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ORIGINAL RESEARCH

Can Pap smear and colposcopy anticipate cervical pathology earlier to hysterectomy?

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ABSTRACT

Aim: To evaluate the exactness of Pap smear and colposcopy as measure of cervical histopathology in patients undergoing total hysterectomy for benign indications, and to determine the incidence of unforeseen cervical pathology in these patients. **Study Design**: Prospective observational study. **Patients and Methods:** Ninty seven women planned for total hysterectomy for benign indications were subjected to preoperative Pap smear and colposcopy, at Index Medical College Hospital and Research Centre, Indore amid the period from September 2023 to March 2024. Discoveries were compared with the histopathology results of the cervices of the hysterectomy specimens. **Results:** Out of 97 patients included in our study, 12 had an abnormal Pap smear and 46 had abnormal findings on colposcopy. Abnormal cervical pathology was found in 32 hysterectomy specimens. Pap smear had a sensitivity and specificity of 34.3% and 96.7%, respectively, while colposcopy had a sensitivity and specificity of 97.7% and 74.6%, respectively. The incidence of unforeseen cervical pathology was 65.7% depending on the Pap alone, and 2.3% when depending on colposcopy. **Conclusion:** Pap smear has a good specificity, but a low sensitivity in anticipating cervical histopathology. For the time being, colposcopy has elevated sensitivity and a reasonable specificity in foreseeing the histopathology. Colposcopy has a elevtaed sensitivity and specificity as a pathology prognosticator, when compared to Pap smear.

Key Words: Cancer cervix, cervical screening, CIN, colposcopy, cytology, histopathology, hysterectomy, Pap smear

INTRODUCTION

Hysterectomy is the Foremost commonly performed major gynaecological operation around world . It can be done for both malignant and non-malignant gynaecological conditions[1, 2].

Cancer cervix is the third most common gynaecological malignancy – after breast and endometrial cancer – which can affect women. Invasive cancer cervix is a preventable disease as it remains in a pre-invasive stage for long periods, and accessible screening programs permit early detection and management of cervical dysplasia[3, 4]. Cytology (Pap smear) is a simple, non-invasive and effective method for detection of pre-malignant changes within cervix and vagina. Other available apparatus are colposcopy and histopathology. The colposcope permit direct visualization of the cervix enabling view of Transformation zone[5, 6]. Coincidental discoveries have been found in cervical tissues in hysterectomy specimens done for Benign conditions; hence, expanding the significance of screening females 35 to 65 years by Pap smear and colposcopy[7].

In India –where there is no official cervical screening program – preoperative cytology and colposcopy permit alteration of the surgical plan, in this way dodging advance surgeries and complications due to metastasis or stump recurrence[8].

The point of our work was to assess the exactness of preoperative appraisal of the cervix by colposcopy and Pap smear, compared to histopathological examination of the cervix after total hysterectomy.

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MATERIALS AND METHODS

A prospective study was conducted among one hundred women who presented with different gynaecological complaints at the gynaecology outpatient clinic in Index Medical College Hospital and Research Centre, Indore, amid the period from September 2023 to March 2024. The Ethics Committee of Malwanchal University, Index affirmed the study protocol. Written informed consent was obtained from all patients who met the inclusion criteria after the nature of the procedures were completely clarified. Patients who were admitted for total hysterectomy for benign indications were told that they would be subjected to preoperative Pap smear and colposcopy, then the outcome would be used to differentiate the histopathological findings of the cervices to the hysterectomy specimens. Inclusion criteria were: married or previously married women of age group 35 to 70 years undergoing total hysterectomy. Exclusion criteria were: virgins, age above 70 years and below 35 years and patients who already had total hysterectomy, patients as of now analyzed or treated for cervical cancer.

All participants were put through to full history taking, general and abdominal examination, and local examination. Routine Pap smear was carried out using Ayres's spatula to rub the cervix in 360 degrees. The material collected was spread on a glass slide which was drenched in alcohol 95% as a fixative for at slightest 20 minutes then stained by Papanicolaou's stain and inspected beneath a light microscope. The cytological translation of the smears was done according to the Bethesda system 2014[9]: Negative for Intraepithelial Lesion or Malignancy (NILM), Low-grade Squamous Intraepithelial Lesion (LSIL), High-grade Squamous Intraepithelial Lesion (HSIL) and Malignancy. Usual smear was defined as one which appeared NILM, while an atypical smear was defined as a smear with LSIL, HSIL or Malignancy. Colposcopic examination was done by a video colposcope "VICO". The cervix was washed with saline to evacuate any excess discharges. The green filter was connected to distinguish anomalous vessels. Acetic acid 3% was applied to the cervix utilizing cotton swabs to upgrade definition of the squamo-columnar junction and transformation zone. Schiller's Iodine test was done by applying Lugol's iodine to the cervix, which stains mature squamous epithelial cells in a mahogany colour due to the high cellular glycogen content. The extent with no iodine uptake mainly if preceded by aceto-white areas were considered abnormal and biopsied Table 1: showing Age and duration of marriage as groups . Squamo-columnar junction and lesions of the cervix were to assess it by colposcopy as areas of aceto-white changes, areas of punctuation, areas of mosaicism and areas of atypical blood vessels. A colposcopic examination appearing any of the forementioned lesions was defined as abnormal.

After total hysterectomy, specimens were fixed in buffered formalin 10%, and sent to the histopathology research facility to be implanted in paraffin blocks. From these paraffin pieces slides were prepared for staining with hematoxylin and eosin for histopathological examination. Outcomes were explained as: cervicitis, CIN1 (cervical intraepithelial neoplasia), CIN2, CIN3 and SCC (squamous cell carcinoma). Abnormal histopathology was defined as a one showing CIN or SCC.

RESULTS

The whole number of women welcomed to participate in the study was 120 women. 20 were prohibited for not assembly the inclusion criteria. Three women pulled back from the study, another two had unregulatory pap smears and four had unsuitable colposcopy. At last , Ninty five women participated in the study. The age of studied group ranged from 40 to 55 years with a mean and standard deviation (SD) of 46.23 ± 4.65 years. The term of marriage was between 6 and 38 years with mean and SD of 23.13 ± 8.06 years (Table 1).

Most of the patients (75%) were married at the time of the study. Those married once in their lifetime were 98%, who utilized contraception were 70%, non-smokers were 94%, and multipara more than 4 times were 44% of the participants. The foremost common complaint was menstrual disorder constituting 48% of all complaints (Table 2).

When connecting the patients' complaints to the ultimate histopathology (of the cervices in the hysterectomy specimens), patients in whom menstrual disorder was the main complaint, CIN was found in 13 out of the 40 patients (32.5%). CIN was also found in 9 of the 32 abdominal pain patients (28%), and in 6 of the 25 post-menopausal bleeding patients (24%). SCC was seen in only one patient in the study, whose complaint was menstrual disorder (Table 3).

Table 1: Age and duration of marriage as groups

AGE {YEARS} DURATION OF MARRIAGE			
		Frequency	**Percent**
Marital status	**Married**	**86**	**86%**
	Widow	**8**	**8%**
	Divorced	**3**	**3%**
Number of Marriages	**Once**	**97**	**97%**
	Twice	**4**	**4%**
Contraception	**Yes**	**74**	**74%**

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	No	**28**	**28%**
Smoking	**Yes**	**3**	**3%**
	No	**97**	**97%**
Parity	**Nullipara**	**2**	**2%**
	Para 1	**14**	**14%**
	Para2	**22**	**22%**
	Para3	**26**	**2%**
	Para4	**44**	**44%**
Complaint	**Menstrual Disorder**	**42**	**42%**
	Post-Menopausal bleeding	**27**	**27%**
	Lower abdominal pain	**32**	**32%**
	Uterine descent	**3**	**3%**

Table 2: Demographic data of the patients

Groups	Frequency	Percent
40-45	**28**	**28%**
45-50	**46**	**46%**
>50	**24**	**24%**
5-10 years	**10**	**10%**
10-20years	**28**	**28%**
>20 years	**57**	**57%**

Regarding the clinical appearance of cervix by speculum examination, we had three primary discoveries, namely normal cervix, cervical erosion and suspicious cervix. Cervical erosion was the regular abnormal finding (84%). correlating with the histopathological findings , 1 8 o f th84 patients with erosions had CIN (21%). Two patients had a suspicious cervix, one was found to have CIN 2 by histopathology and the other had SCC (Table 4) connection between age, parity and duration of marriage, and the histopathological findings are shown in Tables 5-7. Most elevated recurrence of CIN was found in the age group of 45 to 50 years (Tables 5). The higher the patients' parity, the higher the frequency of CIN (Tables 6). Also, the longer the duration of marriage the higher the frequency of CIN (Tables 7)

Table 3: Complaint and histopathology

	Histopathology findings					
Complaint	**Cervicitis**	**CIN1**	**CIN2**	**CIN3**	**SCC**	**TOTAL**
Menstrual disorder	**28%**	**10%**	**2%**	**-**	**2%**	**42%**
Postmenopausal bleeding	**21%**	**5%**	**1%**	**-**	**-**	**23%**
Abdominal pain	**17%**	**6%**	**2%**	**1%**	**-**	**32%**
Uterine descent	**4%**	**1%**	**-**	**-**	**-**	**3%**
Total	**70%**	**22%**	**6%**	**1%**	**1%**	**100%**

Table 4: Cervical examination and histopathology

	Histopathology Findings					
	CERVICITIS	**CIN1**	**CIN2**	**CIN3**	**SCC**	**TOTAL**
NORMAL	**4%**	**10%**	**-**	**-**	**-**	**14%**
EROSION	**68%**	**10%**	**5%**	**1%**	**-**	**84%**
SUSPICIOUS	**-**	**-**	**1%**	**-**	**1%**	**2%**
TOTAL	**70%**	**22%**	**6%**	**1%**	**1%**	**100%**

Table 5: Age and histopathology

AGE GROUP	CERVICITIS	CIN1	CIN2	CIN3	SCC	TOTAL
40-45	**19%**	**8%**	**1%**	**-**	**-**	**28%**
45-50	**33%**	**10%**	**4%**	**1%**	**-**	**48%**
>50	**20%**	**2%**	**1%**	**-**	**1%**	**24%**
	70%	**22%**	**6%**	**1%**	**1%**	**100%**

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Table 6: Parity and Histopathology

	Histopathology Findings					
PARITY	**CERVICITIS**	**CIN1**	**CIN2**	**CIN3**	**SCC**	**TOTAL**
NULLIPARA	**3%**	**1%**	**-**	**-**	**-**	**4%**
PARA1	**10%**	**1%**	**-**	**-**	**-**	**11%**
PARA2	**15%**	**3%**	**1%**	**-**	**-**	**19%**
PARA3	**19%**	**3%**	**2%**	**-**	**-**	**24%**
PARA4 OR>4	**23%**	**13%**	**3%**	**1%**	**1%**	**41%**
Total	**70%**	**22%**	**6%**	**1%**	**1%**	**100%**

Table 7: Duration of marriage and Histopathology

Histopathology Findings						
DURATION OF MARRIAGE	**CERVICITIS**	**CIN1**	**CIN2**	**CIN3**	**SCC**	**TOTAL**
5-10	**12%**	**2%**	**1%**	**-**	**-**	**15%**
10-20	**18%**	**8%**	**2%**	**-**	**-**	**28%**
>20	**40%**	**12%**	**3%**	**1%**	**1%**	**57%**
TOTAL	**70%**	**22%**	**6%**	**1%**	**1%**	**100%**

Comparison of Pap smear with histopathology appeared that out of total 13 patients with abnormal Pap smear, 10 (77%) had abnormal histopathology, and of the 87 patients with normal smears, 67 (77%) had normal histopathology (Table 8). There were 3 false positive cases (23%). There were 20 false negative cases i.e. cytology missed 20 cases with abnormal histopathology. The calculated sensitivity and specificity for Pap smear were 33.3% and 95.7%compared to histopathology, denoting a very low sensitivity compared to its specificity. Colposcopy discoveries were ordinary in 56 (56%) women, and 44 (44%) had abnormal findings. Among the 44 with abnormal colposcopy, 29of the 44 (66%) had abnormal histopathology, while in the remaining 15 (34%) women, the histopathology was normal (Table 9). On the other hand, out of the 56 women with normal colposcopy, histopathology was abnormal in one case i.e. 1.8% false negative. The calculated sensitivity and specificity of colposcopy findings compared to histopathology was 96.7% and 78.6%.

A correlation of Pap smear discoveries to colposcopy discoveries is demonstrated in Table 10. All 13 women with atypical smears had an atypical colposcopy examination. Alternatively, of the 87 women with typical smears, 31 (35.6%) had atypical colposcopy. The sensitivity and specificity of Pap smear was 29.5%and 100%, respectively, compared to colposcopy. The total number of women who had an abnormal cervical histopathology – CIN or malignancy – in their hysterectomy specimens was 30 cases. Pap smear could predict only ten of them, while colposcopy missed only one case. However, colposcopy had a false positive result in 14 cases with a normal histopathology, meanwhile Pap smear had only three false positive results. This means that in our present finding, the incidence of unexpected cervical pathology was 66.7% depending on the Pap alone, and only 3.3% when depending on colposcopy.

Table 8: Association of Pap smear to histopathology

	Histopathology Findings					
Pap Smear	**Cervicitis**	**CIN1**	**CIN2**	**CIN3**	**SCC**	**TOTAL**
NILM	**66%**	**20%**	**1%**	**-**	**-**	**87%**
LSIL	**4%**	**2%**	**2%**	**-**	**-**	**8%**
HSIL	**-**	**-**	**3%**	**1%**	**-**	**4%**
Malignancy	**-**	**-**	**-**	**-**	**1%**	**1%**
Total	**70%**	**22%**	**6%**	**1%**	**1%**	**100%**

Table 9: Correlation of colposcopy to histopathology

	Histopathology Findings					
Colposcopy Findings	**Cervicitis**	**CIN1**	**CIN2**	**CIN3**	**SCC**	**TOTAL**
Normal	**54%**	**1%**	**-**	**-**	**-**	**55%**
Aceto-white area	**8%**	**11%**	**2%**	**-**	**-**	**21%**
Fine punctations	**7%**	**3%**	**1%**	**1%**	**-**	**12%**
Coarse punctations	**2%**	**6%**	**2%**	**-**	**-**	**10%**
Mosaic punctations	**-**	**-**	**1%**	**-**	**1%**	**2%**
Total	**70%**	**22%**	**6%**	**1%**	**1%**	**100%**

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Table 10: Association of Pap smear and colposcopy

Histopathology Findings						
Pap Smear Findings	**Normal**	**Fine Punctations**	**Aceto-white areas**	**Coarse punctations**	**Mosaic punctations**	**Total**
NILM	**56%**	**10%**	**18%**	**3%**	**-**	**87%**
LSIL	**-**	**-**	**3%**	**5%**	**-**	**8%**
HSIL	**-**	**1%**	**-**	**2%**	**1%**	**4%**
Malignancy	**-**	**-**	**-**	**-**	**1%**	**1%**
Total	**56%**	**11%**	**21%**	**10%**	**2%**	**100%**

DISCUSSION

In the present study, Pap smear and colposcopy were done for 100 cases undergoing total hysterectomy. Colposcopy showed a higher sensitivity and specificity than Pap smear in foreseeing the cervical histopathology .Unforeseen abnormal cervical pathology was found in 3.3% of cases when depending on colposcopy, and in 66.7% when depending on Pap smear.

Colposcopy as a screening methodology has been addressed by many authors, and is predominant in accuracy, sensitivity and specificity compared to Pap smear. The study by Sideri et al. showed a good correlation between colposcopic and histopathological discoveries, with a sensitivity of 90.2%sensitivity and a specificity of 48.6% in predicting CI[1]. In a meta-analysis which included eight longitudinal studies, colposcopic accuracy was 89% versus histopathology. The sensitivity of colposcopy ranged between 87 and 99%, and specificity ranged between 26 to 87[5].

Several studies support the incidental finding of abnormal cervical histopathology in hysterectomy specimens for benign indications. Chapman et al. reported that 27% of women diagnosed with occult cervical cancer at the time of benign hysterectomy had a normal pap smear before their operations [2]. In an Indian study, 14 out of 100women undergoing hysterectomies for benign indications, were later on found to have CIN in their hysterectomy specimens [3]. Another study reviewed supposed benign hysterectomy specimens of 430 patients who all had normal preoperative Pap smears, and found 5 (1.2%) to have abnormal cervical Histopathology [3].

Strengths and weaknesses of the study

The strength of the study lies in pointing out the importance of cervical screening, and addressing the possibility of having a diseased cervix in patients undergoing hysterectomy. Also, Hospital of Index University in which the study was conducted, isa large university hospital that attracts a wide variation of healthcare seekers from different socioeconomic and educational categories.

Our study is not short of weaknesses. Pap smears at our hospital are carried out in the conventional way, and not by liquid based cytology, and the HPV status of our patients was not known.

CONCLUSION

Pap smear has a good specificity, but a low sensitivity in predicting cervical histopathology. Meanwhile, colposcopy incorporates a high sensitivity and a reasonable specificity in predicting the histopathology. Colposcopy has a elevated sensitivity and specificity as a pathology predictor, when contrast to Pap smear. In spite of this, unpredicted cervical pathology could be encounter in hysterectomy specimens postoperatively.

Relevance and possible implications of our findings .Colposcopy could be incorporated as a routine cervical screening tool, in combination with Pap smear. Also, in situations where national screening programs are not available, and patients are scheduled for hysterectomy, preoperative cervical assessment by Pap smear and colposcopy is advised to avoid unexpected histopathological findings later. In cases of unknown status of the cervix, it would be reasonable to avoid a subtotal hysterectomy

CONFLICT OF INTEREST

There are no conflicts of interest .

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