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Sensitivity and Specificity of VIA in Diagnosing Cervical Cancer and Precancerous Lesions

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Abstract **Original Research Article**

Cervical cancer is the leading cause of death in women in India. Cervical Cancer is the most preventable cancer in women as it has a long premalignant phase. Cytological screening is most frequently used method. Visual inspection using acetic acid can be used as an alternative of Pap smear in a low-resource countries. Keeping this in mind this study was done to determine the sensitivity and specificity of VIA in detection of cervical cancer and precancerous lesions. ***Material and Method:*** Five hundred and twenty-five women over a period of two years were included in the study. VIA was performed and Pap's smear, colposcopy, cervix biopsy were performed in women having VIA positive results, and results were analysed. ***Results:*** VIA was positive in 29.3% cases. Out of 154 VIA positive cases, precancerous lesions were observed in 111 cases by cytology, 132 cases by colposcopy and 136 cases by histopathology. Sensitivity and specificity of VIA to diagnose precancerous lesions were 88.3% and 95.4% respectively. In 11.7% cases VIA was false positive. Positive predictive value was 88.3% and negative predictive value was 95.4% for VIA. ***Conclusion***: VIA is a safe, acceptable, and effective test that can save lives from cervical cancer even in remote areas with few resources.

Keywords: Cervical Cancer, screening, VIA, cytology, colposcopy, histopathology.

INTRODUCTION

Cervical cancer is leading cause of the death in women in India. Majority of the cases of cervical cancers are still diagnosed in advanced stage. This is because of the lack of awareness about the disease and inaccessibility of the medical care, Neha et al., [1]. Annually 130,000 women in India are diagnosed with cervical cancer and more than 70,000 women die from cervical cancer annually [2]. Various risk factors for developing cervical cancer are human papilloma virus (HPV), young age at the first coitus, marriage before age 18 years, multiple sexual partners, multiparity, low socio-economic status and smoking [3]. All women with vaginal discharge, foul smelling discharge, post coital bleeding, irregular bleeding and unhealthy cervix on examination are at risk of developing cervical cancer so they should be screened for cervical cancer regularly.

Cervix being easily assessable to examination we can diagnose cervical cancer at an early stage. Pap smear is most frequently used methods for cervical screening. Other methods of screening are HPV DNA testing, visual inspection with acetic acid and visual inspection with lugol's iodine [4]. In low resource setting screening by Pap smear is not feasible. Visual inspection with acetic acid is an alternative method as it can be performed by trained health professionals. In a critical assessment of screening methods for cervical neoplasia, sensitivity of VIA for detection of cervical precancer and invasive cervical cancer varied from 67% to 79% and specificity varied from 49% to 86% [5]. Keeping this in mind this study was done to determine the sensitivity and specificity of VIA in detecting cervical cancer or precancer lesions.

MATERIAL AND METHODS

This was a prospective study done in the Department of Obstetrics and Gynaecology at National Institute of Medical Sciences, Jaipur. 525 women were included in the study after taking informed written consent for screening of cervical cancer over a period of two years. Women with visible growth on cervix, pregnancy, undergone hysterectomy were excluded from the study. VIA was performed in all women after

applying 5% acetic acid on the ectocervix. Pap smear, colposcopy and cervical biopsy were performed for women who were VIA positive. Histopathological diagnosis was taken as gold standard for diagnosis of cervical cancer or precancerous lesions. Data were entered into MS Excel sheet and results were analysed. Sensitivity and specificity of VIA was calculated.

RESULTS

In our study out of 525 women screened, 154 (29.3%) women were VIA positive and 371 (70.6%) women were VIA negative (Table-1).

In present study, cytology was performed on all VIA positive patients (n=154). The cytological findings were classified according to the Bethesda System. 11 cases showed normal results, 32 were having inflammatory changes, 5 cases had HPV changes, 20 cases had ASCUS, 44 cases had Low grade squamous intra-epithelial lesions, while 41 cases had High grade squamous intra-epithelial lesions and 1 patient had invasive cancer.

Table-3 shows the results of Colposcopy performed on 154 VIA positive cases. The colposcopy finding has been classified according to coppleson's grading. 12.3% had grade 1 changes, 59.7% had grade 2 changes, while 28 % had grade 3 changes.

Cervical biopsy and histopathological examination were done in all 154 VIA positive women. Out of 154 women, 1 woman had early invasive cancer, 135 women had precancerous lesions, remaining 18 women had normal, inflammation or squamous metaplasia on histopathology (Table-4).

On Comparison of VIA results for pre-Cancerous lesions it was found that out of 154 VIA positive cases, Cytology could depict 111 (72.07%) as precancerous lesions and 43 (27.92%) as insignificant change. On Colposcopy, 132 (88%) were diagnosed as precancerous and 18 (12.0%) showed insignificant lesions and on histopathology the proportion of cervical cancer and precancerous and lesions were 136 (91.27%) and 13 (8.72%) showed insignificant lesions the association was found to be statistically significant. (P-< 0.001) (Table-5).

Sensitivity and specificity of VIA to diagnose precancerous lesions were 88.3% and 95.4% respectively. In 11.7% cases VIA was false positive. Positive predictive value was 88.3% and negative predictive value was 95.4% for VIA.

Table-1: Distribution according to VIA results

VIA	Number	Percentage
Negative	371	70.7
Positive	154	29.3
Total	525	100

Table-2: Cytological findings in VIA positive women

Cytology	Number	Percentage
Normal	11	7.1
Inflammatory	32	20.7
HPV Changes	5	3.2
ASCUS	20	12.9
LGSIL	44	28.5
HGSIL	41	26.6
Invasive Cancer	1	0 .6
Total	154	100

Table-3: Colposcopy results in VIA positive women

Colposcopy results	Number	Percentage (%)
Grade 1	19	12.3
Grade 2	92	59.7
Grade 3	43	28.0
Total	154	100

Table-4: Histopathological findings in VIA positive women

Histopathology results	Number	Percentage
Normal	8	5.2
Inflammation	6	3.9
Sq. Metaplasia	4	2.6
HPV infection	2	1.3
Atypia	50	32.5
CIN-1	44	28.6
CIN-2	24	15.6
CIN-3	15	9.7
Early invasive Carcinoma	1	0.6
Total	154	100

Table-5: Association of VIA with Cytology, Colposcopy & Histopathology

Screening method	Total	Pre-Cancerous	Insignificant lesions	Chi square, p value
VIA	154	154	-	X^2= 11.03
Cytology	154	111	43	P< 0.001
Colposcopy	154	132	18	
Histopathology	154	136	13	

DISCUSSION

The present study was done to determine sensitivity and specificity of VIA in diagnosing precancerous lesions of the cervix. Out of 525 women screened by VIA, VIA was positive in 154 women (29.3%) and negative in 70.7% women. Our results were comparable with results of Basu PS et al., [6] where 27.4% women had VIA positivity and higher than that observed by Poli UR et al., [7].

Sensitivity and specificity of VIA in our study was 88.3% and 95.4% respectively. Our result was comparable with sensitivity and specificity observed by Bhavana Sherigar et al., [8] and Singh Kavita N et al., in their study [9]. In a study done by Saroj Singh et al., sensitivity and specificity of acetic acid was 58.33% and 87.5% respectively [10]. Similarly in Qureshi S, Das V, Zahra F study the sensitivity of visual inspection after acetic acid was 55% and specificity was 71.39% [11]. Sensitivity of VIA was lower (70.8%) but specificity was higher (95%) in a study done by Hegde D et al., [12], Rana T et al., in their study observed a higher sensitivity (93%) and lower specificity (90%) [12].

In our study out of 154 VIA positive patients, on Histopathology were diagnosed as CIN1 in 44(28.5%), CIN 2 in 24(15.5%) and CIN3 in 15(9.7%) while 1 patient had Sq. Cell Carcinoma. In L O Sarian et al., study VIA was positive in 61.8% of the women with CIN 1, 57.0% of those with CIN 2, 35.0% of women with CIN 3 and in 21 of 28 (75%) of women with cancer [13].

Negative predictive value of VIA in our study was 95.4%. This implies that women assessed as test negative can be safely assured that they are not likely to have a high grade disease. Our results were comparable with that observed by Bhavana Sherigar et al., [8], Bhatla et al., [15] and Ghislain et al., One of the limitations of VIA screening technique is its high false positive rate owing to the subjective nature of the test. False positive rate was 11.7% in our study which was lower than that observed by Bhavana Sherigar et al., [8].

CONCLUSION

VIA has a sensitivity of 88.3% and specificity of 95.4% and a false positive rate of 11.7%. It is a simple, cost effective and effective way to screen a woman for cervical cancer specially in rural area. Paramedical persons can be trained to perform this test in remote areas.

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