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Research Article

Role of cytology in screening of cervical lesions along with its histopathological correlation: A study in two-tier city.

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ABSTRACT

Background: One of the most common carcinoma amongst Indian women is cervical carcinoma. World Health Organisation (WHO) recommends use of Papanicolaou cytology (Pap smear) as a screening technique in the detection of precancerous lesions. The lesions were classified based on the Bethesda terminology was correlated with the histopathological findings.
Aim: To compare the cervical pap cytology results with their corresponding histopathological findings received in our institution.
Method: 300 cervical cytology smears from November 2019 to March 2020 were prospectively classified according to the Bethesda system (2014) for reporting of Cervical Cytology and compared with its histopathological findings.
Results: Most of the patients were in 3rd -4th decade of life. The most common finding was NILM constituting 74% of cases, followed by Atypical squamous cells of undetermined significance (ASC-US) (12%cases),low grade squamous intraepithelial lesion (L-SIL) and high grade squamous intraepithelial lesion (HSIL) both comprised of 6 %cases. Malignancies (squamous cell carcinoma and adenocarcinoma), Atypical glandular cells of undetermined significance (AGUS)constituted about 1% of cases. Histopathological correlation was possible in 113cases.The sensitivity of the present study was 100 %, specificity was 50%. PPV was 39.82%, NPV was 100% and the diagnostic accuracy was 62.43% .
Conclusion: PAP smear is one of the best, easy and cost-effective screening method for cervical lesions. However histopathology being considered as the gold standard test, hence its correlation with cytology pronounces the efficacy of cervical PAP smears.

Keywords: ASCUS,ASC-H,L-SIL, HSIL

• **Introduction:** In 1920s, Dr. George Papanicolaou introduced, the Papanicolaou(PAP) screening[1]. PAP smear is used worldwide for screening and the diagnosis of cervical lesions and carcinomas[2].With advent of newer diagnostic modalities, the cervical cytology interpretation by PAPNET system and liquid cytology such as Surepath has lead to initiation of the faster treatment[3]. HPV genetic testing along with colposcopy is one of the recent diagnostic modality available for the screening and diagnosis of cervical pathology[4]. With the introduction of Bethesda system of cervical cytology classification (2014), the smears are reported as Negative for Intra-epithelial Neoplasm/ Malignancy(NILM), Low Grade Squamous Intra-Epithelial (LSIL), High Grade Squamous Intra-Epithelial Neoplasm(HSIL),Atypical Squamous cell of undetermined significance(ASC-US), Atypical Squamous cells -cannot exclude a high grade squamous intraepithelial lesion(ASCH), Squamous cell carcinoma(SCC), Atypical Endocervical cells(NOS), Atypical Endometrial cells(NOS), Atypical Glandular cells(NOS), Atypical Endocervical cells favour neoplasia, Atypical Glandular Cells favour neoplasia, Endocervical Adenocarcinoma insitu and Adenocarcinoma(ADCa) has brought the consistency for reporting of the cervical smears[5]. Therefore, in the present study, we have analysed the cervical pap smears and correlated it with histopathology(HPE) .
Materials and method: This is a 1year prospective studied carried out on 300 cervical cytology smears from November 2019 to November 2020 in a tertiary care centre of two tier city with 6months of follow-up.
Inclusion Criteria: Cervical smears received at department of pathology for reporting.
Exclusion Criteria: Post-total hysterectomy samples, inadequate smears and post-chemo-radiation samples.

Clinical details were obtained. The pap smear slides were fixed with 95% ethyl alcohol were evaluated and examined under light microscope. The cytological findings were classified according to the Bethesda System 2014. HPE correlation was available for 113 patients only. Biopsy specimens received in 10% formalin were processed, slides were prepared, stained with hematoxylin and eosin stain and examined under a light microscope. HPE findings were categorized according to the WHO[6] female genital system book as chronic cervicitis, Cervical Intraepithelial Neoplasm (CIN)- I, CIN-II, CIN-III, SCC and ADCa.
Statistical analysis for sensitivity, specificity, positive predictive value(PPV), negative predictive value(NPV) and diagnostic accuracy(DA) of PAP smear was done keeping HP diagnosis as the gold standard using Microsoft excel 2019.

Results:

The present retrospective study consisted of 300 cervical pap smears cases between 20 to 65years of age. Most of the patients examined were in the age group of 41-50 years with 36% of cases and least being at age group of 21-30 years (7.33%)(table 1).

Table 1:Age distribution of the study population

AGE DISTRIBUTION	FREQUENCY	PERCENTAGE
21-30	22	7.33%
31-40	70	23.33%
41-50	108	36%
51-60	77	25.66%
›61	23	7.66%
TOTAL	**300**	**100%**

Table 2: Distribution of cases based on cervical cytological

BETHESDA CYTOLOGICAL RESULTS	FREQUENCY	PERCENTAGE
NILM	222	74%
AGUS	03	1%
ASCUS	36	12%
HSIL	18	06%
LSIL	18	06%
Malignancy	03	01%
TOTAL	**300**	**100%**

Out of 300 smears examined, 74% of the smears showed NILM, followed by ASCUS (12% cases)(Figure No.1), LSIL and HSIL(6% cases each), malignancy(SCC and ADCa) and AGUS(1% of cases each)(Figure No.2).
Distribution of cases under NILM category is given in table 3

Table no 3. Distribution of NILM cases

NILM –Specific Disease	FREQUENCY	PERCENTAGE
Bacterial vaginosis	82	36.9%
Atrophic smear	76	34.2%
Trichomonas vaginalis	33	14.8%
Candidiasis	20	9%
Reparative change	11	4.95%
TOTAL	**222**	**100%**

Table 4: Distribution of cases based on histopathological(HP) findings

HISTOPATHOLOGY (HP)FINDING	NUMBER OF CASES	PERCENTAGE
BENIGN		
Chronic cervicitis	30	26.5%
Atrophic cervicitis	16	14.1%
Squamous metaplasia	12	10.6%
Follicular cervicitis	06	5.3%
Tunnel cluster	04	3.5%
MALIGNANT		
CIN1	14	12.3%
CIN2	14	12.3%
CIN3	12	10.6%

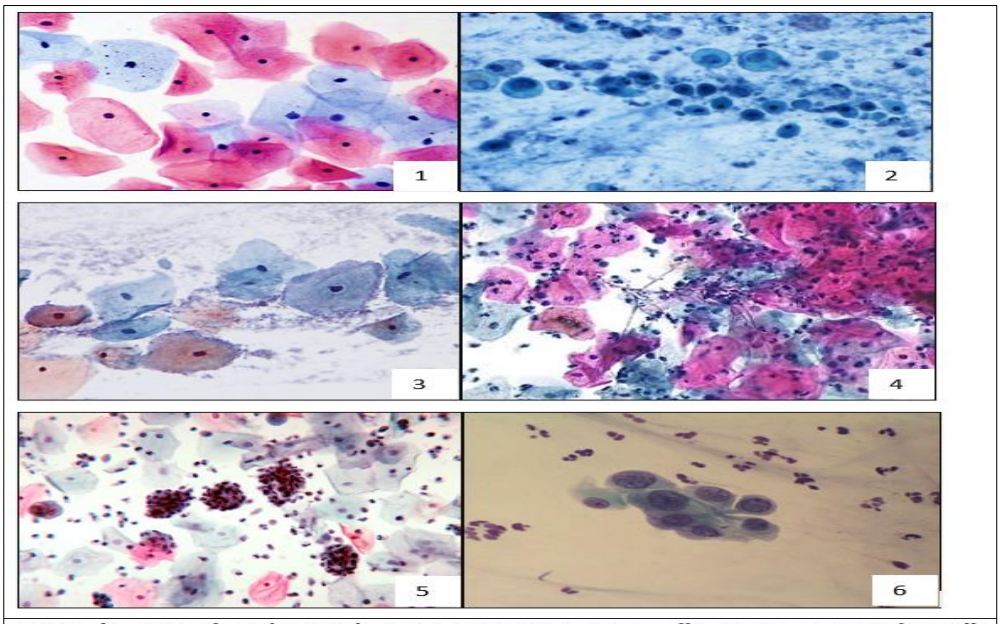
SCC	04	3.5%
Endometrioid carcinoma	01	0.8%
TOTAL	**113**	**100%**

Out of 300 cytological smears studied only 113 were subjected to HP correlation as most of the cases were of NILM which does not require surgical intervention. Under HP, the commonest benign lesions included was chronic cervicitis and the least common was tunnel cluster with 3.5% of cases each(table 4). Among the neoplastic lesions CIN I and CIN II were the most common with 12.3% of the cases each. Endometrioid carcinoma was the least common with 0.8% of cases. Cytology was correlated with HP in 113 cases(Table 5).

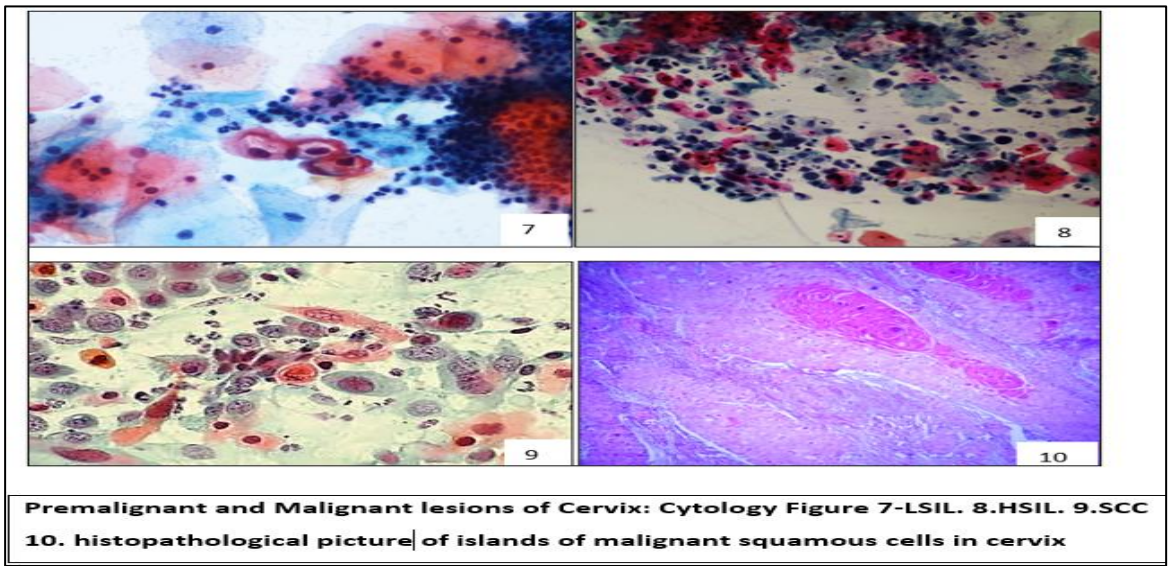
Table 5 : Correlation of cases based on cytology and histopathology (HP) results.

BETHESDA CYTOLOGICAL RESULT		**HISTOPATHOLOGICAL CORRELATION**							
		BENIGN LESION	**ATYPIA**	**CIN**		**CAR CIN OMA**	**TOTAL HP CASES**	**RISK OF MALIGNANCY (ROM)% =Malignant x100/total cases**	
				I	**II**	**III**			
NILM	222	29	00	00	00	06	00	35	17.14
AGUS	03	02	00	00	00	00	01	03	33.33
ASCUS	36	27	00	06	03	00	00	36	25
LSIL	18	08	00	08	02	00	00	18	55.55
HSIL	18	02	00	00	09	06	01	18	88.88
SCC &ADCa	03	00	00	00	00	00	03	03	100
TOTAL	**300**	**68**	**00**	**14**	**14**	**12**	**05**	**113**	

As shown in table no.5., cervical cytology results of 3AGUS cases when correlated with HP, one case showed features of endometrioid carcinoma cervix while 2 cases were benign. Out of 36 ASCUS cases on cervical cytology, 06 cases showed CIN I and 3 cases showed CIN II while 27 cases showed benign lesions on HP. Out of 18 LSIL cases where the biopsy or HP correlation was available, 8 cases were reported as CIN I and 2 cases were reported as CIN II ,whereas 8 cases were reported as benign on HP. Out of 18 HSIL cases on cervical cytology,9 cases was reported as CIN II, 6 cases were reported as CIN III and 1 case was reported as SCC, while 2 cases were reported as benign lesion on HP. All 3 cases turned out to be malignant in both cervical cytology and HP. Ten out of 11 NILM cases of cervical cytology report available for biopsy or HP correlation was reported as benign on HP while 01 case showed features of malignancy.
Risk of malignancy(ROM) was highest(100%) for Epithelial cell abnormalities –Malignancy Category and least for NILM



Cervical Pap cytology (Benign): Figure No 1. Squamous cells - NILM 2. Atrophic cells. 3. Bacterial Vaginosis. 4.Candida Colonies. 5.Trichomonas Vaginalis. 6. ASCUS



Premalignant and Malignant lesions of Cervix: Cytology Figure 7-LSIL. 8.HSIL. 9.SCC 10. histopathological picture of islands of malignant squamous cells in cervix

The sensitivity of the present study was 100 %, specificity was 50%. PPV was 39.82%, NPV was 100% and the DA was 62.43%.

Discussion

In our study most of the patients examined belonged to the age group of 41-50 years, followed by 51-60 years which is similar to a study done by Joshi C et al[7] and by Algotar et al[8]. The commonest finding in our study was NILM with 74% of the cases which was concordant with the study by Bamaikar et al[9] . It is also in line with a study done by Joshi et al[7] where he observed 64% NILM cases on cervical PAP smears. Out of 49.33% of NILM cases on cervical smears, bacterial vaginosis were most commonly seen with 36.9% of cases, followed by atrophic smear with 34.2% of cases. Trichomonas vaginalis was seen in 14.8% of cases and 9% cases comprised cases of candidiasis. The least common finding in NILM was of reparative change with 4.95% of cases which is incontrast to a study by Bamanikar SA et al[9], Kaveri SB et[10] and Shivastava M et al[11]where they observed non-specific inflammatory lesions more commonly. In the present study ASCUS comprised 12% of cases and AGUS was seen in 1% of the cases which is similar to that of Bamanikar et al[9] and Kapila et al[12] where they reported in their study that ASCUS as the most finding with 2.98% cases while AGUS was seen in 0.21% cases. LSIL and HSIL was seen in 6% of the cervical smears examined in our study which is similar to study done by Joshi C et al[7] where he reported LSIL and HSIL in 17% and 12% of cases respectively, but is in contrast to study done by Bamanikar et al[9], Abdullah[13], Filipi and Xhani[14] where they reported a lower incidence of LSIL and HSIL. In the present study, malignancy(SCC and ADCa) was seen in 1% of cases which is similar to study done by Joshi C et al[8] where he reported 2% of frank malignancy cases and Bamanikar et al[9] where he reported 0.95% of frank malignancy in cervical PAP smears.

Out of 300 cytological smears studied only 113 were subjected to HP correlation as most of the cases were of NILM, as they donot require surgical intervention. Out of these benign lesions, chronic cervicitis (26.5% cases) was the commonest lesion, similar to study by Josh et al[7] where he found chronic cervicitis (48%)had maximum number of cases on HP. In the present study,SCC was seen in 3.5 % of cases and endometrial carcinoma was the least common with 0.8% of cases which is in contrast to the study done by Josh et al[7], Bodal and Brar et al[15] where they SCC and ADCa in2% cases only. The more number of malignancy reported in the present study could be likely because of overweight, poor hygiene and under-diagnosis of precancerous lesions examinations done in a rural set up.

In the present study out of 300 PAP smear only 113 cases were available for HP correlation.Out of 35 NILM cases of cervical cytology report available for biopsy or HP correlation 29 was reported as benign, while 06 case showed features of malignancy. Cervical cytology result of 3 cases of AGUS when correlated with HP 1 case showed features of endometrioid carcinoma cervix while 3 cases were benign on the HP which is similar to study done byAlakananda[16], where 1 case showed features of adenocarcinoma on HP. Out of 36 cervical cytology results of ASCUS where the biopsy or HP correlation was available, 6 cases showed CIN I and 3 cases showed CIN II while 27 cases showed benign lesions which is similar to study done byAlakananda[16] where they reported chronic cervicitis in 19 cases, 13 cases of CIN I and 2 cases of CIN II. Out of 18 LSIL cytology cases ,8 cases were reported as CIN I, 2 cases as CIN II on the HP whereas 08cases were reported as benign , which is similar to study done by Yeoh et al[17] where CIN II cases more common. Among the HSIL(18)cases reported on the cervical cytology, HP turned out to be CIN II(9cases), CIN III(6cases), carcinoma(1case) and benign lesion(2cases) on HP . In a study by Kalayani et al[18] out of 6 cases, 1 case was reported as chronic cervicitis, 4 cases as SCC and 1 case as CIN III on HP. As per Yeoh et al[17], 104 HSIL cases on cytology turned out to be CIN II in 72cases, CIN I in 19cases, chronic cervicitis in 8cases.We

found that 3 malignant cytology cases in our study were in par with HP. Similar observation was made by Kalayani et al[18] and Alakananda[16], where they reported 3 out of 3 and 9 out of 9 malignant cases respectively on HP. Table shows sensitivity, specificity, PPV, NPV and accuracy of our study compared to other studies.

Table No. 6 shows Sensitivity, Specificity, PPV NPV and accuracy comparison.

	Present study	Joshi C et al[7]	Tamboli and Khatod et al[19]
Sensitivity	100%	65.38	90.65
Specificity	50%	95.83	90.27
PPV	39.82%	94.44	89.81
NPV	100%	95.83	-
Accuracy	62.43%	-	-

Conclusion

Pap smear test is a sensitive, less invasive and cost effective modality for screening of pre-malignant and malignant lesions of the cervix especially if implemented early. Hence it should be recommended routinely as a method of improving reproductive health. But sometimes cervical pap smears fail to accurately localize the lesion and also there might be difficulty in identifying ADCa on cytology. Hence cervical biopsy is recommended to confirm the cytological findings in clinically suspicious cases.

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