

Role of Colposcopy in Evaluation of Abnormal Cytology a Tertiary Care Centre Experience

Sachan Rekha^{1,*}, Shukla Ayushi¹, Sachan Pushpalata², Patel ML³, Shankhwar Pushpalata¹

ABSTRACT

Background: Evidence for using colposcopy in the absence of a squamous intraepithelial lesion on conventional cytology has important position in cervical cancer screening. Aim of this study to evaluate sensitivity, specificity and diagnostic accuracy of colposcopy and cytology in unhealthy cervix to know role of colposcopy in concurrent use with cytology or replacing to cytology at tertiary centre experience. **Methods:** Prospective study was carried out over a period of one year, in patients attending Gynaecology OPD, King George's Medical University, Lucknow, Uttar Pradesh. After informed consent and ethical clearance from institutional ethics committee, total 664 diagnostic colposcopy were performed in women presenting with gynaecological complaint. These women were called for concurrent colposcopy and pap smear. 41 women were lost to follow up, only 623 women were subjected for concurrent colposcopy and cytology. 99 women who had high grade colposcopy with Swede score ≥ 5 underwent colposcopic guided biopsy and tissue were sent for histopathological examination and cytology of same patients were compared for analysis. **Results:** Mean age of women was 42.68 ± 11.69 years and mean age of consummation of marriage 20.94 ± 3.21 years. Cervical erosion was most common finding (41.4%) followed by hypertrophy of cervix (33.3%) and cervix bleeds on touch (17.2%). 24.14% ($n=7$) women with ASCUS cytology had high grade HPE (CIN2+) while 42.3% ($n=11$) women with LSIL had high grade HPE (CIN2+). Taking ASCUS and above as cut-off, the sensitivity, specificity, of Pap smear was 97.8%, 14.6% and diagnostic accuracy was 55.3%. For overall analysis of Colposcopy Swede Score at ≥ 5 , colposcopy was 100% sensitive and 41.2% specific and diagnostic accuracy was 69.7%. At swede score ≥ 7 , colposcopy was 64.6% sensitive and 100% specific and diagnostic accuracy was 82.8%. **Conclusion:** Colposcopy has good sensitivity and specificity as compared to cytology and can be used in evaluation of abnormal or controversial cytology to obtain better outcome.

Key words: Colposcopy, Swede Score, Cervical Cancer, Cytology, Cervical intraepithelial neoplasia.

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INTRODUCTION

Cervical cancer is a common cancer among women worldwide.¹ In developing countries it is the second most common cancer and third highest reason for death due to cancer after breast and lung cancer. Over 85 percent new cases are diagnosed in resource-limited countries where it is the most common cancer in women after breast cancer.² In India, Cervical cancer is the second leading cause of new cancer cases and cancer-related deaths among gynaecological cancers in females, with an estimated 96,922 new cases and 60,078 deaths each years.³ The available methods for screening are the papanicolau (pap) test (cytology) and Human Papilloma virus (HPV DNA) testing.⁴ Screening can detect precursors and early-stage disease for both types of cervical cancer including squamous cell carcinoma and adenocarcinoma. Treatment for precursor lesions will prevent the development of invasive cervical cancer and thereby reduce cervical cancer related morbidity and mortality.

In India, women do not have access to effective screening program and without major improvement in cytology services it will not be possible to screen even 25 percent of the population once in a lifetime in near future.⁵ One study reported that only 63.0% of women in developing countries received cervical cancer screening.⁶ Evidence for using colposcopy in the absence of a squamous intraepithelial lesion by the conventional cytology is fast gaining important position in cervical cancer screening. It has been felt that apart from cervical smears cytology, colposcopy should be offered as diagnostic method in all patients with unhealthy cervix with clinical findings of hypertrophied cervix, presence of erosions, nabothian cysts and cervix that bleeds on touch.⁷ An unhealthy cervix or grossly abnormal cervix can harbour premalignant cervical lesions or invasive carcinoma even when the cytology test is negative.⁸ Due to poor sensitivity of Pap smear, symptomatic women with negative smear requires

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further evaluation by colposcopy and high grade colposcopy then should be taken histopathology.⁹⁻¹¹

It is well-established fact that 90 percent of mild dysplasia regress spontaneously or after treatment and only 10 percent of them either persist or progress to higher grade lesions. Further investigation of these high risk 10 percent cases will reduce the burden of follow up. This can be made possible by application of colposcopy which is of low cost and more reliable as compared to cytology for tertiary centre. Thus this study was planned to evaluate sensitivity, specificity and diagnostic accuracy of colposcopy and cytology in unhealthy cervix and to evaluate the role of colposcopy in abnormal cytology at tertiary care centre experience.

MATERIALS AND METHODS

This prospective comparative study was carried out over a period of one year from August 2018–September 2019, in women attending gynaecology OPD of Queen Mary’s Hospital, King George’s Medical University, Lucknow, Uttar Pradesh. After informed consent and ethical clearance from institutional ethics committee, total 664 diagnostic colposcopies were performed on women presenting with gynaecological complaint. Females with unhealthy cervix having High grade colposcopy (Swede score ≥5) and with abnormal cytology report (≥ASCUS) and with age ≥25 years to <65years were included. Clinical diagnosis of an “unhealthy cervix” was based on any one or a group of chronic conditions affecting the uterine cervix including hypertrophied cervix, erosions, nabothian cysts, bleeds on touch, polyps and erosions.⁷ Women who were not willing to participate, pregnant females, visible growth on cervix, acute PID, type 2 or 3 Transformation zone on colposcopy, immunocompromised subjects, or who have previously undergone any treatment for cervical intraepithelial neoplasia (CIN), or having any other malignancy were excluded from the study.

41 women were lost to follow up and only 99 women who had high grade colposcopy (Swede Score≥5)¹² were enrolled for further analysis and cytology of these 99 women were simultaneously evaluated and compared with colposcopy after hisopathological examination of tissue.

Out of 623 women 161 women had unhealthy cervix on per speculum examination. These women were called for concurrent colposcopy and cytological examination (Pap smear). 11 women were lost to follow up. 99 women who had high grade colposcopy Swede score ≥5 underwent colposcopic guided biopsy and tissue was sent for histopathological examination. Cytology reports of the same 99 women were evaluated for comparison with colposcopy findings.¹² Reports of cytology and colposcopy were correlated with histopathology.

The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 21.0 statistical Analysis Software. The values were represented in Number (%) and Mean±SD. Sensitivity, Specificity, Positive Predictive value, Negative Predictive value and accuracy of colposcopy and cytology were calculated.

RESULTS

Majority of these women (n=64; 63.7%) were aged between 25 and 45 years. Mean age of women was 42.68±11.69 years. Age at consummation of marriage ranged from 15 to 30 years. Mean age at consummation of marriage was 20.94±3.21 years. Maximum number of women (n=49; 49.5%) were of parity 3-5. Maximum number of cases (n=41; 41.4%) were from upper middle socio-economic strata.

On per-speculum examination, cervical erosion was the most common finding (41.4%) followed by hypertrophy of cervix (33.3%) and cervix bleeds on touch (17.2%). [Table 1]

After analysis of cytology it was observed that proportion of women whose cytology showed HSIL, after colposcopic guided biopsy and

histopathology of tissue CIN 3 and SCC was found in 95.8%, as compared to other pap smear abnormality (p<0.001). Also 24.14% (n=7) women with ASCUS had high grade HPE (CIN2+) and 42.3% (n=11) women with LSIL had CIN2 or above report.

On cytology taking atypical squamous cells of undetermined significance (ASCUS) and above as cut-off, the sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of Pap smear was 97.8%, 14.6%, 52.3% and 87.5% respectively. The accuracy was 55.3%. [Table 2, 3] On combined assessment, proportion of those women having Swede score 7-10 on colposcopy had significant number of higher grade of intraepithelial neoplasia. After histopathology analysis it was observed that cervical intraepithelial neoplasia 3 (CIN3) and squamous cell carcinoma of cervix (SCC) was more with high grade score as compared to lower cut off of Swede score (p<0.001). Considering high grade squamous intraepithelial lesions (HSIL) and Reactive cellular changes (usually considered low grade but we had taken as high grade because in our study this finding was observed in women with complaints of bleeding, showed reactive cellular changes). For cytology evaluation sensitivity, specificity, PPV and NPV of Pap test was 58.7%, 91.7%, 87.1% and 69.8% respectively. The accuracy was 75.5%.

For overall analysis at cut off Swede score 5 or more colposcopy was 100% sensitive and 41.2% specificity, its PPV and NPV was 61.5% and 100%. The diagnostic accuracy was 69.7%. At Sweed score 7 or above sensitivity of colposcopy was 64.6% and specificity was 100%, its PPV and NPV was 100% and 75%. The diagnostic accuracy was 82.8%. [Table 4, 5]

Table 1: Distribution of patients according to Age, Parity, Socio-economic status and per speculum findings.

S.N.	Age Group	Total (n=99)		Mean Age±SD (in years)
		No.	%	
1.	25-35 Years	36	36.3	42.68±11.69 (25-69)
2.	36-45 Years	28	28.3	
3.	46-55 Years	16	16.2	
4.	56-65 Years	18	18.2	
5.	>65 Years	1	1.0	
Parity				
1.	0-2	37	37.4	
2.	3-5	49	49.5	
3.	>5	13	13.1	
Socio-economic status				
1	Upper middle	41	41.4	
2	Lower middle	8	8.1	
3	Upper lower	26	26.3	
4	Lower	24	24.2	
Perspeculum Findings				
1	Erosions	41	41.4	
2	Hypertrophy	33	33.3	
3	Gross hypertrophy with Nabothian cysts	8	8.1	
4	Bleeds on touch	17	17.2	
Mean age at consummation±SD (Range) in years				20.94±3.21 (15-30)

Table 2: Correlation of Cytology with HPE.

SN	HPE Finding	NILM		Reactive cellular changes		ASCUS		LSIL		HSIL (incl ASC-H)		Inadequate	
		n	%	N	%	N	%	N	%	n	%	N	%
1.	CC	5	62.5	3	42.9	15	51.7	12	46.2	0	0.0	1	20.0
2.	CIN1	2	25.0	1	14.3	7	24.1	3	11.5	0	0.0	2	40.0
3.	CIN2	1	12.5	0	0.0	6	20.7	5	19.2	1	4.2	0	0.0
4.	CIN3	0	0.0	2	28.6	1	3.4	5	19.2	11	45.8	1	20.0
5.	SCC	0	0.0	1	14.3	0	0.0	1	3.8	12	50.0	1	20.0
Total (n=99)		8	100	7	100	29	100	26	100	24	100	5	100

$\chi^2=67.07$ ($d_f=20$); $p<0.001$

Table 3: Diagnostic Efficacy of Cytology against Histopathology of tissue (n=94)*

Cytology positive (>= ASCUS)	HPE (CIN2 and above)		Total	Cytology positive (>= ASC-H, HSIL)	HPE (CIN2 and above)		Total		
	Positive	Negative			Positive	Negative			
Positive	45	41	86	Positive	27	4	31		
Negative	1	7	8	Negative	19	44	63		
Total	46	48	94	Total	46	48	94		
Sensitivity	Specificity	PPV	NPV	Accuracy	Sensitivity	Specificity	PPV	NPV	Accuracy
97.8	14.6	52.3	87.5	55.3	58.7	91.7	87.1	69.8	75.5

*After excluding 5 inadequate cases

Table 4: Correlation between Colposcopy Swede Score with HPE.

SN	Swede Score	CC		CIN1		CIN2		CIN3		SCC		Total
		N	%	N	%	n	%	N	%	n	%	
1.	0-4	17	47.2	4	26.7	0	0.0	0	0.0	0	0.0	21
2.	5-6	19	52.8	11	73.3	11	84.6	5	25.0	1	6.7	47
3.	7-10	0	0.0	0	0.0	2	15.4	15	75.0	14	93.3	31

$\chi^2=83.01$ ($d_f=4$); $p<0.001$

Table 5: Diagnostic Efficacy of Swede Score against HPE in total study population (n=99).

Swede Score 5 or more	HPE (CIN2 and above)		Total	Swede Score 7 or more	HPE (CIN2 and above)		Total		
	Positive	Negative			Positive	Negative			
Positive	48	30	78	Positive	31	0	31		
Negative	0	21	21	Negative	17	51	68		
Total	48	51	99	Total	48	51	99		
Sensitivity	Specificity	PPV	NPV	Accuracy	Sensitivity	Specificity	PPV	NPV	Accuracy
100	41.2	61.5	100	69.7	64.6	100	100	75.0	82.8

DISCUSSION

Multiparity has a definite role in etiopathogenesis of cervical cancer. Maximum women in our study were multiparous. In present study mean age of patients was 42.68 ± 11.69 years. Other authors have also reported increase in cytopathological abnormalities with increasing age and parity.¹³⁻¹⁶

The mean age at first intercourse in our study was 20.94 years which was higher as compared to other studies who reported an association between early age at first intercourse and increased risk of cervical cancer.^{14,17} Majority of the patients in our study (86.9%) were Hindu and 11.9 % were Muslims which is consistent with 2011 Census data where 79.8% Indian population practices Hinduism and 14.2% Islam.¹⁸ One study reported 100% increased risk of development of cervical cancer

and 60% increased risk of developing CIN in low socio-economic class.¹⁹ Contrary in our study population was from urban region and were of upper middle class. Most common Per-speculum finding (sign) in our study was cervical erosions (41.4%) which was much higher than reported by another study (19.2%).²⁰ In present study 33.3% patients had hypertrophied cervix while only 11.5% patients had such findings in another study.²¹

On analysis of cytology reports it was observed that high grade cytology lesions (HSIL) were in (31.3%), low grade cytology lesions (LSIL) in 55.6% and non-infective lesions or malignancy (NILM) in 8.1 %. While another study found 3.5% women with high grade cytology, 13.5% with low grade cytology and 83% with NILM.²¹ This difference between both studies can be attributed due to different inclusion criteria because present study further filtered patients of unhealthy cervix with colposcopy. One study evaluated women with unhealthy cervix and found 18% women with high grade colposcopy and 19% with low grade colposcopy²¹ but in our study high grade colposcopy was observed in 31.3%, low grade in 21.2% and intermediate grade colposcopy in 47.5%. The difference between both studies is due to different set of population being evaluated and different colposcopy scores being taken to define colposcopy findings.

One study reported incidence of CIN 1 and CIN 2,3 in 11.25% and 10% respectively and sensitivity of colposcopy was 83.33%.⁹ In our study chronic cervicitis was found in 36.4%, CIN 1 in (15.2%), CIN 2 in 13.1%, CIN 3 found in 20.2% and squamous cell carcinoma (SCC) was found in 15.2%. and sensitivity of colposcopy on Swede score ≥ 5 100%.

All women with high grade cytology had high grade disease (CIN 2+) on histopathology in present study other authors have found CIN 1/ low grade disease on HPE even on high grade cytology 20%, 30%, 8.3 respectively²¹⁻²³ 50% women with HSIL in our study had squamous cell carcinoma (SCC) cervix on HPE, near to findings reported in one study (41.67%).²³ but other studies reported lower rate (20%) and (10%) respectively.^{21,22} 1 case (12.5%) with NILM in our study had CIN 2 on HPE, similarly reported by another study (10.6%).²¹ Another studies reported lower percentage (3.4%) and (4%).^{22,23} This difference can be attributed to smaller sample size of our NILM group.

14.3% patient with reactive cellular changes had SCC on HPE, almost similar to finding of another study (11.1%).¹⁰ This emphasizes the need of evaluating persistently inflammatory smears in symptomatic females with unhealthy Cervix. 40% women in our study with inadequate smear had CIN3 and SCC on HPE thereby justifying the increased risk of high grade CIN in inadequate smears as proposed by one author.²⁴ Though the cervical cytology has been proven role in reduction of cervical cancer, but it has significant limitations, most important being is low sensitivity. The overall sensitivity and specificity of colposcopy at Swede score cut off of ≥ 5 was 100% and 41.2 % respectively. When the threshold was raised to higher Swede score cut off ≥ 7 , sensitivity fell to 64.6% while specificity rose to 100%. The overall accuracy of Colposcopy improved from 69.7% to 82.8% in our study. One study reported sensitivity of colposcopy was 89% at any threshold of lesion, which fell to 56% at cut off of high grade lesion.²⁵ Cytology and colposcopy findings of our study was compared for sensitivity, specificity and diagnostic accuracy with other studies, it was found that studies using Swede score ≥ 8 sensitivity was 38% and 42.4%, specificity was 95% and 100% respectively^{12,26} and at score ≥ 5 sensitivity was 100% and specificity 88.3%.¹² Another study reported sensitivity of pap smear 44.44% while sensitivity of colposcopy was 88.88% suggesting colposcopy as screening tool even women has no symptoms.¹⁰ Another study reported sensitivity and specificity of pap smear were 71.42% and 86.2% respectively and for colposcopy sensitivity 90.47% and specificity was 89.65% this justify the role of concurrent colposcopy along with cytology.²³ Various studies have shown low sensitivity of cytology in

detection of high grade cervical intraepithelial lesions. Hence need of newer screening modalities like concurrent colposcopy.²⁷ Colposcopy can be used as a valuable tool in abnormal cytology results to confirm the severity of disease and to obtain better idea in whom to take biopsy. This is a intermediate link between cytological screening and histopathological diagnosis.^{28,29}

CONCLUSION

Women with cytology reports of ASCUS and LSIL had CIN 2+ on histopathology, thereby highlighting the drawbacks of conventional cytology. Swede score ≥ 5 colposcopy was 100% sensitive and 41.2% specific and accuracy was 69.7%. At score ≥ 7 , 64.6% sensitive and 100% specific and diagnostic accuracy was 82.8%. Thus, Colposcopy can be used as a valuable concurrent tool in controversial cytological reports to confirm the severity of disease and to obtain better idea in whom to take biopsy.

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CONFLICT OF INTEREST

The authors declare no Conflict of interest.

ABBREVIATIONS

NILM: Non-infective lesions or malignancy; **LSIL:** Low grade cytology lesions; **HSIL:** High grade cytology lesions; **SCC:** Squamous cell carcinoma; **ASCUS:** Atypical squamous cells of undetermined significance; **ASC-H:** Atypical squamous cells cannot exclude a high-grade lesion; **CIN:** Cervical Intraepithelial neoplasia; **PPV:** Positive predictive value; **NPV:** Negative predictive value.

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