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Acetic acid Visualisation of Cervix as an Alternative Screening Method for Cervical Cancer in Low Resource Settings

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Abstract
Cancer cervix is the second most common cancer worldwide. It is more prevalent in low resource settings. But it is a preventable disease that's why in developed countries its incidence has decreased due to effective screening programmes. A study was done in AIMSR Bathinda to compare different screening methods that are VIA, Pap smear and Colposcopy. Results showed that VIA is a good screening method, simple test with low cost and high sensitivity in comparison to Pap smear. It can be easily used in low resource settings. Sensitivity of VIA is 89.4% as compared to 79% for PAP with less specificity. So VIA is a simple objective test. Its results are available immediately allowing further investigations in the same visit. To conclude VIA has a good role in screening programme in low resource settings and can become an alternative screening tool.

Introduction

Cancer cervix, a preventable disease continues to be a cause of great concern to women's health in developing countries. It is associated with great morbidity and mortality. It is the second most common gynaecologic cancer worldwide accounting 13% of all female cancers in developing countries[(1)]. Cervical cancer is a disease that can be prevented through both primary prevention and early detection. So there is need of low cost approach for effective cervical cancer screening[(2)]. In developed countries the incidence of cervical cancer has decreased markedly from 44 cases per 100000 in 1947 to 8 per 100000 in 2012 due to organized and effective screening programmes leading to detection of pre invasive disease at early stages[(3)]. In India nearly 90,000 new cases of cancer cervix occur every year. The incidence in India is 45 per lakh women [(4)]. It is the most common genital cancer in clinical practice in India. 80-85% of cases are detected in stage III and stage IV. The important reasons for higher cervical cancer incidence in developing countries are lack of resources, lack of effective screening programs and poorly organised health system[(2)]. Several screening modalities are now available for early detection of cervical cancer and its precursor lesions as Pap smear, VIA, VIAM, HPV screening and Colposcopy etc[(5)]. PAP smear is a simple safe non invasive and effective method for early screening programme[(6)] but it is difficult in low resource settings and rural set ups due to its complex process of sample collection, preparation, staining and reporting. So for mass

screening in these areas more cost effective strategies are to be adopted.VIA is a good alternative that is visual inspection of cervix with acetic acid[7]. VIA is low cost, simple to do with real time screening of results and with accuracy comparable to good quality pap smears. VIA does not depend on lab services, doesn't need 2nd visit of patient to collect reports and further investigations, treatment can be planned and carried out in the same visit. So it is a promising screening tool for early detection of cervical cancer for developing countries. So it has been recommended by WHO as an alternative to cytology as a method of screening[8]. VIA involves naked eye examination of cervix after applying 3-5% acetic acid with illumination by a bright light source without any magnification. A positive test means detection of well defined dull acetowhite area on the cervix leading to early diagnosis of CIN and precancerous lesions.

Material and Methods

This prospective clinical study was done on 300 patients of age group 20-50yrs attending Gynae OPD of AIMSR Bathinda from July 2016 to August 2017. The females under study came with complaints of discharge per vaginum, intermenstural bleeding, post coital bleeding, pruritus vulvae, dysparunia etc. After taking careful history of patients, complete general and local examination was done. Unmarried women, women with frank carcinoma cervix and with bleeding per vaginum were excluded from study. Per speculum examination of patients was done. A picture in mind was made of pinkish squamous epithelium, reddish columnar epithelium and transformation zone. Pap smear of patients was taken from ecto and endocervix. Pap smear slide was immediately fixed with 90% ethyl alcohol and sent for cytology. After taking Pap smear, same patients were subjected to VIA. The changes in surface epithelium were noted one minute after applying 3-5% acetic acid with a cotton swab. Then the cervix was carefully inspected for any acetowhite areas particularly on transformation zone. The VIA results were interpreted as positive with detection of any distinct, opaque, dense or well defined acetowhite area. If no acetowhite area is recorded then result is considered negative. The sites and characteristics of the lesions were mapped and Reid scoring was done. All women then underwent colposcopy on the same day and if colposcopically suspected lesions are identified then punch biopsies were taken from abnormal areas. Results were compiled and analyzed. Sensitivity, specificity, positive and negative predictive value were then calculated for Pap smear, VIA and colposcopy and colposcopy with histopathology results were taken as gold standard.

Results

Out of 300 patients under study, the mean age of patients was 34.2 and mean parity was 1.8. (Table 1)

Table 1: Demographic criteria of the patients

	Range	Mean
Age of subjects	20-50yrs	36.2+_10
Parity of subjects	0-5	2.61+_1.4

Table 2: Complaints of patients

Complaints	Percentage
Vaginal discharge	72
Pruritus vulvae	8
Postcoital bleeding	7
Intermenstural bleeding	5
Dysparunia	4
Lower abdominal pain	4

The most common presenting symptom was vaginal discharge (Table2). Most common finding on per speculum examination was chronic cervicitis. Pap smear was recorded as normal or inflammatory smear in 264 cases (88%). It was abnormal in 42 (12%) cases. Out of these 36 abnormal smears included 26 LSIL, 14HSIL, 2 cases with cells suspicious of malignancy (Table3).

Table 3: Pap smear results

Pap smear	Number	Percentage
Normal or inflammatory	264	88
LSIL	26	7.3
HSIL	14	4
Smear with atypical cells	2	0.7

On VIA 26% cases were positive and 74% cases were negative (Table4). On Colposcopy, 242 cases came out to be normal and 58 were abnormal. 40 cases had Reid score of 0-2, 18 had Reid score 3-8 (Table 5).

Table 4: VIA results

VIA results	Number	Percentage
Negative	222	74%
Positive	78	26%

Table 5: Colposcopy findings

Colposcopy findings	Number	Percentage
Negative	242	80.6
Positive	58	19.3
Reid score(0-2)	30	51.7
Reid score(3-8)	28	48.3

Biopsy findings: Out of these 58 cases, 34 were positive on biopsy and 24 were negative. Out of 34 positive cases, 24 had mild dysplasia, 6 were of moderate dysplasia, 2 had severe dysplasia and 2 had carcinoma in situ. Out of 34 cases, 30 cases were detected by VIA and only 25 cases were detected by PAP. So 4 cases were missed by VIA and 9 cases were missed by PAP.

Sensitivity of VIA is 89.4% as compared to 79% of Pap. Specificity of VIA is 74.5% as compared to 97% of Pap. PPV of VIA is low 43.5% but NPV is high that is 98.5% means if VIA is negative means patient can go assured that there is no risk of cervical cancer yet.

Table 7 comparison of different screening methods

	Pap test	VIA
Sensitivity	79%	89.4%
Specificity	97%	74.5%
PPV	80.9%	43.5%
NPV	96.7%	98.5%

Discussion

Cervical cancer is the leading cause of morbidity and mortality among women worldwide. The incidence and mortality of cervical cancer has declined over 80% in developed countries since the advent of successful screening. The appropriateness of a screening test not only depends on its sensitivity and specificity but also on its simplicity and safety[5]. Wide spread use of Pap smear has achieved drastic reduction in incidence and mortality of cervical cancer in developed countries[3]. Its poor sensitivity (29-56%) has been overcome by using liquid based thin layer cytology and use of highly specific HPV DNA testing. But definitely the cost of screening increases[9]. This is not applicable in poor resource settings. So VIA has gained popularity as cervical screening method and proven as an alternative to PAP smears in developing countries. VIA is easy to use, low cost, needs fewer visits. Whereas Pap smear requires slide cytobrush, microscope, pathologist and a follow up visit of patient to collect results. On the other hand any trained nurse or field worker who is able to use speculum can do the VIA test. It doesn't require any extra equipment or laboratory backup. Patient is told result at the same time and if further investigations are required can be done in the same sitting. So this study was done to evaluate VIA in comparison to PAP and colposcopy. Gaffikin in 2003 published a meta-analysis study concluding that VIA was useful as an adjuvant or alternate to cytology[10]. Doh did screening in Africa and concluded that Sensitivity of VIA was 70.4% vs 47.7% for PAP. Specificity of VIA was 77.6% and 94.2% for PAP. PPV of VIA was 44% and NPV was 91.3%. He concluded that though PAP has slightly better testing qualities but VIA has acceptable test qualities and can be implemented as a large scale screening method[11]. Shankaranarayanan and Mahe have published results comparing VIA to cytology and to HPV DNA testing and found that all three had similar detection rate of CIN 2 and 3 lesions and the range of sensitivity for VIA was 67-79% and specificity 49-86% [12].

In India, Goel examined 400 females attending Gynae OPD and performed Pap smear, VIA and colposcopy on all. He found sensitivity of VIA as 96.7% much higher than of PAP smear which was only 50%. Specificity of VIA was much lower than PAP 36.4% vs 97%. He found that VIA was a poor test for catching endocervical lesions but is

very sensitive for ectocervical lesions with low cost and ease to use. This study evaluates the cross sectional accuracy of screening tests for cervical cancer precursors in developing countries[13].

Kavita Singh and Shefali did screening on 750 patients and results showed sensitivity of VIA as 93.1% and of Pap smear 70.2%. The specificity of VIA was 86.8% as compared to 97.2%. The PPV of Pap smear 51.2% was more than 22.1%. The NPV of VIA is 99% vs 97% of PAP smear[14].

Hend S.Saleh did study in Egypt on 200 women attending Gynae OPD and showed sensitivity of Pap smear 50.1%, specificity of 93.1%, PPV 89.3%, NPV 65.6%. VIA had a sensitivity of 90%, specificity of 37%, PPV of 52% and NPV of 81%. He concluded that VIA is a good screening, simple test with low cost and high sensitivity in comparison to Pap smear. So it can be used as alternative screening method[15]. Study done by Bharti Bharani and Phatak Satish R on 380 patients showed 100 patients to be positive on VIA. Out of these 100 patients 75 were abnormal on colposcopy. Cervical biopsy of these 75 patients showed 22 cases of LSIL, 8 of HSIL, 7 of preclinical invasive cancers. 38 showed no abnormality in their cervical biopsy concluding that VIA is a simple method to pick up high grade squamous intraepithelial lesions or early invasive cancers. Coplposcopy is complementary only so VIA can be widely practised on wider scales to evaluate cervix at risk[16].

The results of current study are compatible with the previous studies showing sensitivity of VIA as 90% as compared to pap with sensitivity of 50.1%. Specificity of VIA and PAP are 37% and 93.1% respectively. PPV of VIA 52% and 89.3% of Pap smear. NPV of VIA is 80% as compared to 65.6% for PAP concluding that VIA is a better screening test than PAP due to ease to use and low cost. VIA has high NPV which means that when test is negative the woman can go home reassured that she is not likely to have neoplastic cervical lesion. VIA can also guide regarding the site to be biopsied. Although colposcopy accurately identifies the most abnormal area for biopsy but in case colposcopy facility is not available then VIA will demarcate the site precisely and is better than blind biopsy of ectocervix.

Conclusion

VIA has a role as a screening tool in low resource settings. It is simple, easy to do cost effective, needs minimum infrastructure and its results are available easily. It is comparable to cytology in detecting low grade as well as high grade lesions in terms of sensitivity, specificity and positive predictive value. So in countries like India VIA based screening program can be done at primary health care level of health service and incidence of cancer cervix can be decreased and downstage.

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