Original Article

Accuracy of Visual Inspection of Cervix with 5% Acetic Acid (VIA) in the Diagnosis of Cervical Cancer

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Abstract

Objective: To evaluate the accuracy of Visual inspection of cervix with 5% acetic acid (VIA) in the diagnosis of cervical cancer.

Place and Duration: It was a cross sectional study conducted Department of Obstetrics and Gynecology, Unit-III, Out Patient Department, SIMS/Services Hospital, Lahore, Pakistan. over a period of six months from 06-02-2017 to 05-08-2017.

Methodology: A total of 250 cases of VIA were included in this study. The VIA test was performed by adding 5ml of acetic acid in 95ml of water to form 5% acetic acid in a kidney dish. If VIA positive, cervical biopsy will be done under local anesthesia and ask the patient to follow up with report of histopathology.

Results: Comparison of VIA vs histopathology in the detection of cervical cancer shows 250 positive cases seen on VIA while 167 positive and 83 negative cases were seen on histopathology. Positive predictive value of VIA was 78.3%.

Conclusion: VIA is a simple and cost effective procedure which can be offered in OPD setting and it can become an alternate tool for screening of cervical cancer especially in a low resource setting country like Pakistan.

Key words: Cervical cancer, VIA, Biopsy.

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Introduction

Cervical cancer is the worldwide most common gynecological cancer in which the late presentation and diagnosis of the cancer is detected in more than half of them. In Pakistan the prevalence of cervical cancer is 3.6%.[1] Cervical screening programmes are covering only 5% of the population in the developing countries whereas it is the cancer which is having a pre malignant condition and that can be easily screened by the screening tools.[2,3]

CIN is characterized by abnormal cellular proliferation, abnormal epithelial maturation and cytological atypia. It is characterized into three types i.e. CIN I, CIN II and CIN III. Risk factors for cervical cancer are multiparity, age at first intercourse, oral contraceptive pills usage, smoking, socioeconomic status and Human Papillomavirus (HPV) infection.[4] HPV 16 and 18 are the most common high-risk types, a sexually transmitted infection accounting for 60% of HPV positive invasive cervical cancers.Although in majority of cases this virus is not activated due to body's immune response but poor immunity due to underlying risk factors or repeated infection may lead to cause changes in cervix.

In 1933, Schiller published an article on applying an iodine solution on cervix for detection of neoplastic disease of cervix. Visual inspection of

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cervix by applying acetic acid on the cervix is an alternative way in detecting cervical cancer instead of Pap smear which requires vigilant follow up of the patient and repeated smears.[4] Positive VIA is when after application of acetic acid an aceto-white change appears on the cervix close to the squamo-columnar junction followed by colposcopic examination.[5,6] When 5% acetic acid is applied on the neoplastic tissue of the cervix, it takes up the acetic acid and changes to the acetowhite area this is called VIA positive. It takes place precisely around the squamocolumnar junction, the main anatomical site where cervical malignant neoplasia develops.[7] Different trials are being conducted on the use of VIA in detecting cervical cancer and it is found to be an easy and cost effective procedure in low resource settings as it requires no tedious follow up [8]

A prospective study was carried out on 225 women of age group 20-50 years at K.S Hedge Charitable Hospital from November 2008 to june 2010.The aim of the study was to assess the role of VIA as an alternate to PAP smear in the screening program for cervical cancer in low resource settings. Out of 225 VIA was positive in 27 and PAP smear was abnormal in 26. On biopsy there were 15 mild dysplasia,2 moderate dysplasia,4 severe dysplasia and 3 squamous cancer. VIA has a sensitivity of 70.8, specificity of 95%, the positive predictive value of 62.9% and negative predictive value of 96.5%.[9]

Another study was carried out in Ganga Raam hospital from July to December 2012 as a comparison between VIA and PAP smear. Out of 250 women 55 patients were VIA positive and 27 patients showed abnormal pap smear. Among them 36 patients underwent biopsy and were diagnosed as cervical cancer. The biopsy detection rate of VIA was 13 % and pap smear was 8%.[10]

There is a rising incidence of cervical cancer in the past decade which is approximately 13.6/100,00 population but inspite of this deadly increase in the prevalence of cervical cancer, the coverage of population with screening methods is only 1.9%.The main reason for this poor coverage is lack of follow up of patients and poor resources for nation-wide screening programmes. Visual imspection of cervix with acetic acid is one step screening method towards early diagnosis of this deadly disease. The rationale of my study is to assess the diagnostic accuracy of visual inspection of cervix with acetic acid for detecting cervical cancer. Literature has reported that it is a good and reliable alternative to interventional investigation method. Moreover it is non-invasive, cost effective for a low resource country like Pakistan. It would be also accessible in areas where surgical and biopsies facilities are not available.

Methodology

It was a cross sectional study conducted in Obstetrics and Gynecology unit III, Outpatient Department, Services hospital Lahore, SIMS over a period of six months from 06-02-2017 to 05-08-2017 after approval from the hospital ethical committee. A sample size of 250 cases is calculated with 95% confidence level, 5% margin of error and taking expected percentage of positive predictive value i.e. 62.9% of VIA with 5% acetic acid for detecting cervical cancer taking histopathology as the gold standard.

Patients who fulfilled the inclusion criteria visiting the Gynae OPD during study period were enrolled in the study. Patient were explained about the research protocol and informed consent taken. Confounding variables were excluded through exclusion criteria.

The VIA test was performed by adding 5ml of acetic acid in 95ml of water to form 5% acetic acid in a kidney dish. A patient was asked to lie in a lithotomy position in a good source of light. After complete aseptic measure, external genitalia inspected, cuscos speculum inserted, and cervix was cleaned with antiseptic solution. 5% acetic acid was applied the at the squamocolumnar junction; waited for 1 to 2 minutes. A cervical biopsy was done under local anaesthesia when VIA result was positive and patient was asked to follow-up with a report of histopathology. All the information was collected on the specially designed proforma. Data was analyzed though SPSS version 20. Quantitative variables like patient's age, parity, duration of type of symptoms and smoking was presented by mean and standard deviation. Qualitative variables like cervical carcinoma on VIA and histopathology was presented by calculating frequency and percentage. PPV of VIA was calculated in the detection of cervical cancer and presented in the form of frequency and percentages. Data was stratified for age, educational status, parity, duration and type of symptoms and smoking. Post stratification Chi Square test was applied with p value $\leq$ 0.05 as significant.

Results

Regarding age distribution of patients, 55 (22.0%) were between 18-30 years of age while 198 patients (78.0%) were between 31-45 years old. Mean age of the patients was 36.24±7.27 years.

Distribution of cases by education was as follows: illiterates 105 (42.0%), undergraduates 141 (56.4%) and graduates were 4 (1.6%). Primipara were 15 (6%), multipara 139 (55.6%) and grandmultipara were 96 (38.4%). Vaginal discharge was observed in 80 patients (32.0%). Mean duration of vaginal discharge was 13.81±10.55 months. Post-coital bleeding reported in 39 patients (15.6%) and mean duration of post-coital bleeding was 10.33±11.14 months. Intermenstrual bleeding was seen in 71 patients (28.4%) and the mean duration of inter-menstrual bleeding was 8.23±4.96 months. Only 3 cases (1.2%) of smokers were reported.

Comparison of VIA versus histopathology in the detection of cervical cancer shows 248 positive and 2 negative cases seen on VIA while 167 positive and 83 negative cases were seen on histopathology (Table-I). Positive predictive value of VIA was 78.3% (Table-II). Stratification with regard to age, parity, educational status, smoking, vaginal discharge, post-coital bleeding and inter-menstrual bleeding was also carried out (Table 3-9).

Table I: Comparison of VIA versus histopathology in the detection of cervical cancer

VIA	Histopathology (Gold Standard)		Total
	Positive	Negative	
Positive	98 (TP)	27 (FP)	125
Negative	10 (FN)	115 (TN)	125
Total	**108**	**142**	**250**

Table II: Positive Predictive value of VIA

True Positive

Positive predictive Value (PPV) = $\frac{\text{True Positive}}{\text{True Positive + False Positive}} \times 100 = \frac{98}{98+27} \times 100 = 78.3\%$

Table III: Stratification for age

Age (Year)	Cervical Cancer		Total
	Positive	Negative	
≤ 30	35	20	55
31-45	132	63	195
Total	**167**	**83**	**250**
Chi square=0.318			
P value=0.573			

Table IV: Stratification for parity

Parity	Cervical Cancer		Total
	Positive	Negative	
Primipara	08	07	015
Multipara	90	49	139
Grandmultiapra	69	27	096
Total	**167**	**83**	**250**
Chi square=2.605			
P value=0.272			

Table V: Stratification for educational status

Education	Cervical Cancer		Total
	Positive	Negative	
Illiterate	72	33	105
Undergraduate	93	48	141
Graduate	02	02	04
Total	**167**	**83**	**250**
Chi square=0.703			
P value=0.704			

Table VI: Stratification for smoking

Smoking	Cervical Cancer		Total
	Positive	Negative	
Yes	0	03	3
No	167	80	247
Total	**167**	**83**	**250**
Chi square=6.109			
P value=0.013			

Table VII: Stratification for vaginal discharge

Vaginal discharge	Cervical Cancer		Total
	Positive	Negative	
Yes	56	24	80
No	111	59	170
Total	**167**	**83**	**250**
Chi square = 0.543			
P value = 0.461			

Table VIII: Stratification for post-coital bleeding

Post-coital bleeding	Cervical Cancer		Total
	Positive	Negative	
Yes	23	16	39
No	144	67	211
Total	**167**	**83**	**250**
Chi square=1.276			
P value=0.259			

Table IX: Stratification for inter-menstrual bleeding			
Inter-menstrual bleeding	**Cervical Cancer**		**Total**
	Positive	**Negative**	
Yes	40	31	71
No	127	52	179
Total	**167**	**83**	**250**
Chi square=4.894 P value=0.027			

Discussion

Cervical cancer is the most common gynecological cancer and nearly 80% invasive cervical cancer is prevalent in developing countries. It is one of those cancers which are easily preventable yet an ignored disease because of poor coverage of its screening in masses.[11] Pap smear is a screening tool to detect its pre-malignant condition but sadly due to poor standardization of methods, low coverage of woman with risk factors and lack of follow up with reports of positive results, it has a very high mortality rate in Pakistan.[12] It is now an urgent need of an hour for alternate ways of screening this deadly cancer for early diagnosis and treatment. Human papillomavirus (HPV) DNA testing and visual inspection of acetic acid are the alternate screening methods for cervical cancer.[13]

Cytological – based screening can be offered but it requires considerable technical team and resources which again is not feasible for low resource settings. On the other hand, visual inspection of acetic acid is now being evaluated for its sensitivity and cost-effectiveness as a potential alternative with less resources involved.[14]

In many trials conducted all over the world, VIA has been proven a better alternative being easy to perform, no specific equipment and cost-effectiveness.[14] Even few studies reported its predictive value comparable to Pap smear in detection of pre-malignant condition or CIN.[15] Although there are limited studies on use of VIA in high resource settings in developing countries.[16]

Sensitivity of VIA has been shown to be equally or even better than pap smear in some studies but its specificity is lower.[17]

In the present study, VIA positive predictive value was 78.3% which is comparable with some previous studies reported positive predictive value 38-90%.[18]

A prospective cohort trial in China conducted study on the accuracy of VIA. The study showed that visual inspection of cervix by acetic acid is a single visit procedure but it has greater sensitivity in detecting high grade CINs and can be a reasonable option without requiring an infra-structure.[19]

Another study was carried out in Ganga Ram hospital from July to December 2012 as a comparison between VIA and Pap smear. Out of 250 women 55 patients were VIA positive and 27 patients showed abnormal pap smear. Among them 36 patients underwent biopsy and were diagnosed as cervical cancer. This study included 540 patients, out of them 356 were tested for both pap smear and VIA and were having negative result. Out of total, 156 had positive test of VIA corresponding to 28.9% while 78 patients had positive result of pap smear corresponding to 14.4%.[20] The result showed sensitivity of VIA about 93.9% which is comparable to our study.[21]

Another study carried out by Ardahan and Temel (2011) [22] demonstrated 67.64% positive predictive value of VIA which is close to our findings i.e. 78.3%. Similarly Ibrahim et al reported the positive predictive value of VIA 62.9% which is also consistent with results of current study[23]. A study in Nigeria conducted to access the feasibility and accuracy of visual inspection of acetic acid in Nigereia.[24] The results showed VIA to be better in 94% of the patients screened. Cervical cancer screening using VIA was feasible and effective despite scarce resources in the Nigerian health system.

Conclusion

VIA is a simple and cost effective procedure which can be offered in OPD setting and it can become an alternate tool for screening of cervical cancer especially in a low resource setting country like Pakistan.

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