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Original Research Article

Visual Inspection by Acetic Acid as a Tool in Screening of Cervical Cancer in Rural Areas of Hapur, UP

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ABSTRACT

The aim and objective of our study was to establish Visual inspection with acetic acid (VIA) as effective screening tool for diagnosing premalignant and malignant cervical lesion for rural areas. A total of 400 patients having cervical lesions were selected for our study and they were categorized into three groups according to age. Pap smear was done for of all patients, followed by VIA (using 2% acetic acid). Cervical biopsies were also taken for all VIA positive patients. In our study we found sensitivity of VIA was 90.62% and false positive cases were 0.0%. For Pap smear sensitivity was 54.68% and false positive cases were 3.30%. Our study proves VIA as more sensitive and economic test then Pap smear or cervical biopsies for screening cervical lesions for rural areas.

Key Words: Pap smear, Cervical Biopsies, VIA, Cervical cancer.

INTRODUCTION

Cervical cancer is the leading cause of morbidity and mortality among women worldwide. There are over 500,000 cases of cervical cancer found worldwide, and more than 280,000 women die of it every year. 85% live in developing countries. [1, 2] Nearly two thirds of healthy years lost by women in developing countries are lost because of cervical cancer and not, as is often supposed, because of problems related to reproductive health. [3] Cervical cancer is the leading cause of years-of-life lost in women in South Central Asia, Latin America and Sub-Saharan Africa, resulting in a greater reduction in a women's life expectancy even when compared with AID's, TB, or maternal conditions in Latin America and Europe. [4] India's cervical cancer age- standardized mortality rate of 30.7 per 100000 and age-standardized mortality rate of 17.4 per 100000 are the highest in South Central Asia. [5]

From the poor results from Papanicolaou (PAP)-based screening programs, alternative methods for cervical cancer screening have been sought. One method, direct visualization with acetic acid has gained popularity and proven itself in many clinical trials as an adequate

alternative to PAP smears in developing countries. Pre-cancerous lesions, with a higher ratio of intracellular proteins, turn white when combined with acetic acid. On application of acetic acid cervical epithelial neoplasia (CIN) lesion take on white color due to increased nuclear protein and cytokeratins in the cervical epethilial. [6] Normal cervices without any precancerous lesions, do not change color. VIA is an attractive alternative to PAP smears for its ease of use, low-cost, non cytology based sea and treat alternative for economically underprivileged geographic region and it requires fewer physician visits. [7] In rural areas where people travel hours for a doctor's visit, a screening method requiring fewer visits will have a much higher success rate. A National work shop on control of cervical cancer, considered conventional PAP cytology and VIA as a suitable test for early diagnosis of cancer cervix. [8]

Visual methods like visual inspection of cervix with Lugol's iodine (VILI) are alternative screening modalities with the advantage that the results are immediately available and one can apply "see and treat" policy in suitable cases. [9] Squamous epithelium contains glycogen, whereas precancerous lesions and invasive cancer contain little or no glycogen. Iodine is glycophilic and is taken up by the squamous epithelium, staining it mahogany brown or black. Columnar epithelium does not change color, as it has no glycogen. Immature metaplasia and inflammatory lesions are at most only partially glycogenated and, when stained, appear as scattered, ill-defined uptake areas. Precancerous lesions and invasive cancer do not take up iodine (as they lack glycogen) and appear as well-defined, thick, mustard or saffron yellow areas. [10, 11]

MATERIALS AND METHODS

The study was carried out in the Department of Obstetrics and Gynecology in collaboration with department of Pathology, Saraswathi Institute of Medical Sciences, Hapur, U.P. The present study was started from 2008 to 2012 after obtaining ethical clearance from the Institute. Informed consent was obtained from individual patients. A total of 400 patients were selected on the basis of complaints of per vaginal discharge, pain lower abdomen, post coital bleeding. The patients were categorized into following groups according to age, Group I, 21-30 years, Group II, 31-40 years, Group III, 41-50 years. After a thorough history and examination PAP smear was taken from all the patients. VIA was performed by application of 2% acetic acid to cervix with a cotton swab, left for 30-60 seconds and then examined for acetowhite patches and then examined with naked eye and lamp. Cervical biopsy was taken for all VIA positive patients. Patients having chronic systemic illness like diabetes, hypertension, liver disease, chronic infection and other co existing lesions of genital organs were excluded.

Stastical analysis: It was done by ANOVA.

RESULTS

In our study we found the following results. When Pap smear was compared with cervical biopsies in all the 400 patients, sensitivity was found to be 54.68%, specificity 96.69%, positive predictive value of 88.6, negative predictive value of 81.93, false positive 3.30% and false negative 45.31% respectively. (Table II)

Similarly when VIA was compared with cervical biopsies, sensitivity was 90.62%, specificity 91.54%, positive predictive value 83.45, negative predictive value 95.4, false positive 0.0% and false negative 9.37% respectively. (Table III)

Results of Pap smear and biopsies for all 400 patients are shown in Table I. Sensitivity of VIA was found to be higher that is 90.62% and false positive cases were zero percent as compared to Pap smear.

In our study VIA was found to be a superior, cheap and reliable test as compared to cervical biopsies or Pap smear as tool of screening in premalignant and malignant cervical lesions in rural areas.

Table I – Results of pap smear and cervical biopsy (n=400).

PAP smear	BIOPSY					
	Metaplasia	Cervicitis	CIN I	CIN II	CIN III	Invasive carcinoma
Normal	0	40	6	0	0	0
Inflammatory	6	198	27	14	0	0
LSIL	1	20	54	0	0	0
HSIL	0	7	5	12	8	0
Malignant	0	0	0	0	0	2
Total	7	265	92	26	8	2

LSIL, HSIL - low grade and high grade squamous intraepithelial lesion,

Table II – Comparison of Pap smear with cervical biopsy (n=400).

Pap smear	Biopsy		
	Positive	Negative	Total
Positive	70	9	79
Negative	58	263	321
Total	128	272	400

Sensitivity 54.68%, Specificity 96.69%, Positive predictive value 88.6, Negative predictive value 81.93, False positive 3.30%, False negative 45.31%

Table III – Comparison of VIA with cervical biopsy (n=400).

VIA	Biopsy		
	Positive	Negative	Total
Positive	115	23	139
Negative	12	249	261
Total	128	272	400

Sensitivity 90.62%, Specificity 91.54%, Positive predictive value 83.45, Negative predictive value 95.4, False positive 0.0% , False negative 9.37%

DISCUSSION

The rates of cervical cancer in developed countries are 5 per 100 000 women compared with 25 per 100 000 in low-resource countries. The high mortality rates are due to the advanced stage at presentation, affected women being unable to complete therapy, lack of available treatment, and unaffordable therapy. [12] Bellinson examined 1,997 women they compared visual inspection with acetic acid to colposcopy with biopsy and concluded that the sensitivity of VIA equaled or exceeded reported rates for conventional cervical cytology and encouraged continued research into the possibility of a see and treat method for cervical cancer screening. [13] Gaffkin in 2003 published a mini- meta-analysis although a lower specificity was noted in various publications; the authors nonetheless unanimously concluded that VIA was useful as an adjuvant or alternate to cytology. [14] Ngelangel conducted four different screening exams: visual inspection with acetic acid, magnified visualization with acetic acid (VIAM), spatula + cotton swab PAP smear and cervical brush PAP smear. Sensitivities for the four tests were found to be 37% for VIA, 34.1% for VIAM, 14.3% for spatula PAP, and 19.1% for cervical brush PAP. The specificity rates were 90.7%, 90.7%, 97.5%, and 97.9% respectively. VIA had the highest sensitivity of the four tests recommended for initial cervical cancer screening in the Phillipines. [15]

Ghaemmaghami [16] tested the VIA method of cervical cancer screening in Iran found sensitivity of VIA to be 74.3% compared with 72% for PAP smear. The specificity of VIA was 94% compared to 90.2% for PAP. Doh [17] examined VIA as a screening method (Doh, International Journal of OB/Gyn 1994). Sensitivity of VIA was 70.4 % vs 47.7% for PAP. VIA

specificity was 77.6% vs 94.2% PAP. PPV of VIA was 44% and NPV 91.3%. Doh concluded that, although PAP has slightly better testing qualities, VIA has acceptable test qualities and may in low resource settings be implemented as a large scale screening method.

In India, Goel [18] found VIA to have a sensitivity of 96.7%, much higher than that of a PAP smear, which they found to be a mere 50%. The specificity of VIA, however, was much lower than the PAP smear, 36.4% vs. 97%. Goel concluded that VIA with acetic acid is very sensitive for ectocervical lesions; with its low cost and ease of use making it very advantageous for a primary screening method in developing countries.

Bomfim [19] did a similar study and found sensitivity of VIA was found to be 100% vs 18% for PAP smears and specificity was 78% for VIA vs 100% for PAP smears in detecting. The negative predictive value (NPV) of VIA was much better and found to be 100% for both. PAP smear NPV was 97% and 99%.

De Vuyst [20] studied VIA comparing it to three other screening methods, including HPV DNA typing. Sensitivity and specificity were 83.3% and 94.6% for Pap smear, 73.3% and 80.0% for VIA, 94.4% and 73.9% for HR HPV PCR, and 72.3% and 93.2% for cervicography. Although pap smear had the highest sensitivity and HPV PCR the highest specificity, the visual inspections showed an accuracy between the two. De Vuyst concluded that in poor resource countries VIA is effective as a primary screening tool. Lawrence [21] and colleagues offered cervical cancer screening to 1,052 Guatemalan women using VIA. 9.3% of patients deferred screening at all and refused examination. Among the 954 women screened, 13% were found to have findings consistent with CIN I or higher. 99% of the women with positive findings agreed to undergo immediate treatment with cryotherapy.

CONCLUSION

These studies have shown that VIA is an adequate and acceptable screening method for cervical cancer. Furthermore, in low-resource areas, VIA can be better than PAP smears for its ease of use and low cost. VIA confers a very high NPV, which means that when a test is negative, the women can go home reassured that she is not likely to have a neoplastic cervical lesion; eliminating the need for follow-up visits. However, the low PPV of VIA does present the problem of many false positives, discouraging the see-and-treat method. However, PPV is dependent on incidence and if a see-and-treat method were implemented in a high-risk population with a high incidence of cervical cancer, the qualities of the VIA test may improve.

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