RESEARCH COMMUNICATION

Accuracy of Visual Inspection with Acetic Acid (VIA) for Early Detection of Cervical Dysplasia in Tehran, Iran

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Abstract

Objective: To evaluate the accuracy of visual inspection with 5% acetic acid (VIA) when used to detect cervical cancer and its precursors.

Methods: The study population included women attended Family Planning and Gynecological Clinic in Bagher Abad Health Center and Mirza Koochak Khan Hospital for regular cervical screening tests. After obtaining informed consent from each woman, VIA was performed. One hundred with a positive VIA test and 100 women with a negative VIA test were randomly selected for this study. Cytology and colposcopy examination were performed for all 200 cases and cervical biopsies were conducted for those individuals showing abnormal colposcopic findings.

Results: Nine cases in VIA-positive group and two cases in VIA-negative group had an abnormal cytology. Ninety five women in the VIA-positive group and 25 in the VIA-negative group had abnormal colposcopic findings. From biopsy examination, 67 (71%) of cases in the VIA-positive group and 3 (12%) cases in the VIA-negative group had a final diagnosis of dysplasia. Among biopsied samples, only 7 cases of VIA-positive group showed abnormal result and the remaining were normal. Based on these results, VIA test sensitivity and specificity were 95.7% and 44.0% respectively, while they were 10% and 92% for cytology tests.

Conclusions: The results of this study indicate that although VIA is a sensitive screening test for detection of cervical dysplasia, it can not be used by itself. Applying VIA along with Pap smears helps to detect a higher number of cases with cancer precursor lesions.

Key Words: Visual inspection - white acetic acid - cervical screening test - cervical dysplasia

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Introduction

Widespread implementation of cervical screening with the Papanicolaou (Pap) test has resulted in a significant decrease in the rate of cervical cancer (Landis et al., 1999). The success of this screening depends upon obtaining good quality cytology smears, adequate technical personnel and laboratory services and efficient follow-up (Morrellna, 1982; Coppleson, 1994). The difficulty in this program along with too many reports of false-negative Pap smears, especially in less-developed countries, have encouraged searches to find a better effective way of cervical screening. One alternative method is visual inspection with dilute acetic acid (VIA) (Sankaranarayanan et al., 2001). This procedure is based on application of 3-5% acetic acid to detect opaque acetowhite lesions. The reported ranges of sensitivities and specificities of VIA in detecting cervical intraepithelial neoplasia are 70-85% and 67-85% respectively. We here conducted a randomized clinical trial to evaluate the accuracy of VIA in detecting preneoplastic lesions.

Materials and Methods

This prospective study was carried out in Family Planning and Gynecological Clinics in the Bagher Abad Clinic and Mirza Koochak Khan Hospital, Tehran, Iran. The study protocol was reviewed and approved by the ethics committee of Tehran University of Medical Sciences.

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Table 1. Characteristics of Screened Women

Characteristics	VIA-positive women	VIA-negative women	p-value
Age (Mean ± SD)	35.71 ± 9.31	37.17 ± 10.29	0.20
Menarche age (Mean ± SD)	13.78 ± 1.16	13.88 ± 1.39	0.58
Gravity (Mean ± SD)	4.21 ± 2.54	4.86 ± 3.20	0.16
Parity (Mean ± SD)	3.78 ± 2.06	4.24 ± 2.84	0.19

VIA: Visual inspection with acetic acid; SD: standard deviation.

Women attending these clinics were invited to participate in this study. Pregnant women and those who had undergone hysterectomy or any other treatment for cervical precancer or cancer in the past were excluded from the study. A written informed consent was signed by all women willing to participate in this study. Prior to examination, a questionnaire was administrated to each woman to collect demographic information. After routine gynecological examination for each woman, a Pap smear was acquired and 5% acetic acid was applied on the cervix using a cotton swab. The test results were categorized as VIA-negative and VIA-positive. VIA-negative was reported when any of the following findings were observed: no acetowhite lesion, faint and bluish white translucent acetowhite lesions, and a white-line indicative of squamocolumnar junction. VIA-positive was reported if a well-defined opaque acetowhite lesion close to the squamocolumnar junction was observed. Then, randomly 100 VIA-positive cases and 100 VIA-negative cases were selected. All 200 cases were then investigated by colposcopy on the same day by an expert gynecologist and biopsies were obtained from colposcopically-assessed abnormal lesions on the cervix. Women with a final diagnosis of various forms of cervix dysplasia were considered positive cases for estimation of sensitivity, specificity and predictive values, calculated using standard statistical formulae in the SPSS software, Version 7.0.

Results

Two hundred women were recruited into the study. Demographic data did not significantly differ between the VIA-positive and VIA-negative groups, as shown in Table 1. VIA, Pap smear and colposcopy were conducted for all 200 participating women. Biopsy specimens were obtained from 120 women with abnormal colposcopical findings (95 VIA-positive and 25 VIA-negative cases). Dysplastic lesions were detected in 70 cases by histological studies. The distribution of dysplastic lesions by the screening test outcome is given in Table 2. VIA detected a higher number of cases with cervical dysplasia compared to the Pap smear. The sensitivity, specificity, positive and negative values for VIA and Pap smear in detecting cervix dysplasia are given in Table 3. VIA had a higher sensitivity, but lower specificity than the Pap smear for detection of dysplastic lesions.

Table 2. Distribution of Dysplastic Lesions Across Screening Test Results

Screening test	Histological finding of dysplasia		
	Positive (n = 70)	Negative (n = 50)	Total
VIA			
Positive	67	28	95
Negative	3	22	25
Pap smear			
Positive	7	2	9
Negative	63	48	111

VIA: Visual inspection with acetic acid.

Discussion

This study addressed the test characteristics of two screening approaches for cervical dysplasia. The sensitivity of VIA in our study was 95.7%, which is higher than reported in some other studies (Basu et al., 2003; Sankaranarayanan et al., 2003; Ghaemmaghami et al., 2004). However, the specificity of VIA in our study (44%) was lower than earlier described. The combination of two tests (VIA and Pap test) greatly increased the specificity for detecting lesions.

The performance of the Pap test for detecting dysplastic lesions was not satisfactory and its sensitivity was much lower of that of VIA (Nanda et al., 2000; Sankaranarayanan et al., 2004). Pap tests missed about 90% of dysplastic lesions in our study. Low detection rates with Pap tests were also reported in some previous studies and a wide range of sensitivities has been reported. Overall, the Pap smear is low-sensitive test in the developing world. The main problem is inappropriate performance of cytology screening test in sample collection and smear preparation. This problem is more obvious in developing countries with low resource settings. Furthermore, even in very good settings, a significant number of false-negative Pap tests have been reported. It has been speculated that abnormal expression of adhesion molecules in some dysplastic lesions of the

Tabale 3. Performance of the Screening Tests in Detecting Dysplastic Lesions of the Uterine Cervix

Screening test	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
VIA	96	44	71	88
Pap test	10	42	70	43
VIA + Pap smear	70	91	77	88

VIA: Visual inspection with acetic acid, PPV: positive predictive value, NPV: negative predictive value.

cervix causes failure of dysplastic cells to exfoliate. In these cases, Pap test is extremely unlikely to detect non-shedding abnormal cells (Felix et al., 2002; Felix, 2003).

Based on this study and some other investigations, the VIA test may be more sensitive than the Pap smear in detecting dysplastic lesions of the cervix in some sttings. Topical application of 3-5% acetic acid solution has been used widely in the clinic to detect premalignant or malignant lesions. In this procedure, acetic acid interaction with dysplastic tissue produces some light-scattering properties in abnormal cervical epithelium which are visible with the naked eye. These alterations become evident as transient white patches which persist for few minutes (Balas et al., 1999). The main limitation of VIA is its low specificity which leads to high rates of referral and overtreatment. On the other hand, it is less expensive than the Pap test and does not require complex laboratory facilities for testing and reporting. By using VIA as the screening test, diagnosis and treatment can be carried out in the same visit. This facilitates a better follow-up for women with dysplastic lesions, although it may be associated with overtreatment as well.

In conclusion, our study indicates that screening for uterine cervix dysplasia by VIA is more sensitive than that by the Pap test under the conditions prevailing in Iran. The combination of VIA and the Pap test in our hands clearly increased the specificity of VIA test. As VIA is inexpensive test and easy to perform, it could be used in combination with the Pap test to detect cervical precancerous conditions and cancer. This might be especially useful in those cases for which the Pap test could not detect non-shedding dysplastic cells, as the lesions are readily identifiable by visual inspection of cervix after application of acetic acid.

The impact of VIA-based screening program in reducing cervical cancer has been confirmed by one study, but this issue needs more clarification (Goldie et al., 2001). In any case, the main target is to develop a powerful screening test to detect tissue abnormalities at an early stage, allowing effective diagnosis and treatment.

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