Diagnostic efficacy of pairing cytology and colposcopy in screening of cervical neoplasia

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Abstract

Introduction: Cancer of uterine cervix is the most common genital tract malignancy. Pap smear though widely used screening test for cervical cancer has the disadvantage of low sensitivity. Colposcopy has higher sensitivity compared to Pap smear. Concurrent screening with Pap smear and colposcopy can overcome this problem.

Aim: The aim of the study was correlation of Pap smear and colposcopic finding with directed biopsy in detection of cervical neoplasm.

Methods: During the study period in 57 symptomatic patient's simultaneous Pap smear, colposcopic examination, followed by directed biopsy was performed. Data was recorded and analyzed.

Results: In correlation between cytology and biopsy, sensitivity of cytology was 82.3%, specificity 96.9% and accuracy of 92%. In correlation between colposcopy and biopsy, sensitivity of colposcopy was 94.1%, specificity 87.8% and accuracy of 90%.

Conclusion: High sensitivity in colposcopy as compared to cytology and high specificity in cytology as compared to colposcopy emphasizes the need for pairing these methods to achieve better results.

Keywords: Accuracy, Cervical cancer, Colposcopy, Histopathology, Pap smear.

Introduction

Cancer of cervix is the leading cause of cancer-related death among women in developing countries, where more than 80% of new cases occur. Cervical cancer continues to be the most common genital tract malignancy in India. Cancer of cervix is preceded by recognizable precancerous histological and cytological changes which provides opportunity for early detection of cervical neoplasm[1,2].

Cervical cytology is the accepted method of screening for cervical cancer all over the world but it has low sensitivity. In the presence of an abnormal Pap smear, a tissue diagnosis is essential before proceeding with definitive therapy. Although cytology is accurate in predicting severity of cervical lesion, it cannot determine their location or extent. A random cervical biopsy in the absence of visible lesion may result in a false negative histologic diagnosis[3].

With the introduction of colposcope, comparative studies substantiated that it was possible to accurately localize the area of abnormal cervical epithelium by colposcopic examination for the selection of biopsy site. Colposcopy as an adjunctive screening test has high sensitivity and can provide immediate results for evaluation of cervical lesions. Executing targeted biopsy, colposcopy can be useful in defining diagnosis of preinvasive lesions and carcinoma of cervix[4,5].

Complete and accurate assessment of the nature of a cervical neoplastic lesion relies on three methods of investigation: cervical smear, examination of cervix with colposcope and histology of a biopsy specimen. Ideally the grade of cervical neoplasia discovered during all three methods should be the same, but in practice disagreement of more than one method is not uncommon[6].

The aim of the study was correlation of Pap smear and colposcopic finding with directed biopsy to assess the advantage of concurrent testing by cytology and colposcopy in the detection of cervical neoplasm.

Materials and Methods

The Present study was conducted in the Department of Pathology, tertiary care teaching hospital in Karnataka for a period of 12months after taking approval from Institutional Ethical Committee.

During the study period 57female patients above the age of 18years, with symptoms of vaginal discharge and other gynecological problems attending the out patient department of OBG following informed consent were subjected for concurrent Pap smear examination, colposcopy and directed biopsy. Pregnant women, teenage girls, hysterectomy patients, unsatisfactory smear (3) and inadequate biopsies (4) were excluded. Total of 50 cases were included in the study.

Clinical details were obtained according to the structured proforma. The relevant clinical findings were collected by personal interview and examination of the patient. Pap smears were taken using Ayre's spatula from squamocolumnar junction. Material spread evenly on glass slide and fixed with cytofix containing 95% ethyl alcohol and carbowax. Fixed smears received were stained with Pap stain and reported according to The Bethesda System.

Colposcopic examination was performed using Gold way SLC-2000 video colposcope. Normal saline was applied to the cervix to remove excess mucus. Green filter of colposcope was used to appreciate vascular pattern and 3% acetic acid applied to visualize the atypical transformation zone, following which biopsies were taken using punch biopsy forceps. Biopsy specimens received in 10% formalin fixative were routinely processed and sections stained with hematoxylin and eosin. Results were categorized according to WHO.

Statistical analysis was carried out by calculating sensitivity, specificity, positive and negative predictive value for Pap smear and Colposcopy.

Results

Total of 50 cases were included in the study. Age range was from 20-70years with mean age of 36.4years. Majority of patients were in the age group of 21-30 years with 19 (38%) cases followed by 31-40 years 17 (34%), 41-50 years 8(16%), 51-60 years 4 (8%), 61-70 years 1 (2%) and 11-20 years 1 (2%).

Commonest clinical presentation was white discharge per vagina(WDPV) with 37 (74%) cases, followed by irregular bleeding 6 (21%), mass per vagina 3 (6%), post-menopausal bleeding 2 (4%) and pain abdomen with WDPV 2(4%).In majority of patients' clinical status of cervix was cervical erosion with 27 (54%) cases, followed by cervicitis 13 (26%), cervical hypertrophy 7 (14%), atrophy 2 (4%) and cervical polyp 1 (2%).

Commonest colposcopic finding was acetowhite area with 20 (40%) cases, followed by multiple abnormal colposcopic finding 18 (36%) [Table 1]. Colposcopic diagnosis was inflammatory in 27 (54%) cases followed by cervical intraepithelial neoplasia (CIN) 1 in 12 (24%) patients [Table 2]. Cytological diagnosis was inflammatory smear in 32 (64%) cases followed by LSIL in 7 (14%) [Table 3]. Histological diagnosis was chronic nonspecific cervicitis among 33(66%) cases and CIN-19 (18%) cases. [Table 4] [Fig. 1-5].

In correlation between cytology and biopsy, sensitivity of cytology was 82.3%, specificity 96.9%, false negative rate of 17.6%, false positive rate of 3% and accuracy of 92%.

In correlation between colposcopy and biopsy, sensitivity of colposcopy was 94.1%, specificity 87.8%, false negative rate of 6.25%, false positive rate of 12.1% and accuracy of 90%. [Table 5-6]

Table 1: Distribution of cases according to colposcopic findings.

Colposcopic Findings	Number of cases	Percentage
Acetowhite area	20	40.0
Punctation	06	12.0
Mosaicism	02	04.0
Surface irregularity	02	04.0
Atypical vessels	02	04.0
Multiple abnormal colposcopic findings	18	36.0
Total	50	100

Table 2: Distribution of colposcopic diagnosis.

Colposcopic Diagnosis	Number	Percentage
Normal	03	06.0
Inflammatory	27	54.0
CIN1	12	24.0
CIN2	05	10.0
CIN3	01	02.0
Invasive carcinoma	02	04.0
Total	50	100

(CIN: Cervical intraepithelial neoplasia)

Table 3: Distribution of cytological diagnosis.

Cytological diagnosis	Number	Percentage
NILM	03	06.0
Inflammatory	32	64.0
LSIL	07	14.0
HSIL	05	10.0
HSIL&AGC	01	02.0
SCC	02	04.0
Total	50	100

[NILM: Negative for intraepithelial lesion/ malignancy AGC: Atypical glandular cells (AGC), LSIL: Low grade squamous intraepithelial lesion, HSIL: High grade squamous intraepithelial lesion (HSIL)]

Table 4: Distribution of Histopathological diagnosis.

Histopathological Diagnosis	Number of cases	Percentage
CNSpC	33	66.0
CIN 1	09	18.0
CIN 2	05	10.0
CIN 3	01	02.0
SCC	02	04.0
Total	50	100

[CNSpC: Chronic Non Specific Cervicitis, CIN: Cervical intraepithelial neoplasia, SCC: Squamous cell carcinoma]

Table 5: Correlation between cytology and Histopathogy.

Cytological Diagnosis	No	Histopathological diagnosis				
		CNSpC	CIN1	CIN2	CIN3	SCC
NILM	03	03	-	-	-	-
Inflam-matory	32	29	3	-	-	-
LSIL	07	01	6	-	-	-
HSIL	05	-	-	5	-	-
HSIL & AGC	01	-	-	-	1	-
SCC	02	-	-	-	-	2
Total	50	33	9	5	1	2

Table 6: Correlation between colposcopy and Histopathogy.

Colposcopic diagnosis	No	Histopathological diagnosis				
		CNSpC	CIN 1	CIN2	CIN3	SCC
Normal	03	03	-	-	-	-
Inflammation	27	26	1	-	-	-
CIN1	12	04	8	-	-	-
CIN2	05	-	-	5	-	-
CIN3	01	-	-	-	1	-
Invasive Carcinoma	02	-	-	-		2
Total	50	33	9	5	1	2

Discussion

Cancer of cervix is the fourth most common cancer in women, with an estimated 528,000 new cases in 2012. Large majority (around 85%) of the global burden occurs in the less developed regions, where it accounts for almost 12% of all female cancers. Almost nine out of ten (87%) cervical cancer deaths occur in the less developed regions[1]. In the present study, the age of patients ranged from 20 to 70 years with the mean age of 36.4 years, which is comparable to study by Joshi C et al where the age range was 20 to 65 years. Boicea et al study showed age range from 20 to 69 years[5,7].

White discharge per vagina was the most common symptom with 37(74%) cases, which was comparable to study done by Chaudhary RD et al and Bhalerao A et al.[8,9]

In the present study, clinical status of cervix in majority of patients was cervical erosion with 27(54%) cases. Comparable clinical appearance of cervix were seen by Chaudhary RD et al and Bhalerao A et al, where majority were cervical erosion with 173(86%), 156(78%) cases respectively[8,9]. Most common colposcopic finding was acetowhite area with 20(40%) cases, similarly reported by Joshi C et al and Krishnegowda et al.[10, 11]

In the present study, on pap smear examination, squamous intraepithelial lesion of all grades were seen in 13(26%) cases [LSIL in 7(14%), HSIL in 6(12%)] and SCC in 2(4%), comparable to other studies[10,11].

Colposcopy was non-neoplastic in 30 (60%) cases, CIN of all grades were seen in 18(36%) cases [CIN1 in 12(24%), CIN2 in 5(10%), CIN3 in 1(2%)] and 2(4%) were invasive carcinoma. Seshadri L et al study showed CIN of all grades in 101(43.3%) cases, 14(6.1%) invasive carcinoma and non- neoplastic in 118(50.6%) cases[12]. In the present study Histopathological diagnosis of cervicitis was seen 33(66%) cases, CIN of all grades in 15(30%) cases [CIN1 in 9(18%), CIN2 in 5(10%), CIN3 in 1(2%)] and SCC 2(4%) comparable to study by Seshadri L et al[12].

Sensitivity of pap smear in the present study was 82.3%, specificity was 96.9% and diagnostic accuracy was 92% which is comparable to study by Maziah et al(90%), Bhatla et al (89%). It was seen that the positive predictive value of Pap smear was highest for HSIL and malignancy. This is similar to study by Naik et al[13-15].

Sensitivity of colposcopy was 94.1% and specificity was 87.8%. The accuracy of colposcopy in the present study was 90%, which is in parallel to the findings of Maziah et al (94%) and Ashmita et al (86.54%)[14,16].

Cytology and colposcopy showed 100% correlation for high grade lesions. High false negative rate on cytology was seen in cases of inflammatory smear and high false positive rate on colposcopy in cases of CIN1, implying the importance of repeat smear and follow-up in these cases.

Conclusion

High sensitivity in colposcopy as compared to cytology and high specificity in cytology as compared to colposcopy emphasizes the need for pairing these methods to achieve better results. When properly used, colposcopy complements cytology by accurately defining the most suspicious area of the cervix for taking biopsy and there by increases the diagnostic accuracy.

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