowrishankar S. A comparative study of cervical smears in an urban hospital in India and a population-based screening program in Mauritius. *Indian J Pathol Microbiol* 2009;52:34-7.
 10. Wasti S, Ahmed W, Jafri A, Khan B, Sohail R, Hassan S. Analysis of cervical smears in a Muslim population. *Ann Saudi Med* 2004;24:189-92.
 11. Banik U, Bhattacharjee P, Ahamad SU, Rahman Z. Pattern of epithelial cell abnormality in Pap smear: A clinicopathological and demographic correlation. *Cytojournal* 2011;8:8.
 12. Ghazal-Aswad S, Gargash H, Badrinath P, Al-Sharhan MA, Sidky I, Osman N, *et al.* Cervical smear abnormalities in the United Arab Emirates: A pilot study in the Arabian Gulf. *Acta Cytol* 2006;50:41-7.
 13. Ranabhat SK, Shrestha R, Tiwari M. Analysis of abnormal epithelial lesions in cervical Pap smears in Mid-Western Nepal. *J Pathol Nepal* 2011;1:30-3.
 14. Martínez-Girón R, Torre-Bayon C, Tamargo-Peláez ML, López-Cabanilles MD, Morales-del-Burgo P, Ribas-Barceló A. *Enterobius vermicularis* ova in a Pap smear: Typical and uncommon morphology. *Acta Cytol* 2007;51:668-70.
 15. Shetty JB, Kulkarni DV, Prabhu V. Eggs containing larvae of *Enterobius vermicularis* in vaginal smear. *J Cytol* 2012;29:94-6.
 16. Walter A. Diagnosis of amebic vaginitis from cervicovaginal smears. *Acta Cytol* 1982;26:378-9.
 17. Balaha MH, Al Moghannum MS, Al Ghoinem N, Al Omran S. Cytological pattern of cervical Papanicolaou smear in eastern region of Saudi Arabia. *J Cytol* 2011;28:173-7.

How to cite this article: Parate SN, Gupta A, Wadadekar A. Cytological Pattern of Cervical Smears in Leukorrhea. *Int J Sci Stud* 2017;4(10):85-89.

Source of Support: Nil, **Conflict of Interest:** None declared.