Original Article

Is Visual Inspection with Acetic Acid Valid for Diagnosing Early Cervical Neoplasia

Early Diagnosing of Cervical Neoplasia

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ABSTRACT

Objective: To compare the sensitivity and specificity of visual inspection of the cervix with 5% acetic acid to Pap smear by using the colposcopically directed biopsy as Gold Standard in the diagnosis of cervical cancer and assessing the concordance of VIA with colposcopy.

Study Design: Cross sectional validation study

Place and Duration of Study: This study was conducted at the Gynaecology and Obstetrics Department of Holy Family Hospital Unit-1 from1st Nov.2014to 30th April 2015.

Materials and Methods: Females fulfilling the inclusion criteria were selected in the study from outpatient department. Bias was controlled by strictly following the inclusion and exclusion criteria.

Results: The sensitivity of VIA was 91.67% and of Pap smear was 81.81% . Corresponding specificities were 97.44% and 96.20%. The PPV of VIA was 84.62% versus 75.00% for Pap smear. The NPV of VIA was 98.70% versus 97.44% for cytology. Overall VIA demonstrated an accuracy of 96.67% as compared to 97.77% for cytology.

Conclusion: In woman undergoing screening for Pre-invasive disease of Cervix, visual inspection using 5% acetic acid was found to be more sensitive and has a similar accuracy as compared to Pap smear.

Key Words: VIA, Cervical intraepithelial neoplasia, pap smear

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INTRODUCTION

Worldwide Carcinoma of cervix is second commonest cancer among women[1]. It accounts for about 473,000 new cases diagnosed and 253,500 deaths every year[2]. Approximately 80% of cervical cancer occurs in under developed countries where it accounts for 22.8% of female cancer[11] and among them 75% present at an advanced stage[3]. Premalignant state of carcinoma cervix is cervical intraepithelial neoplasia. Severe form of the cervical dysplasia leads to carcinoma cervix in 10 years in 18 % of cases and 36 % at 20 years[4].

Pap smear sensitivity ranges from 30-87% and specificity ranges from 86-100%[5]. VIA has emerged as an alternative for use in low resource settings. It is performed by trained health professionals and carries the benefit of being convenient, time saving, economical and requires no laboratory[6,7]

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VIA has low specificity and high false positive findings leading to undue stress and further investigations; however it has very low [0.9 %] false negative[8]. The sensitivity of VIA is 95%[9] and specificity of VIA is 77.6%[10].

Prevalance of cervical cancer is 8% of all cancer in women.[16] Though the incidence of cervical cancer has decreased in industrialized countries in the past twenty years, it still remains a major problem in the developing countries. Approximately 80% of cervical cancers in under developed countries where it accounts for 22.8% of female cancer[11] and among them 75% present in advance stage[3.] Among gynecological malignancies, cervical cancer is the leading cause of death.[17]

Squamous cell carcinoma is a preventable disease arising from high grade squamous epithelial lesions or cervical intraepithelial neoplasia grade 2 and 3 [19].

Human Papilloma virus infection leads to premalignant change in the cervical epithelium (Cervical intraepithelial neoplasia) which has the potential to turn malignant without treatment[18].

Smoking and long use of oral contraceptive pill have also been recognized as risk factor. Immuno-compromised women are at great risk[21].

Other Risk factors for cervical cancer include early age at first intercourse, multiple male sex partners, a history of sexually transmitted diseases, and low socio-economic status.[22]

A study carried out in Nepal supports VIA as an alternative method of screening for cervical cancer[13].

VIA is a relatively simple procedure. Acetic acid is used to enhance and "mark" the aceto white change of a precancerous lesion or actual cancer. Differences in precancerous cell proteins make the abnormal cells temporarily appear white when exposed to vinegar[24].

A study carried out in Lahore revealed that sensitivity of VIA was 93% and of pap smear was 83%, corresponding specificity were 90 and 97%, which conclude that VIA is more sensitive as compare to pap smear [12]. In developing countries VIA is an effective method to achieve fairly accurate and moderately reproducible results. A study carried out in Nepal support VIA as an alternative method of screening for cervical cancer [13].

In comparison, a study carried out in Honduras underscore the need to promote alternative technologies for screening in low resource settings[14]. Similarly a study in Belgium showed the specificity of VIA less than Pap smear and promoted pap smear as a method of screening for cervical cancer[15].

Studies carried out in 3rd world countries support VIA as alternative method of screening, as VIA is simple, convenient and effective method of cervical cancer screening. Therefore rationale of this study is to compare the validity of VIA with pap smear, as an alternative method of screening to detect cervical pathology in premalignant state so as to reduce the morbidity and mortality for cervical cancer in low resource setting.

MATERIALS AND METHODS

This is a Cross sectional validational study that was done In OPD clinic of Gynae Unit-I Holy Family Hospital Rawalpindi. Sample size is 90 by using WHO sample size calculator. All married female of 20-60 yrs of age attending the gynecology clinic were included in the study and unmarried female, women who already had hysterectomy or taking treatment of cervical cancer in the past and pregnant females and women having active vaginal bleeding were excluded. Proper informed written consent was taken. The test results was divided in two categories, visual inspection with 5% acetic acid positive and visual inspection with 5% acetic acid negative. Data was analyzed by using SPSS version 10 as version 14 was not available.

RESULTS

Mean age was 48 as shown in table 3. Mean SD for parity was more than para 4 as shown in table 2. Out of 13 patients who were positive for cervical intraepithelial neoplasia on VIA, 11 turned out to be positive on Biopsy also and 2 were negative. 77 patients were negative on VIA and out of these 77 one (01) found positive on Biopsy.

On Pap smear 12 found positive on Pap smear out of them 9 turned out to be positive on Biopsy and 3 were negative. 78 found negative on Pap smear and 2 turn out to be positive on Biopsy.

By analyzing the above data following result were calculated.

Table No.1a: Sensitivity table

		Colposcopically indicated Biopsy	
Visual Inspection with 5% Acetic Acid	Positive	Positive	Negative
		a (TP) True positive	b (FP) False Positive
	Negative	c (FN) False Negative	d (TN) True Negative

Table No.1b: Specificity table

		Colposcopically indicated Biopsy	
Pap Smear	Positive	Positive	Negative
		a (TP) True Positive	b (FP) False Positive
	Negative	c (FN) False Negative	d (TN) True Negative

Sensitivity: a/ (a+c) x 100 or TP / (FN + TP) x 100
Specificity: d/ (b+d) x 100 or TN / (FP + TN) x 100
Positive Predictive Value: a/ (a+b) x 100
Negative Predictive Value: d/ (c+d) x 100

Demographic characteristics

Demographic characteristics of these patients shown in following tables

Table No.2: Description statistics of parity of the patient57

		n (%)
Parity	nullipara	4 (4)
	p1 - p 2	17 (19)
	p3 - p4	37 (41)
	greater than P4	32 (36)
Total		90(100)

Table No.3: Description statistics of age of the patients

		n (%)
Age Groups (yrs)	20 -30	5 (6)
	31 40	21 (23)
	41 - 50	50 (56)
	51 - 60	14 (16)
Total		**90 (100)**

Comparison of Screening Tests

Table No.4: VIA Test with Biopsy

Count	Positive	Negative	Total
VIA positive	11	2	13
Negative	1	76	77
Total	12	78	90

Sensitivity	=	91.67 %
Specificity	=	97.44 %
PPV	=	84.62 %
NPV	=	98.70 %
Accuracy	=	96.67 %
VIA positive	=	12.87%
VIA Negative	=	69.30%
Histologically positive	=	9.90%
Histologically Negative	=	69.30%

Table No.5: Pap smear Test with Biopsy

Count	Positive	Negative	Total
PAP Smear positive	9	3	12
Negative	2	76	78
Total	11	79	90

Sensitivity	=	81.81 %
Specificity	=	96.20 %
PPV	=	75.00 %
NPV	=	97.44 %
Accuracy	=	97.77 %
Pap Positive	=	10.80%
Pap Negative	=	70.20%
Histologically Positive	=	9.90%
Histologically Negative	=	71.10%

DISCUSSION

It had been shown by EL ALL HAS et al[23] that in developed countries, with effective and extensive screening preneoplastic disease is usually asymptomatic precursor lesion of cervical cancer, making it 100% preventable. However cervical cancer prevails in developing countries, 80% cases are diagnosed at advanced stage.

Worldwide cervical cancer causes 250, 000 deaths per year as shown by Shafi MI [18]. This situation is compounded by the fact that in underdeveloped countries like Pakistan 75% presents with an advanced stage, which is the converse of situation in the developed world where 75% present early and cure can be expected. As cervical cancer is a preventable disease, screening should have a direct effect on incidence and mortality from this condition in Pakistan.

A combination of colposcopy and cervical smear is likely to improve the screening sensitivity in Pakistan[25,]therefore, there is an urgent need for the implementation of cervical cancer screening program.

The American cancer society recommends that all women should begin cervical cancer screening after 3 years of beginning coitus.[26] Khan M S [25] et al showed that average age of prevalence of positive cytology is around 43 years in Pakistan, while some studies in the west showed a younger average age. This fact was also observed in my study and the mean age for prevalence of precancerous cervical lesion was 43 years. This represent that cervical intraepithelial neoplasia is more prevalent in 4th decade of life. The younger age in the west for early cervical neoplasia is probably because of early age at first intercourse, multiple sexual partners, HIV and HPV infection. Numerous studies of epidemiology of cervical cancer have shown strong association with marital and sexual partners. It is well established that the age in which the patient started sexual activity, the number of sexual partners, the number of births and the age in which the 1st birth occur are factors that influence the natural evolution of this disease and should be considered as an important back ground.[27]

High parity has long been associated with an increase risk of cervical cancer.[28, 29] I found a direct association between the number of full term pregnancies and CIN. Mean parity was more than para 4.

A study by K. Vadehra, R. Jha and a study by Rana. T, Zia A showed validity of VIA in diagnosis of early cervical neoplasia by measuring outcomes like accuracy, sensitivity specificity and predictive values of VIA in comparison with Papsmear. My study is comparable to the study by Rana T, Zia A, Sher s[12], and study by Vadehra K., Jha R[13]., with regard to method of test performance and results. In my study a high sensitivity of about 91.67% was observed comparable to the findings of Rana T[12] which showed sensitivity of 93%.

In this study, we have measured the performance of VIA and cytology as a means of identifying the cervical cancer precursors in a low resource setting. As compared to Pap smear VIA has the advantage of being simple and easy-to-learn approach. Moreover VIA has low startup and ongoing costs. It integrates well with the primary health care services. VIA gives the facility of see and treat due to immediate results at one stop clinic.

VIA has the disadvantages of higher referral and potential of over-treatment due to its moderate specificity. There is clear need for training methods and quality assurance to standardize the reporting procedure. Drawback of my study was less number of patients because the duration of study period was short so I cannot implement my results on whole population of Pakistan.

CONCLUSION

VIA is quite accurate in diagnosis of early cervical neoplasia and it has a high sensitivity for detection of lesions. The interobserver variability is the limiting factors in the use of this method. However, it is an effective method in the management of premalignant cervical disease. I would recommend that this simple test should be learned by all postgraduate trainees and gynecologists. VIA clinics should be integral part of gynaecological outpatient department in every hospital.

Author's Contribution:

Concept & Design of Study:	Shahida Perveen
Drafting:	Madiha Khadim

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Conflict of Interest: The study has no conflict of interest to declare by any author.

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