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Original Research Article

Colposcopic evaluation of unhealthy cervix and its correlation with pap smear and cervical biopsy

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ABSTRACT

Background: Carcinoma cervix is the second most common gynecological malignancy amongst Indian women aged 25-44 years after carcinoma breast. But it is preventable as it has a long pre-invasive phase. Various methods are available for screening the cervical cancer which can detect disease in early stages of pre-invasive phase. Present study has been conducted to see the correlation of colposcopy, histopathology and Pap smear. This study aimed to screen women with PAP smear and colposcopy who have abnormal symptoms and to compare and correlate colposcopy and cytology with histopathology. Further, this study aimed to evaluate the sensitivity and specificity of colposcopy versus pap smear in the early detection of dysplasias.
Methods: This study was conducted in the department of obstetrics and gynecology at AMCH, Shahbad from 1st January 2021 to 31st December 2022. This was a prospective clinical study on 200 randomly selected women who fulfilled selection criteria. They underwent Pap smear, colposcopy and cervical biopsy according to the criteria after informed consent.
Results: This study showed that colposcopy had high sensitivity (82%) and a low specificity (81%) when compared to Pap smear. In the present study, the accuracy of colposcopic impression was found to be 82%.
Conclusions: CIN lesions and early invasive cancers should be diagnosed in an earlier stage for instituting appropriate management. Colposcopy is definitely more sensitive and accurate than pap smear. By combining pap smear with colposcopy, we can maximise the sensitivity and specificity of cancer cervix screening.

Keywords: Cancer cervix, Colposcopy, Pap smear

INTRODUCTION

Cervical cancer is a major public health problem in India with an incidence of 1,22,844 cases and mortality of 67,477 cases every year.[1-3] Carcinoma cervix is the second most common gynecological malignancy amongst Indian women aged 25-44 years with an incidence of 3.5% after carcinoma breast (28.6%).[3,4]

Cancer cervix has a long phase of pre-invasive disease which progresses from various grades of dysplasia or Cervical Intraepithelial Neoplasia to invasive cancer. The concept pre-invasive disease of cervix, which denotes changes that are confined to the cervical epithelial cells was introduced in 1947. In most cases, CIN is believed to originate as a single focus in the transformation zone at the advancing SCJ. Once CIN occurs, it can progress horizontally to involve the entire TZ. There is a definitive association of human papilloma virus (HPV)- 16, 18, 31, 33 with CIN. HPV 16 is associated with high grade squamous cell carcinoma and HPV 18 is associated with adenocarcinoma.[5]

Early detection of pre invasive disease and treatment of CIN has the potential to improve the outcome of patients. Invasive cancer of cervix is considered to be a preventable

condition, since it is associated with a long pre-invasive stage of 10-20 years (CIN), making it amenable to screening and treatment. Screening can be done with various methods including PAP Smear, HPV DNA, VIA, VILI, colposcopy etc. PAP smear is cytological examination of exfoliated or scrapped cells to detect dysplasia. Because of the high false-negative rate of PAP smear, premalignant lesion of the cervix can be missed in women with inflammatory PAP smear findings. By colposcopy, the squamo-columnar junction and transformation zone is identified, acetic acid is used for abnormal areas which can be target biopsied. Cytological abnormality can be confirmed by histopathology of colposcopically biopsied lesions.

Aim of the study

To screen women with PAP smear and colposcopy who had abnormal symptoms. To screen women with colposcopy who had unhealthy cervix on visual inspection and women with dysplastic smears on PAP smear. To do histopathological analysis of colposcopically directed biopsies. To compare and correlate colposcopy and cytology with histopathology. To critically evaluate the sensitivity and specificity of colposcopy versus pap smear in the early detection of dysplasias.

METHODS

This study was conducted in the department of obstetrics and gynecology at AMCH, Shahbad from 1st January 2021 to 31st December 2022. This was a prospective clinical study on 200 randomly selected women who fulfilled selection criteria. Informed consent was taken from the participants. Ethical clearance was taken from institutional ethics committee with reference number AMCH/BIO/2020/11/02. The procedures followed were in accordance with the Helsinki Declaration. The criteria to select women for study were presence of either one or more of the factors given below.

Inclusion criteria

Married women with age 20-60 years. Patients with abnormal symptoms like profuse white discharge, post coital bleeding, intermenstrual bleeding or postmenopausal bleeding. Patients with clinically unhealthy cervix diagnosed by speculum examination like cervical erosion, cervicovaginitis, cervical polyp, condylomas etc. Patients with pap smears showing dysplasia.

Exclusion criteria

Women with age >60 years and <20 years. Patients with bleeding at the time of examination. Women with frank invasive cancer. Women who underwent total hysterectomy. Pregnant women and unmarried girls.

After taking written informed consent, history was taken and physical, local and per speculum examination was done. Pap smear was taken using Ayre's spatula and cytobrush and fixed using 95% alcohol. Normal saline colposcopy was done followed by inspection of cervix after applying 5% acetic acid. Examination through green filter was also done. Examination was done after staining the cervix with Lugol's iodine. Colposcope directed biopsy using a cervical punch biopsy forceps was taken from abnormal site and sent for HPE.

RESULTS

Among the 200 women, 17% (34/200) were between 20-29 years, 72 (36%) women were between 30-39 years, 30% (60/200) women belonged to the age group of 40-49 years and 17% (34/200) were between 50-59 years. Incidence of CIN was 2.9% (1/34) in 20-29 age group, 13.8% (10/72) in 30-39 age group, 15% (9/60) in 40-49 age group and 17.64% (6/34) in 50 years and above. Cumulative incidence of CIN was found to be high among the age group 30-49 years.

Table 1: Age distribution.

Age	Total no. of patients (n=200) (%)	CIN cases (n=26) (%)
20-29	34 (17)	1 (2.9)
30-39	72 (36)	10 (13.8)
40-49	60 (30)	9 (15)
50-59	34 (17)	6 (17.64)

Table 2: Complaints.

Complaints	Total no. of cases (n=200) (%)	CIN cases (n=26) (%)
Discharge per vaginum	110 (55)	16 (14.5)
Intermenstrual bleeding	15 (7.5)	4 (26.6)
Post coital bleeding	23 (11.5)	3 (13)
Postmenopausal bleeding	10 (5)	3 (30)
Loss of weight/appetite	10 (5)	-
Non-specific complaints	32 (16)	-

Out of the 55% (110/200) of patients who complained of white discharge 14.5% (16/110) had CIN. Of the 11.5% (23/200) who complained of post coital bleeding 13% (3/23) had CIN, 7.5% (15/200) had intermenstrual bleeding, among them 26.6% (4/15) had CIN, 5% (10/200) had postmenopausal bleeding, out of them 30% (3/10) were diagnosed to have CIN. Other complaints included loss of weight, loss of appetite, UTI, lower abdominal pain. Among them, none had CIN.

Table 3: Pap smear findings.

Result of Pap smear	No. of cases (n=200)	Percentage
Normal	10	5
Inflammatory atypia	162	81
Mild dysplasia	18	9
Moderate dysplasia	6	3
Severe dysplasia	4	2
Invasive cancer	-	-

Pap smear was taken for all the patients. Among them majority showed inflammatory atypia. Eighteen patients (9%) had mild dysplasia and only 4 (2%) had severe dysplasia.

Table 4: Acetic acid application.

Acetowhite areas within TZ	Total cases	CIN cases (%)
Flat acetowhite areas with sharp margin	34	9 (26.47)
Dense, opaque AW area with sharp margin with punctate/mosaic pattern	23	17 (73.91)
Total	57	26

Flat AW areas with sharp margins within the transformation zone indicated immature metaplasia or low-grade CIN. Among those with flat AW areas, 26.47% (9/34) had CIN. Among those with dense opaque AW area, 73.91% (17/23) had CIN.

Table 5: Lugol's iodine application.

Lugol's iodine application	Total cases (%)	CIN cases (%)
Positive	45 (22.5)	-
Partial positive	95 (47.5)	7 (7.36)
Negative	60 (30)	19 (31.66)
Total	200 (100)	26

Mature squamous epithelium-stained deep brown with Lugol's iodine, called Iodine positivity was found among 22.5% of cases. Among them none had CIN. Iodine partial positivity was found among 47.5%. Speckled or variegated appearance within an area of slight AW change might be due to immature metaplasia, regenerating epithelium, or CIN I. Yellow colour within an area of dense AW was highly suggestive of CIN II or III. Among them 7.36% (7/95) had CIN. Iodine negativity was seen in 30% (60/200) representing columnar epithelium, atrophy, inflammation, HPV infection or CIN. Among them 31.66% (19/60) had CIN.

Table 6: Colposcopic appearance of cervix.

Appearance	No. of cases	Percentage
Normal	6	3
Erosion	61	30.5
Inflammatory changes	33	16.5
Polyps	9	4.5
Leucoplakia	4	2
Acetowhite areas	35	17.5
Punctate pattern	16	8
Mosaic pattern	8	4
Atypical vessels	-	
Unsatisfactory	28	14
Total	200	100

Among the 200 cases studied, 29.5% (59/200) were diagnosed as colposcopically abnormal. Among the abnormal cases, AW areas were diagnosed in 17.5% (35/200), punctate pattern of vessels was seen in 8% (16/200) of cases and mosaic pattern of vessels was diagnosed in 4% (8/200) of women. Normal finding was present in 3% (6/200), erosion cervix in 30.5% (61/200), inflammatory changes were seen in 16.5% (33/200) and polyps were diagnosed in 4.5% (9/200), leucoplakia was found in 2% (4/200) and unsatisfactory colposcopic finding was seen in 14% (28/100) and they all underwent endocervical curettage.

Table 7: HPE findings.

HPE	No. of cases	Percentage
Chronic cervicitis	88	44
Chronic cervicitis+ erosion	56	28
Erosion cervix	7	3.5
Epithelial hyperplasia	5	2.5
Polyp	10	5
Mild dysplasia	16	8
Moderate dysplasia	10	5
Severe dysplasia	8	4

All 200 cases were subjected to colposcopically directed biopsy. Majority of cases, 44% (88/200) had chronic cervicitis, 28% (56/100) had chronic cervicitis with erosion, 3.5% (7/200) had erosion cervix, 2.5% (5/200) had epithelial hyperplasia, 5% had benign polyp, 8% (16/200) had mild dysplasia, 5% (10/200) had moderate dysplasia, 4% (8/200) had severe dysplasia.

Correct estimation by pap smear was found in 158 (79%) patients. Under estimation by pap smear was seen in 18 (9%) patients.

Accuracy for PAP smear and colposcopy was found to be 78.5% and 82% respectively (Table 11).

Table 8: Comparison of Pap smear with HPE results.

Pap smear	No.	Normal	HPE mild dysplasia	HPE moderate dysplasia	HPE severe dysplasia	Total no.	%
Normal/inflammatory	172	148 (86.04)	10 (5.8)	8 (4.6)	6 (3.4)	24	13.8
Mild dysplasia	18	15 (83.3)	3(16.6)	-	-	3	16.6
Moderate dysplasia	6	2 (33.3)	-	4 (66.6)	-	4	66.6
Severe dysplasia	4	1 (25)			3 (75)	3	75
Total dysplastic smears	28	18 (64.2)	3 (10.7)	4 (14.2)	3 (10.7)	10	35.7

Table 9: Colposcopic correlation with HPE findings.

Abnormal colposcopic finding	Number of cases	Percentage	CIN 1	CIN 2	CIN 3	Inv. Ca
Acetowhite	35	59.3	10	2	-	-
Punctate	16	27.1	6	6	2	-
Mosaic	8	13.5	-	2	6	-
Atypical vessel	-					-
Total	59	100	16	10	8	-

Table 10: Sensitivity and specificity of colposcopy.

Colposcopy	HPE positive	HPE negative	Total
Positive- 59	True positive- 28	False positive- 31	59
Negative- 138	False negative- 6	True negative- 135	141
Total	34	166	200

Table 11: Abstract.

Test	True positive	False positive	True negative	False negative	Sensitivity	Specificity	PPV	NPV
Pap smear	10	18	147	24	29	89	35	85
Colposcopy	28	31	135	6	82	81	47	96

DISCUSSION

In the present study, 200 women with abnormal symptoms were screened with colposcopy and results were correlated with PAP smear and biopsy to determine the sensitivity and specificity of these methods in detecting CIN.

In present study, majority of women were in age group of 30-39 years. High incidence of CIN was also found among the age group of 30-39 years. Ten out of 26 females having CIN were in age group of 30-39 years. Kalyankar et al had maximum number of females in 31-40 age group.[6] Kushtagi and Fernandes, in their study showed the prevalence of CIN was higher in women over 30 years.[7] Vaidya showed in his study that CIN was more prevalent in the age group of >35 years.[8] These findings are similar to our study.

Among the complaints, majority of women (55%) complained of excessive white discharge per vaginum. Among them CIN was found in 14.5% (16/110). Excessive vaginal discharge playing a role in contributing to the development of CIN was also proved to be a risk factor in the study conducted by Vaidya et al and Durdi et al reported vaginal discharge to be the most common complaint in their study.[8,9]

Regarding the clinical appearance of cervix, the most common finding was erosion cervix where the squamous epithelium of ectocervix was replaced by the columnar epithelium of endocervix. Erosion was seen in 52% (104/200), rest of patients showed congestion in 20.5%, hypertrophy in 11%, polyp was found in 12.5% of cases. CIN was found in 17% of those having erosion, 2% having congestion and 7% having hypertrophy. These findings are similar to the rates in other studies.[10,11]

Pap smear was taken for all cases. It showed mild dysplasia in 9% (18/200), moderate dysplasia in 3% (6/200) and severe dysplasia in 2% (4/200). Pap smear correctly estimated CIN in 79% and underestimated in 9% and overestimated in 12% (false positivity). Sensitivity of pap smear was found to be very low- 29% compared to its specificity which was 89%. This was attributed to the high number of false negative smears. Sensitivity and specificity of PAP smear given by Londhe et al was 13.2% and 96.3%, by Shalini et al was 56% and 90%, by Basu et

al was 29.5% and 92.3%, by Singh was 20% and 91.25%.[12-15] These results are comparable to our study.

This data suggested that with colposcopy as a screening tool, the rate of false negative cytology could be significantly reduced. Colposcopy enhanced cervical screening particularly in women with otherwise negative smears. Correlation between cytology and HPE was poor as far as mild dysplasia was concerned. But the correlation was good for moderate and severe dysplastic lesions. Correlation between colposcopic findings and biopsy showed a good correlation for higher grade lesions (CIN II and CIN III).

Sensitivity was found to be 82% and specificity was 81%. This showed a high sensitivity and a low specificity when compared to Pap smear. Low specificity when compared to pap smear was due to the high incidence of unsuspected AW epithelium which might be due to inflammation, immature metaplasia, erosion and latent HPV infections. Sensitivity and specificity of colposcopy by Pete et al was 87% and 15% respectively, by Massad was 89% and 52%, Singh et al was 95% and 63.5%.[15-17] These results are comparable to our study.

In the present study, the accuracy of colposcopic impression was found to be 82%. Massad et al reported an accuracy of 80%.[17]

So, in nutshell, although pap smear is ideal for mass screening being economical and can be obtained by untrained professional yet it can't evaluate extent of lesion and can't differentiate between inflammatory and neoplastic lesions. So, sensitivity to detect CIN lesions is less with pap smear as compared to colposcopy.

CONCLUSION

CIN lesions and early invasive cancers should be diagnosed in an earlier stage for instituting appropriate management since invasive cancer of cervix is considered to be preventable as it is associated with a long pre-invasive stage (CIN) making it amenable to screening and treatment.

From the results of this study, it is evident that colposcopy is definitely more sensitive and accurate than pap smear. By combining pap smear with colposcopy, we can maximise the sensitivity and specificity of cancer cervix screening. Colposcope in general has a role in the evaluation of women with abnormal pap smears, unhealthy cervix, and seems to be more accurate in detecting CIN. Hence, primary colposcopy may be incorporated into genito urinary tract screening at first visit.

Thus, colposcopy offers an excellent tool in evaluating cervical lesions. There is a need to introduce and encourage the practice of colposcopy, in all medical institutions to evaluate and manage patients with clinically suspicious cervix and abnormal pap smears.

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REFERENCES

1. Nandakumar A, Ramnath T, Chaturvedi M. The magnitude of cancer cervix in India. Indian J Med Res. 2009;130(3):219-21.
2. Singh A, Kujur A. Changing trends in genital cancer. Int J Reprod Contracept Obstet Gynecol. 2017;6:850-5.
3. Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, et al. GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11. Lyon, France: International Agency for Research on Cancer; 2013.
4. National Centre for Disease Informatics and Research, National Cancer Registry Programme, ICMR. Time trends in cancer incidence rates, 1982-2010. Bangalore, India: NCDIR-NCRP (ICMR); 2013.
5. ICO Information Centre on HPV and cancer. Human Papillomavirus and Related Diseases in India (Summary Report 2014-08-22); 2014.
6. Kalyankar VY, Kalyankar BV, Gadappa SN, Kute S. Colposcopic evaluation of unhealthy cervix and it's correlation with Papanicolau smear in cervical cancer screening. Int J Reprod Contracept Obstet Gynecol. 2017;6:4959-65.
7. Kushtagi P, Fernandez P, Significance of persistent inflammatory, cervical smears in sexually active women of reproductive age. J Obstet Gynecol India. 2002;52(1):124-6.
8. Vaidya A, Comparison of pap test among high risk and non risk female. Kathmandu Univ Med J. 2003;1(1):8-13.
9. Durdi GS, Sherigar BY, Dalal AM, Desai BR, Malur PR. Correlation of colposcopy using Reid colposcopic index with histopathology-a prospective study. J Turk German Gynecol Assoc. 2009;10(4):205.
10. Duggan MA, McGregor SE, Stuart GC, Morris S, Chang-Poon V, Schepansky A, et al. The natural history of CIN I lesions. Eur J Gynecol Oncol. 1998;19(4):338-44.
11. 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;5:337-41.
12. Londhe M, George SS, Seshadri I. Detection of CIN by VIA. Indian J Cancer. 1997;34(2):88-91.
13. Shalini R, Amita S, Neera MA. How alarming is post coital bleeding- a cytologic, colposcopic and histological evaluation. Gynaecol Obstet Invest. 1998;45(3):205-8.
14. Basu PS, Sankaranarayanan R, Mandal R, Roy C, Das P, Visual inspection of cervix with acetic acid and

cytology in the early detection of cervical neoplasia in Kolkotta- India. Int J Cancer. 2005;13(6):626-32.
15. Singh SL, Dastur NA, Nanavat MS. A comparison of colposcopy and the Papanicolaou smear: sensitivity, specificity and predictive value. Bombay Hosp J. 2000;42(3):447-51.
16. Pete I, Toth V, Bosze P. The value of colposcopy in screening cervical carcinoma. Eur J Gynaecol Oncol. 1998;19(2):120-2.
17. Massad LS, Collins YC. Strength of correlation between colposcopic impression and biopsy. J Gynecol Oncol. 2003;89(3):424-8.

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