



Analysis of Cervical Papanicolaou Smears for two Consecutive Years Using Bethesda System 2014

¹Dr. Paul Ittoop, ²Dr. Rangaswamy R

¹Postgraduate, Dept. of Pathology, Kempegowda Institute of Medical Science, Bengaluru, Karnataka, India

²Professor, Dept. of Pathology, Kempegowda Institute of Medical Science, Bengaluru, Karnataka, India

Citation of this Article: Dr. Paul Ittoop, Dr. Rangaswamy R, “Analysis of Cervical Papanicolaou Smears for two Consecutive Years Using Bethesda System 2014,” IJMSAR – May – 2023, Vol. – 6, Issue - 3, Page No. 11-17.

Copyright: © 2023, Dr. Paul Ittoop, et al. This is an open access journal and article distributed under the terms of the creative common attribution noncommercial License. This allows others to remix, tweak, and build upon the work non commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Corresponding Author: Dr. Paul Ittoop, Postgraduate, Dept. of Pathology, Kempegowda Institute of Medical Science, Bengaluru, Karnataka, India

Type of Publication: Original Research Article

Conflicts of Interest: Nil

ABSTRACT

Introduction

In India, cervical cancer is the third most common cancer and the second leading cause of death among females. Papanicolaou smears helps in detection of malignant and premalignant lesions of cervix. The aim of the study is to determine the prevalence of squamous intraepithelial lesions in different age groups with the help of cervical pap smears.

Materials and Methods

We have studied and analysed 2000 conventional pap smears reported between August 2017 and July 2019. All smears were reported as per the Bethesda system 2014 and abnormalities were calculated in percentages.

Results

Out of 2000 smears studied 36 cases (1.8 %) showed

epithelial abnormalities. Smears were normal in 496 cases (24.8%) Inflammatory in 1168 cases (58.4%), Infectious in 244cases (12.2%),Atypical squamous cells of undetermined significance (ASCUS)in 12 cases (0.6%),low-grade intraepithelial lesion (LSIL)in 14 cases (0.7%),high-grade intraepithelial lesion (HSIL) in 10 cases (0.5%) and inadequate in 56 cases (2.8%).

Conclusion

Study Show Less Prevalence of cervical epithelial abnormalities. Pap smear screening is a safe, simple, and non-invasive test which helps in detection of cervical lesions. Our study suggests women over 25 must undergo yearly Pap smear examination and to be continued in post-menopausal status also.

Keywords

Cervical cancer, Papanicolaou smear, ASCUS, LSIL, HSIL, Screening.

INTRODUCTION

Cervical cancer is one of the major health problems in women worldwide. It stands in fourth place in cancer and its related deaths. In India, cervical cancer is the third most common cancer and the second leading cause of death among females (1). In 2020, cervical cancer was the fourth most common cancer among women globally, with an estimated 604000 new cases and 342000 deaths. About 90% of the new cases and deaths worldwide occurred in low and middle-income countries.

The main cause of cervical cancer is persistent infection with high-risk types of human papillomavirus (HPV) which is transmitted through sexual contact (2). Carcinoma cervix develops from precancerous lesions and if left untreated can develop into carcinoma. It is a preventable cancer because of its long pre-invasive stage. The conventional Pap smear is the basic test done to assess the cervical cell cytology. Pap smear is simple and routinely done as it is minimally invasive and a cost-effective technique. It has evolved from conventional pap smear to liquid based cytology with better standardization. In 1989, the Bethesda system was introduced which was widely accepted for reporting cervical cytology smears. The aims of this study were to analyze cervical papanicolaou smears and report according to the Bethesda System 2014.

MATERIALS AND METHODS

This study was conducted retrospectively from 1st January 2017 to 31st December 2018 (two consecutive years) on 2,000 cervical conventional Papanicolaou smear cases reported in Cytology,

Department of Pathology, Kempegowda Institute of Medical Sciences, Bengaluru(urban), Karnataka, India.

All of the cervical Papanicolaou smear findings were recorded and analyzed according to the Bethesda System 2014. It was classified mainly into negative for intra epithelial lesion / malignancy and epithelial cell abnormalities. The epithelial abnormalities were calculated in percentages.

Inclusion Criteria

- Women with age 21 - 80 years, who attended gynecology OPD with complaints of pain abdomen, discharge per vagina, menstrual irregularities, and postmenopausal bleeding.
- Women with unhealthy cervix or cervical erosion on routine per speculum examination.

Exclusion Criteria

- Women less than 21 years or > 80 years of age and also known and treated cases of cancer cervix.

RESULTS

Out of 2000 smears studied, 36 cases (1.8 %) showed epithelial cell abnormalities. Smears were Normal in 496 cases (24.8%), Inflammatory in 1168 cases (58.4%), Infectious in 244 cases (12.2%), Atypical squamous cells of undetermined significance (ASCUS) in 12 cases (0.6%), Low-grade intraepithelial lesion (LSIL) in 14 cases (0.7%), High-grade intraepithelial lesion (HSIL) in 10 cases (0.5%) and Inadequate in 56 cases (2.8%). In this study, out of 2000 conventional cervical pap smears studied, majority were NIEL/M with inflammation. Smear NIL/M with infection were seen in 244 cases, among which 104 cases were bacterial vaginosis, 82 were candidiasis, and 58 were Trichomonas vaginalis infection.

Table 1: OBSERVED CERVICAL LESIONS IN DIFFERENT AGE GROUPS

Age Group	Total	Inadequate	Counted	NEGATIVE FOR INTRAEPITHELIAL LESION / MALIGNANCY					Epithelial cell abnormalities		
				Normal	With Inflammation	With Infection			ASC-US	LSIL	HSIL
						BV	TV	C			
21-25	76		76	24	33	6	1	12			
25-30	250	2	248	18	192	11	5	22			
31-35	310	4	306	62	195	15	11	23			
36-40	346	3	343	76	210	23	14	18		1	1
41-45	358	15	343	89	201	27	11	4	3	2	6
46-50	334	18	316	107	169	11	13	2	4	8	2
51-55	118	11	107	53	33	8	3	1	5	3	1
56-60	80	3	77	35	39	3					
61-65	72		72	11	61						
66-70	30		30	10	20						
71-75	22		22	11	11						
76-80	4		4		4						
Total	2000	56	1944	496	1168	104	58	82	12	14	10
Total					1944						
Total number of epithelial abnormal cases										36	
Total of Infectious cases							244				

this study, out of 2000 conventional cervical pap smears studied, majority were NIEL/M with inflammation. Smear NIL/M with infection were seen in 244 cases, among which 104 cases were bacterial vaginosis, 82 were candidiasis, and 58 were Trichomonas vaginalis infection.

DISCUSSION

Cervical cancer burden has reduced drastically over the years after the introduction of screening programs. It is important to check on the efficiency of these screening tests with different hospitals. Various studies from India show wide prevalence of cervical epithelial abnormalities ranging from 0.018 (Chandigarh)5 to 9.27 (Lucknow)(8). Variations can be due to sample size, prevalence in risk factors and differences in inclusion and exclusion criteria. Most frequent epithelial abnormality seen is LSIL, which is seen in age ranging from 36 – 55 years (mean age of

47 years). Epithelial abnormalities are most prevalent in 41 -50 years age group. Majority of the smears examined were inflammatory in nature.

Cervical Pap smear test is a simple, non-invasive test and safe tool for detecting precancerous cervical epithelial lesions in women. It is regarded as the gold standard method for cervical screening. VIA (Visual inspection with acetic acid) and VILI (Visual inspection with Lugol’s iodine) supported by colposcopy is also used as a screening test of cervical cancer and is comparable to the Pap smear testing. (10)

In the present study, majority of the cases were Negative for intra-epithelial lesion/malignancy with inflammation (58.4 %). Since the present study was conducted in an urban medical college and many of the patients undergo Pap smear as a part of the routine gynaecological examination, most of the smears were inflammatory.

Cervical smears show lactobacilli, which is a normal commensal that maintains acidic pH. In bacterial vaginosis, there will be absence of lactobacilli and neutrophils with presence of other coccobacilli. Clue cells are also seen. The squamous cells were covered by coccobacilli obscuring the cell border which are called clue cells. In candida infection, budding yeast forms or pseudo-hyphae were seen. Trichomonas vaginalis appears as pear-shaped organisms with flagella and has pale vesicular nuclei. In the present study, we observed 104 cases of bacterial vaginosis, 82 cases of candidiasis and 58 cases of Trichomonas vaginalis. Our study was correlated with studies of Meghana et al and Vikrant et al.

According to The Bethesda System 2014, Atypical squamous cells (ASC) are those cells which show three main features i.e., squamous differentiation, increased nuclear to cytoplasmic (N/C) ratio and nuclear changes like hyperchromasia, chromatin clumping, multi-nucleation and irregularity. Nuclear changes must be present to interpret as ASC.

Incomplete changes suggestive of koilocytosis or poorly preserved cells with features suggestive of LSIL were designated as ASC-US (11). LSIL cases had squamous cells with abundant cytoplasm and nucleomegaly (three times intermediate nuclei) with anisonucleosis and inconspicuous nucleoli. HSIL cases showed small dysplastic cells with a high N/C ratio, hyperchromatic nuclei and irregular nuclear borders.

Out of 1944 adequate cases, 36 cases showed epithelial cell abnormalities. Atypical squamous cells of undetermined significance (ASCUS) in 12 cases (0.6%), low-grade intraepithelial lesion (LSIL) in 14 cases (0.7%), and high-grade intraepithelial lesion (HSIL) in 10 cases (0.5%). Our studies correlated with studies of Preetha George (3), Sadhana Kohari (4), Geethu G Nair(7), Puashpa Latha(8) and Vikrant et al (5).

LIMITATIONS OF THE STUDY: It is a retrospective study. Outcome couldn't be accessed. Newer techniques like Liquid Based Cytology can reduce the incidence of unsatisfactory smears.

Table 2: INCIDENCE OF SMEARS WITH EPITHELIAL CELL ABNORMALITIES

Age Group	ASC-US	LSIL	HSIL	Percentage
36-40		1	1	5.56
41-45	3	2	6	30.56
46-50	4	8	2	38.89
51-55	5	3	1	25.00
Total	12	14	10	36
Percentage	33.33	38.89	27.78	100%

Table 3: DISTRIBUTION OF INFECTIOUS CASES ACCORDING TO AGE GROUP				
AGE GROUP	COUNTED	INFECTIONS		
		BACTERIAL VAGINOSIS	TRICHOMONAS VAGINALIS	CANDIDIASIS
21-25	76	6	1	12
25-30	248	11	5	22
31-35	306	15	11	23
36-40	343	23	14	18
41-45	343	27	11	4
46-50	316	11	13	2
51-55	107	8	3	1
56-60	77	3		
61-65	72			
66-70	30			
71-75	22			
76-80	4			
Total	1944	104	58	82
Total of Infectious cases			244	

Table 4: COMPARISON OF INFECTIOUS CASES IN DIFFERENT STUDIES					
S. NO.	STUDIES	NO. OF CASES STUDIED	BACTERIAL VAGINOSIS	CANDIDIASIS	TRICHOMONAS VAGINALIS
1	VIKRANT ET AL	1000	112(0.112%)	24(0.024%)	16(0.016%)
2	MEGHANA ET AL	1500	47(3.13%)	46(3.06%)	15(0.09%)
3	OUR STUDY	2000	104(5.2%)	82(4.1%)	58(2.9%)

Table 5: COMPARISON OF RESULTS OF SIMILAR STUDIES

Ref No	Author	Year	Place	Total no: of patients	Total prevalence	Epithelial abnormality			
						ASC-US	LSIC	HSIL	SSC
3	Preetha george	2014	Mangalore	1000	3.5	0.3	2	0.9	0.3
4	Sadhana Kohari	2014	Ahmedabad	36740	1.32	0.11	0.83	0.31	0.05
5	Vikrant	2015	Chandigarh	1000	0.018	0.012	0.004	0.002	
6	Geetha Katheit	2015	Bhopal	1887	1.32	0.48	0.42	0.16	0.05
7	Geethu G Nair	2016	Kozhikode	2028	2.42	0.15	1.58	0.49	0.2
8	Pushpa Lata S	2018	Lucknow	1650	9.27	2.9	5.89	0.48	
9	Phani Meghana	2019	Vijayawada	1500	1.1	0.2	0.3	0.6	
	Present Study	2022	Bengaluru	1944	1.80	0.60	0.70	0.50	0.00

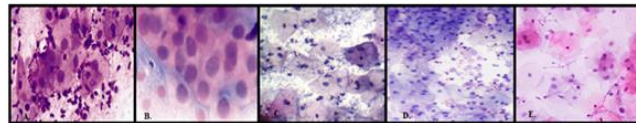


Figure 1. Pap smear showing –A. LSIL (400X), B.HSIL (400X), C. Bacterial Vaginosis, Clue cells (400X), D.Trichomonas vaginalis, (100X), E.Candidiasis (400X).

CONCLUSION

Study show predominantly inflammatory cases and also less prevalence of cervical epithelial abnormalities. Pap smear screening is a safe, simple, and non-invasive test which helps in detection of cervical lesions. Our study suggests women over 25 years must get regular Pap smears tests Pap smear examination and to be continued in post-menopausal status also.

REFERENCES

1. Mehrotra, R., Yadav, K. Cervical Cancer: Formulation and Implementation of Govt of India Guidelines for Screening and Management. Indian J Gynecol Oncolog 20, 4 (2022). <https://doi.org/10.1007/s40944-021-00602-z>
2. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers

- in 185 countries. CA Cancer J Clin. 2021;71:209–49. doi:10.3322/caac.21660
3. Preetha George, Sumathy Rao. Cytology of uterine cervix by pap smear: a study from South India. Journal of evolution of Medical and Dental Sciences 2014;3:13796-803.
4. Sadhana Kothari, Arpit Gohel, Anupama Dayal, Rupal Shah, Shantibhai Patel. Pap smear - A tool for detection of cervical intraepithelial lesions in health check up schemes: A study of 36,740 cases. Int J Res Med 2014;3:12-5. Available from http://www.ijorim.com/archive_show.php?year=2014&issue=VOLUME%203,%20ISSUE%202.
5. Sherwani RK, Khan T, Akhtar K, Zeba A, Siddiqui FA, Rahman K, et al. Conventional Pap Smear and Liquid Based Cytology for Cervical Cancer Screening- A Comparative Study. J Cytol. 2007;24(4)167-172.

6. Geetha Katheit, Shilpa Tiwari. Cytological pattern and demographic determinants of cervical cytology (Papanicolaou smear) in a tertiary centre of central India. *European journal of biomedical & pharmaceutical sciences* 2015;2:1402-9.
7. Nair, Geethu Gopinathan et al. "Cytopathological pattern of cervical pap smears - a study among population of North Malabar in Kerala." *Indian Journal of Pathology and Oncology* 3 (2016): 552-557.
8. Sachan PL, Singh M, Patel ML, Sachan R. A study on cervical cancer screening using pap smear test and clinical correlation. *Asia Pac J Oncol Nurs.* 2018;5(3)337-341.
9. Phani Meghana, B., Inuganti Venkata, R., Chitturi, R., Baddula, D. P., & Sireesha, K. (2020). A study of liquid-based cytology in cervical smears. *Tropical Journal of Pathology and Microbiology*, 6(3), 238-244.
10. Kalgong G, kamdje AN, Tagne RS, Amvene JMBO, Nangue C (2017) Cervical Cancer Screening with Visual Inspection with Acetic Acid and Lugol as Primary Screening Test, a Comparable Result to Conventional PAP Smear in Northern Cameroon. *J Can Sci Res* 2: 109.
11. Siebers AG, Klinkhamer PJ, Grefte JM, Massuger LF, Vedder JE, Beijers-Broos A, et al. Comparison of liquid-based cytology with conventional cytology for detection of cervical cancer precursors- a randomized controlled trial. *JAMA.* 2009;302(16)1757-1764.