Correlation Of Cervical Pap Smear With Colposcopic And Histopathological Findings In Lesions Of Cervix

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Abstract

Introduction: Cervical cancer is said to be the second most common malignancy among the Indian female population. The implementation of cervical cytology using conventional Papanicolaou Smears in tertiary care centres, supported by colposcopy and histopathological evaluation can easily be able to identify premalignant lesions and early stage malignancy.

Materials and methods: This is a prospective study which included a total of 100 patients who underwent conventional Papsmear followed by colposcopy guided cervical biopsy. Colposcopic findings and pap smear interpretation were correlated with the final histopathological report to assess the sensitivity, specificity, predictive value and accuracy.

Results: In this study, sensitivity of colposcopic biopsies was 87.5%when compared to conventional Pap smears which was 83.3% . The accuracy of pap smear and colposcopic cervical biopsy in detecting cervical lesions in our study showed 82% and 91% respectively.

Conclusion: Cervical cytology and colposcopy showed high accuracy of 82% and 91% along with high sensitivity and specificity suggesting the need for extensive screening programmes that implement both these methods in the detection of premalignant and malignant lesions of the cervix.

Keywords: Carcinoma cervix, conventional pap smear, colposcopic findings, histopathological diagnosis.

INTRODUCTION

Cervical cancer is one of the few cancers that can be detected early and prevented with vaccination.Current World Health Survey data suggests that the cervical cancer screening between the ages of 25 -64 years was only 3.1% in India. The highest number of new cases detected in the year 2020 was between the age group of 55-59 years. [1,2] Cervical cancer is the second leading cause of female cancers in India as of 2020.

In this study we compare results of 100 adequate samples of conventional Pap smears, their colposcopic findings and cervical biopsies to access it's sensitivity, specificity and accuracy in detection of cervical lesions.

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MATERIALS AND METHODS:

This prospective study was conducted in the Department of Pathology, MMCH&RI in Kanchipuram over a period of 28months after the approval from the Institutional Ethical Committee.

The study included 100 symptomatic female patients between the age group of 25 to 65years who presented to the Obstetrics and gynaecology outpatient department and underwent concurrent conventional Pap smear examination, colposcopy followed by colposcopy guided biopsy.

Pap smears were taken using the Ayer's spatula and smeared on a clean glass slide; fixed immediately in 95% ethanol and ether in equal parts. Slides were then stained by conventional Papanicolau staining protocol at the Pathology department. The adequacy was assessed and interpretation has been done according to the Bethesda system 2014[4]

The colposcopic findings were obtained from the requisition forms sent along with the samples received at Department of Pathology. Colposcope has the ability to localize and determine the extent of all lesions which is visible to the naked eye and can be detected in single setting and in determining the site of biopsy.

Reid's colposcopic index is a systematic, objective method of colposcopically grading the severity of premalignant cervical lesions. Index considers 4 colposcopic signs, which are lesion margins, Colour of acetowhitening, Blood vessels and Iodine staining. According to that they graded as Benign – score 0-2, Low grade- score3-5, High grade- score 6-8, Carcinoma- score >8[3]

Cervical biopsies received from the same patients were fixed in 10% neutral buffered formalin solution, embedded in paraffin blocks and stained with haematoxylin and eosin (H and E) stain.The interpretation has been done by the pathologists and the results were categorised under Chronic cervicitis, LSIL, HSIL and invasive carcinoma.

Inclusion Criteria:

Patients who presented with symptoms of leucorrhea, abdominal pain, dysmenorrhea and postmenopausal bleeding.

Patients who undergone colposcopy, pap test and cervical biopsy were included.

Exclusion criteria:

Pregnant women, unmarried women, unsatisfactory smears and samples without biopsy correlation and colposcopic findings were excluded from the present study.

STATISTICAL ANALYSIS:

Information about patients were obtained from requisition forms and their cytological and histopathological diagnosis were tabulated and statistically analysed using McNemar Chi-squared statistics.

Sensitivity, specificity, positive predictive value, negative predictive value, accuracy of pap smear and colposcopywere calculated considering histopathological diagnosis of cervical biopsy as the gold standard test.

RESULTS:

In our study which included 100 symptomatic cases,30 cases were between the age group of 40-49 years, 24 cases were between 30-39years and 50-59 years respectively. 11 cases were between 60-69 and 20-29 years respectively. Out of which 25women belonged to postmenopausal age group.

55 cases presented with pain abdomen mainly in the age group of 40-49 years, followed by 28 cases who presented with leucorrhea, 11cases with dysmenorrhea, 4cases presented with postmenopausal bleed and 2 cases with prolapse.

The colposcopic findings that were obtained from the Obstetrics and gynecology outpatient department showed 73cases suggesting benign, 19cases suggesting low grade, 6casessuggestinghigh grade and 2caseswereCarcinoma.[Table 1]

Out of 100 cases on pap smear cytology, 66 cases were negative for intraepithelial neoplasm (NILM); 34cases were identified as dysplasia of which 16 cases were Atypical squamous cells of undetermined significance(ASCUS)[Figure 1], 14cases of Low grade squamous cell intraepithelial lesion (LSIL) and 4 cases were High grade squamous cell intraepithelial lesion (HSIL)[Figure 2] [Table 1]

Table 1: Colposcopic, Conventional pap smear and cervical biopsy interpretation

S.NO	Colposcopic Interpretation (Reid score)	No. of Cases
1	Benign 0-2	73
2	Low grade 3-5	19
3	High grade 6-8	6
4	Carcinoma >8	2
Conventional pap smear interpretation		

5	Negative for intraepithelial neoplasm (NILM)	66
6	Atypical squamous cell of undetermined significance (ASCUS)	16
7	Low grade squamous cell intraepithelial neoplasm (LSIL)	14
8	High grade squamous cell intraepithelial Neoplasm (HSIL)	4
Cervical biopsy interpretation		
9	Chronic cervicitis	76
10	Low grade intraepithelial lesion	15
11	High grade intraepithelial lesion	7
12	Invasive Carcinoma	2

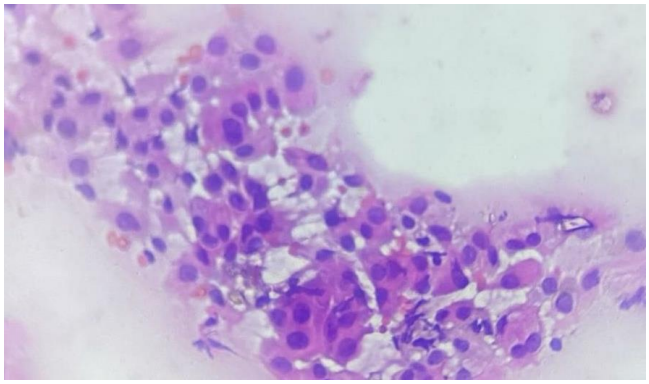

Fig 1: ASCUS (Pap smear x40)

The squamous cells with moderate amount of cytoplasm and nuclear enlargement.

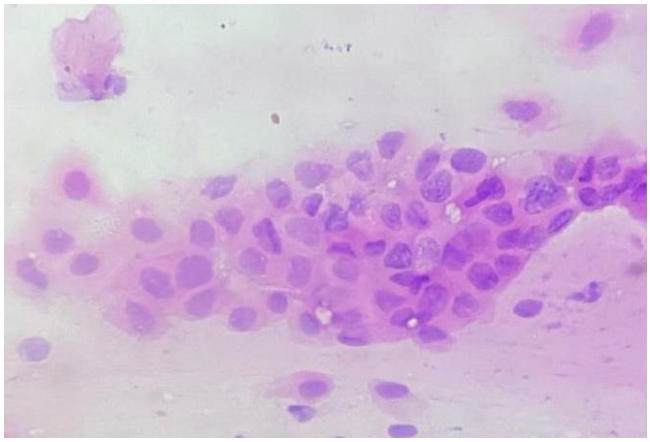

Fig 2: HSIL (Pap smear x40)

The squamous cells with scanty cytoplasm with high N:C ratio, hyperchromatic nucleus and irregular nuclear membranes.

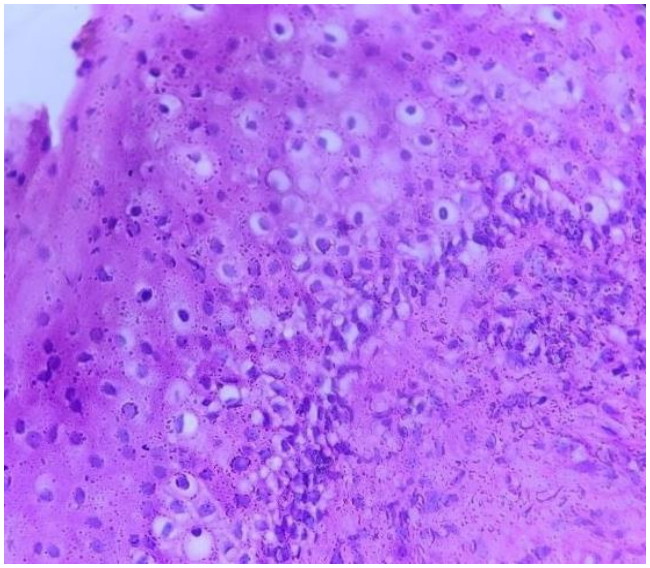

Fig 3: LSIL (HPEx40)

Cervical epithelium with koilocytic atypia.

Out of 100 cases of cervical biopsies, 76 cases were diagnosed as chronic cervicitis, 15(15%) cases were diagnosed as LSIL [Figure 3], 7cases as HSIL [Figure 4], and 2 cases were diagnosed as invasive carcinoma. [Table 1] . The cases of LSIL showed a predominance in the age group of 40-49years with 8 cases(33%) while HSIL were predominant in the age group of 50-59 years with 3 cases (12.5%).

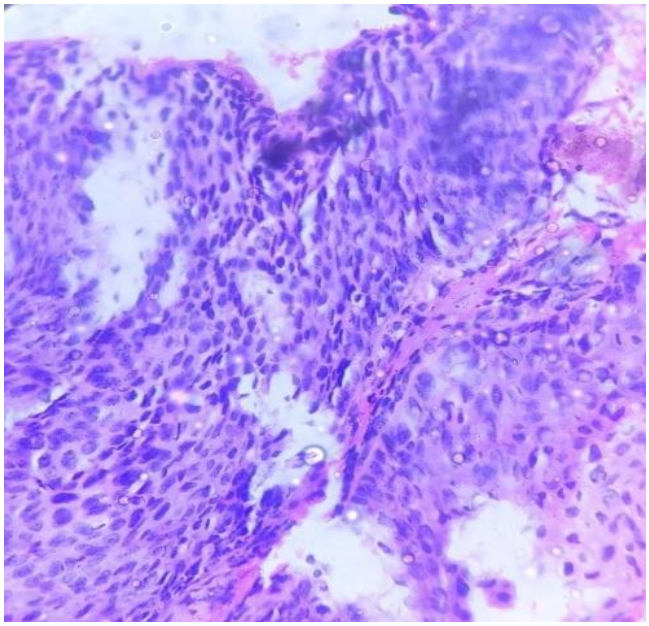

Fig 4: HSIL (HPEx40)

Cervical epithelium with full thickness dysplasia and loss of polarity.

The correlation of Conventional Pap smear findings were then compared to the cervical biopsy. About 6% (4 cases) of NILM cases were diagnosed to be LSIL on cervical biopsy though no cases of HSIL or carcinoma were detected among the NILM cases on cervical cytology. Majority of the cases identified to be ASCUS were confirmed to be benign on cervical biopsy though nearly 25% (4 cases) of ASCUS were diagnosed as LSIL and 6.25% (1case) was detected to be HSIL on cervical biopsy. Out of the 14 cases interpreted as LSIL on Pap smear, 35% (5cases) were diagnosed to LSIL, 35% (5cases) were diagnosed to be HSIL, 1 case (7.14%) was invasive cervical SCC and only 3 cases were benign on biopsy. Among the 4 cases detected to be HSIL on cervical cytology, 2 cases(50%) were LSIL, 1case (25%) HSIL and 1 case (25%) invasive carcinoma.

The colposcopic findings correlated with pap smear findings. Out of 73 cases which were benign under colposcopy, 61cases were NILM, 1case was HSIL, 2cases were LSIL and 9 cases were ASCUS on pap smear. Out of 19 cases which were low grade under colposcopy ,7cases were ASCUS, 6cases were LSIL, 1 case was HSIL and 5 cases were NILM. On pap smear among6 cases with high grade on colposcopy findings, 5cases (83.33%) were diagnosed to be LSIL and 1casewas diagnosed as HSIL on pap smear. Out of 2 cases of carcinoma on colposcopy, 1case was LSIL and other case was HSIL on pap smear. [Table 2]

Table 2: Correlation of Reid Score Grading with Pap smear Cytology

Reid score	NILM	ASCUS	LSIL	HSIL	Total No.of cases
Benign (0-2)	61 cases(83.5%)	9 cases (12.3%)	02 case(2.7%)	1 case (1.36%)	73
Low grade (3-5)	5 cases (26.3%)	7 cases (36.8%)	6 cases (31.5%)	1 case (5.26%)	19
High grade (5-7)	0 (0%)	0 cases (0%)	5 case (83.3%)	1 case (16.6%)	6
Carcinoma (>8)	0 (0%)	0 cases (0%)	1 case (50%)	1 case (50%)	2
TOTAL	66 cases (66%)	16 cases (16%)	14 cases (14%)	4 cases (4%)	100

The correlation of colposcopic findings were then compared to the cervical biopsy diagnosis. Of the 100 cases subjected to colposcopy, 73 cases which were benign under colposcopy, 70cases were diagnosed to be chronic cervicitis, 3cases were diagnosed to be LSIL on biopsy. Of the 19caseswith low grade on colposcopy, 5 cases were diagnosed as chronic cervicitis, 10 cases were diagnosed to be LSIL and 4 were HSIL on biopsy. Of the 6 cases with High grade on colposcopy, 1 case was chronic cervicitis, 2 cases were LSIL and 3 cases were HSIL on biopsy. Of the 2cases showed carcinoma on colposcopy, both the cases showed concurrence of Invasive carcinoma on histopathological correlation. [Table 3]

Table 3: Correlation of Reid Score Grading With Biopsy Diagnosis

Reid score	Chronic cervicitis	LSIL	HSIL	Invasive Carcinoma	Total No.of cases
Benign (0-2)	70 cases(95.8%)	3 cases (4.1%)	0 case (0%)	0 case (0%)	73

Low grade (3-5)	5 cases (26.3%)	10 cases (52.6%)	4 cases (21%)	0 case (0%)	19
High grade(5-7)	1 case (16.6%)	2cases (33.3%)	3 cases (50%)	0 case (0%)	6
Carcinoma(>8)	0 case (0%)	0 case (0%)	0 case (0%)	2 cases (100%)	2
TOTAL	76 cases (76%)	15 cases (15%)	7 cases (7%)	2 cases (2%)	100

The final correlation of histopathological evaluation of the cervical biopsy and the conventional Pap cervical cytology showed 62 cases (62%) studied were negative in both cervical pap cytology and confirmed with cervical biopsy for dysplasia or malignancy. 20 cases (20%) were detected to have dysplasia and confirmed by cervical biopsy to be positive for dysplasia or malignancy. Only 4% of the cases were not detected on conventional Pap but identified on biopsy. [Table 4]

Table 4: Correlation of cervical biopsy and conventional pap smear

	Pap +ve	**Pap –ve**	**TOTAL**
Cervical biopsy Premalignant &malignant cases (+)	20 cases (83.3%)	4 cases (16.6%)	**24 cases (24%)**
Benign cases (-)	14 cases (18.4 %)	62 cases (81.5%)	**76 cases (76%)**
TOTAL	**34 cases (34%)**	**66 cases (66%)**	**100 cases**

Analysing and comparing the data, Pap smear showed a sensitivity of 83.3% and specificity of 81.5%. The positive predictive value of pap smear cytology was 58.8% and the negative predictive value was 93.9%. The accuracy of pap smear cytology at detecting cervical dysplasia or malignancy was 82%.

The sensitivity of colposcopy was found to be 87.5%, specificity was 92.1%, positive predictive value was 77.7% and the negative predictive value was 95.8%. The accuracy of Colposcopic grading of cervical lesion when correlated with gold standard of cervical histopathology was 91%.

Discussion:

Cervical carcinoma accounts for 9.4% of all cancers in India and 123,907 new cases were detected in 2020.[4] Out of 100 cases, 66 cases identified as NILM on pap smear were all diagnosed to be benign on biopsy.

Out of 34 cases detected as dysplasia on pap smear, 16cases were diagnosed as ASCUS, 14cases were diagnosed as LSIL and 4cases were diagnosed as HSIL in pap smear.

Out of 16 ASCUS cases, 11 were diagnosed as chronic cervicitis, 4 were diagnosed as LSIL, 1 case was diagnosed as HSIL in biopsies.

Out of 14 LSIL cases, 3were diagnosed as chronic cervicitis, 5 were diagnosed as LSIL, 5 were diagnosed as HSIL and 1 case was diagnosed as invasive carcinoma on biopsy.

Out of 4 HSIL cases, 2 were diagnosed as LSIL, 1 was diagnosed as HSIL and 1 was diagnosed as Invasive carcinoma.

In our present study, 2 cases detected as LSIL and HSIL on pap smear were diagnosed as invasive carcinoma on biopsy while colposcopy showed carcinoma . This signifies the importance of colposcopy and histopathological biopsy which can aid in early intervention and further follow up.

3 cases were detected as LSIL on pap smear were diagnosed to be chronic cervicitis on biopsy.

2 cases were detected as HSIL on pap were diagnosed to be LSIL on biopsy.

The sensitivity of colposcopy was found to be 87.5% and specificity was 92.1% .Positive predictive value was 77.7% and the Negative predictive value was 95.8%. The accuracy of Colposcopic grading of cervical lesion when correlated with gold standard of cervical histopathology was 91%. Thus Reid's colposcopic index shows a good correlation with colposcopy directed biopsy and in differentiating HSIL from LSIL.

On comparing the present study on colposcopy, it shows that sensitivity of our study (87.5%) is similar to study by suleyman et al (85.7%) [7]and savitha et al (83%)[8]. Specificity of the present study (92%) is similar to study by karimi-zarchi et al (98.94%)[6]. Positive predictive value of our present study (77.7%), is similar to Zahra et al (78.8%)[9]. Negative predictive value of our study is similar to study by Zahra et al (93.9%), savitha et al (95.7%) and FatemansadatNajib et al (95.41%)[5].

Pap smear cervical cytology showed a sensitivity of 83.3%. The specificity of pap smear cervical cytology showed 81.5% which is similar to Zahra et al (85.5%) [9]. The positive predictive value of conventional cervical cytology was 58.8% and the negative predictive value was 93.9% which is similar to suleyman et al (88.1%) [7] and savitha et al (87.8%) [8]

The overall accuracy of cervical cytology in detecting

cervical dysplasia or malignancy was 82% which is similar to study by chaudhary et al(80.5%)[10] and Mallur et al (80%) [12] .

Also 66 NILM cases on pap smear, are diagnosed to be benign on biopsy. Of 34 cases detected as dysplasia on Pap cytology 16 cases were identified as ASCUS which on biopsy revealed 11cases of Chronic cervicitis, 4 cases were LSIL and 1 case was HSIL on biopsy. Thus, ascertaining the importance of identifying the group of lesions of uncertain squamous differentiation.

Conclusion:

Pap smear is a very useful, highly economical and safe tool for detecting precancerous cervical epithelial lesions. It should be established as a routine screening procedure to reduce the morbidity, mortality and treatment burden among women for cervical cancer. Hence by properly implementing pap smear in screening programs with colposcopic findings and followed by colposcopic guided cervical biopsy can help to reduce the incidence of cervical malignancy by early detection of premalignant lesions.

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