

Comparative Study of Visual Inspection of Cervix by Acetic Acid Application and Pap Smear Cytology in Screening of Cervical Cancer in Asymptomatic Woman

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Abstract:

Introduction: In India Cervical cancer is second most common cancer in woman. Every year around 1.23 lakh new cases are diagnosed with cervical cancer and 67,500 of these woman die in India. There are various screening various screening techniques such as visual inspection with acetic acid, visual inspection with Lugol's iodine, visual inspection with magnification devices-Magna visualizer, Pap smear and HPV-DNA testing have been suggested and tried under low-resource settings of our country, and cervical cytology screening has been found effective in reducing incidence of the disease.

Material and Methods: It is prospective observational study. This study was be conducted in the Department of Obstetrics and Gynaecology in medical college and tertiary health centre comprising of woman who are sexually active during 2020 -2022 with sample size of 236.

Results: Out of 236 cases, 39.80% were positive and 60.20% were negative according to visual inspection of cervix with acetic acid. According to cytology (Pap smear) reports, 56.8% were normal, 41.6% were inflammatory, 1.2% was having LSIL/ atypical and 0.4% was having HSIL. VIA has, the sensitivity of about 43.58% and specificity of about 41.70%. Pap smear has the sensitivity of about 43.58% and specificity of about 41.70%.

Conclusion: Visual inspection with acetic acid is simple and easy. It is effective and can be used as an alternate strategy in low resource settings where screening for cancer cervix by Pap smear is not always possible due to inadequate cytologists.

Keywords: Screening of Cervical Cancer, Visual Inspection of cervix by Acetic Acid, Pap smear.

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Introduction

Fourth most frequent cancer in woman is cervical cancer with an estimate of 570,000 new cases and 3, 11,000 deaths occurred in 2018 representing 6.6% of all female cancer. [1] Second most common cancer in woman in India is cervical cancer.

Yearly around 1.23 lakh new case are diagnosed with cervical cancer and 67,500 of these women die in India. [2] Different screening strategies such as camp approach and rural cancer registries for cancer detection have been found useful in minimizing the problem of cervical cancer in the villages. [3]

Various screening various screening techniques such as visual inspection with acetic acid, visual

inspection with Lugol's iodine, visual inspection with magnification devices-Magna visualizer, Pap smear and HPV-DNA testing have been suggested and tried under low-resource settings of our country, and cervical cytology screening has been found effective in reducing incidence of the disease. [3] Visual Inspection with Acetic Acid was endorsed by World Health Organization in 2010. Acid is applied on a woman's cervix and observed, precancerous spots turn white. Acetic Acid highlights lesions, which have more DNA, and therefore less water and more protein, than healthy tissue. [4] On timely diagnosis, cervical cancer is one of the most successfully treatable forms of cancer, as long as it is detected early and management. VIA has been shown to be cost

effective and easy method for detection of early pre-cancerous lesions effectively.

Aims and Objectives

Aims:

1. To compare sensitivity of acetic acid (VIA) with Pap smear cytology for visual inspection of cervix cancer in asymptomatic woman.
2. To compare cervical biopsy after application of acetic acid (VIA).
3. Early detection of precancerous lesions of cervix.

Objective:-

To compare sensitivity of visual inspection of cervix by application of acetic acid (VIA) with Pap smear cytology in screening for cervix cancer in asymptomatic woman.

Review of Literature

Availability of highly effective primary (HPV vaccine) and secondary (screening) prevention measures makes cervical cancer nearly completely preventable, financial and technical constraints of implementing cytology-based screening programs in developing countries have led to the investigation of screening tests based on visual examination of the uterine cervix. Visual inspection with 3–5% acetic acid (VIA) appears to fulfil the

basic criteria of a satisfactory screening test. It involves non-magnified visualization of uterine cervix soaked with 3–5% acetic acid. [5]

The direct precursor to cervical cancer is high-grade dysplasia, which can progress to cervical cancer over a period of up to 10 years. Mostly lower-grade dysplasia regresses or does not progress, particularly lower-grade incident cases in younger women (aged 34 or less). [5]

Criteria for Screening of Disease [9]

The disease to be screened should fulfil the following criteria before it is considered suitable for screening:

1. The disease should be an important health problem.
2. The disease should have a latent asymptomatic stage.
3. There is a test that can detect the disease prior to its onset.
4. Facilities should be available for confirmation of the diagnosis.
5. There is good evidence that early detection and treatment reduces morbidity and mortality.

Cervical cancer screening matches these criteria quite well.

Table 1: HPV prevalence among women [6]

HPV prevalence among women with	Percent (%)
Normal cytology	6
HSIL/CIN2/CIN3	56
LSIL/CIN1	29.4
Cervical cancer	82.5

Screening for Cervical Intraepithelial Neoplasia-

It is technically easy to screen for cervical cancer since:

1. The cervix can be easily visualized and tests performed.
2. Cervical cancer goes through premalignant changes, and if the diagnosis is made at this stage, cancer can be prevented.
3. There is a lag time of 10-20 years before the disease progresses from pre invasive to invasive diseases.

Several screening modalities are available, but cytology is most widely used. In resource – poor settings where cytological screening is not easily available other methods are used. [7]

Methods used for Cervical Cancer screening [7]
Cytology

1. Conventional cytology (Pap smear)
2. Liquid – based cytology (LBC) Naked eye visual inspection or down staging
3. Visual Inspection after acetic acid (VIA)

3. Visual Inspection after acetic acid with magnification (VIAM)
4. Visual Inspection after lugols iodine (VILI)
5. Cervicography HPV DNA testing
Investigational strategies Polar probe Laser – induced fluorescence

Visual Inspection after Acetic Acid (VIA)-

It is difficult to practice cytology screening tests in a set up with inadequate resources, so other methods of screening have been introduced.

Acetic acid when applied to the cervix coagulates the mucus and the areas of cells with increased chromatin density. Areas of CIN, neoplasia, HPV-related changes are aceto white.

VIA has been extensively studied in developing countries and is currently recommended by the WHO as the primary screening test for developing countries.

The disadvantage of this test is the high false – positive rate, resulting in large number of referrals [7]. The sensitivity of VIA in detecting high-grade

dysplasia is at least equal to that of cytology, while VIA's specificity is somewhat lower.

Preparation of 5% acetic acid (Ingredients) [8]

1. Glacial acetic acid 5 ml
2. Distilled water 95 ml

Aim is to detect and treat cervical dysplasia in asymptomatic women, to prevent development of cervical cancer.

It can also be used to complement Pap-smear screening, where that facility is available, albeit in limitation. [9]

Table 2: Shows Different categories used to classify results of direct visual inspection-

Category	Results
Suspicious	Cervical ulcer or exophytic growth suspicious for Carcinoma.
Definite Lesion	Acetowhite lesion with well circumscribed border
Non-confluent scattered lesion	Focal small, punctuated acetowhite areas
III defined lesion	Poorly circumstanced and faintly acetowhite
No Lesion	No acetowhite lesion visible

Pap Smear

Georgios Nikolaou Papanicolaou (13 May 1883 – 19 February 1962) was a Greek physician who was a pioneer in cytopathology and early cancer detection, and inventor of the "Pap smear".

The Pap tests specificity is consistently high, approximating 98%. However, estimates of its sensitivity are lower and more variable. The occurrence of false-negative and unsatisfactory Pap

smear has prompted the development of LBC and automated screening devices. [10]

Pap smear

The cervix is visualized after placing a bivalve speculum, and the ectocervix is scraped using an Ayer's spatula and endocervix with a cytobrush. The cells are smeared on a glass slide and fixed in a 1:1 mixture of 95% ethanol and ether. They are stained using papanicolaou's stain and examined.

Table 3: Shows Pap smear Nomenclature

Papanicolaou Class system (1954)	Descriptive (1968)	CIN 1978 (Cervical intra epithelial neoplasia)	Bethesda system (1988)
Class I	Negative for malignant cells	Negative	Within normal limits
Class II	Inflammatory atypia Squamous atypia Koilocytic atypia	Negative	Reactive and reparative changes Atypical squamous cells of undetermined significance
Class III	Mild dysplasia Moderate dysplasia Severe dysplasia	CIN-I CIN-II CIN-III	Low grade squamous Intraepithelial lesion High grade squamous intraepithelial lesion (HSIL) HSIL
Class VI	Carcinoma insitu	CIN-III	HSIL
Class V	Invasive Carcinoma	Invasive Carcinoma	Invasive carcinoma

Methods

This study was conducted in the department of OBGY of a medical college and tertiary health care centre, total 236 of patients were included in this study. Written and informed consent was taken from all the study participants. Detailed history, complete general examination and gynaecological examination were done. By Per speculum examination excess mucus or discharge was cleaned with a cotton swab soaked in normal saline solution. Pap smear was taken using longer bifurcated end of an Ayre's spatula which was introduced into the external os and the whole of transformation zone (squamocolumnar junction) was sampled by gentle 360degree rotation. It was

immediately smeared over a numbered glass slide and immersed in fixative (95% solution of ethyl alcohol) and handed over to pathology department.

Freshly prepared 5% acetic acid was applied over cervix for 1 minute then observed.

Test negative- No acetowhite lesions or faint acetowhite lesions.

Test positive- Sharp, distinct, well-defined, dense (opaque/dull or oyster white) acetowhite areas— with or without raised margins touching the squamocolumnar junction (SCJ) All acetowhite area positive cases were subjected to cervical biopsy after written and informed consent. Similarly, all Pap smear positive cases as per Bethesda system

were subjected to colposcopy directed biopsy. All acetowhite area positive cases were subjected to cervical biopsy after written and informed consent. Similarly, all Pap smear positive cases as per Bethesda system were subjected to colposcopy directed biopsy.

Results

Out of 236 cases, 6 (2.5%) belongs to age group less than 20 years, 25.5% belongs to age group 21-30 years, 61.9% belongs to age group 31-40 years, 8.4% belongs to age group 41-50 years and 1.6% belongs to age group 51-65 years.

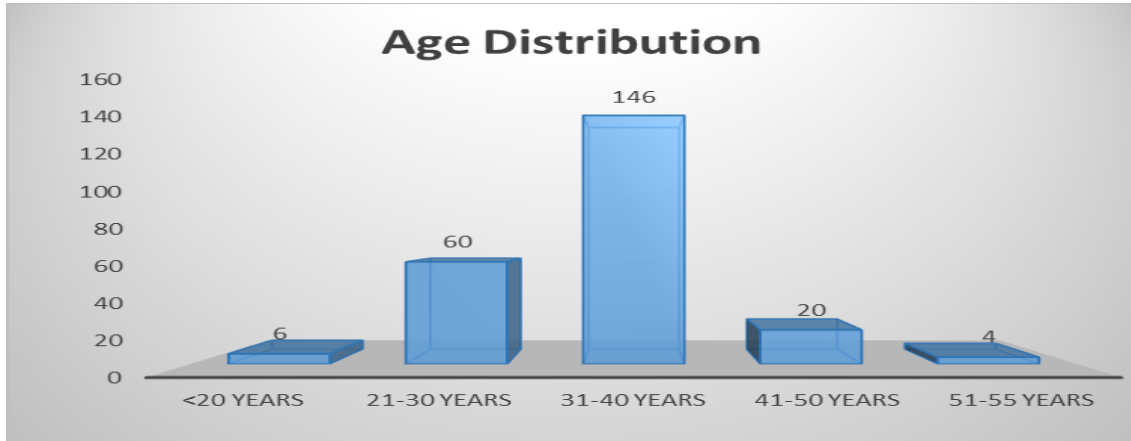


Figure 1: Age Distribution

Table 4: Distribution of Study Group According To Parity

Parity	Frequency	Percentage
1	20	8.5
2	70	29.6
3	110	46.8
4	32	13.5
5	4	1.6
TOTAL	236	100

Most of the patients in our study were parous

Table 5: VIA Reports

VIA	Frequency	Percentage
Positive	94	39.80%
Negative	142	60.20%
Total	236	100

Out of 236 cases, 39.80% were positive and 60.20% were negative according to visual inspection of cervix with acetic acid.

Table 6: Cytology (PAP Smear) Reports

Findings	No. of Cases	Percentage
No major lesion Detected	134	56.8
Inflammatory	98	41.6
LSIL/Atypical	3	1.2
HSIL	1	0.4
TOTAL	236	100

According to cytology (Pap smear) reports, 56.8% were normal, 41.6% were inflammatory, 1.2% were having LSIL/ atypical and 0.4% were having HSIL.

Table 7: Sensitivity and Specificity For VIA

Index	Estimate	Lower 95% CI	Upper 95% CI
Sensitivity	43.58%	40.42%	45.58%
Specificity	41.70%	39.50%	43.90%
Predictive value of positive test	40.32%	38.50%	42.30%
Predictive value of negative test	39.80%	37.20%	41.60%
Likelihood ratio of positive test	1.105	0.919	1.325
Likelihood ratio of negative test	0.716	0.5642	1.857

VIA has, the sensitivity of about 43.58% and specificity of about 41.70%.

Table 8: Sensitivity and Specificity for Pap smear

Index	Estimate	Lower 95% CI	Upper 95% CI
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Likelihood ratio of positive test	1.105	0.919	1.325
Likelihood ratio of negative test	0.716	0.5642	1.857

Pap smear has the sensitivity of about 43.58% and specificity of about 41.70%.

Discussion

In our study majority (61.9%) of the cases belongs to age group 31-40 years. Similar results were found in Study conducted by Bhattacharyya AK et.al [11] 36% in the age group of 40-49 years out of 300 women. In Mercy Mrudula Dasari et.al [12] Out of 500 cases, most common age group was 21 to 40 years of age consisting of 305 cases that is 61%.

According to our study out of 236 cases, 8.5% were having parity 1, 29.6% were having parity 2, 46.8% were having parity 3, 46.8% were having parity 4 and 1.6% were having parity 5. In Bhattacharyya AK et.al [11] 45 cases had parity 2 while 255 cases had more than parity 2. Kamal Patil et al [13] study majority of the cases were para two (46%) and para three (34.5%). With Visual inspection of cervix acetic acid in our study 39.80% were positive and 60.20% were negative.

The sensitivity of VIA test is about 43.58% and specificity is about 41.70% these results were similar with study done by Niyodusenga A et.al [14] in which VIA positive are 47.4% and 52.6 were negative and the sensitivity and specificity for VIA were 88.5% and 84.68%, respectively. Mercy Mrudula Dasari et.al [12] reported that VIA was positive in 31.2% and negative in 68.8 cases with VIA showed sensitivity is 52.38% and specificity of VIA 92.4%.

According to cytology (Pap smear) reports, 56.8% were normal, 41.6% were inflammatory, 1.2% was having LSIL/atypical and 0.4% was having HSIL observed in our study. Similar results were seen in study conducted by SO Albert et.al [15], Pap smear detected 84.9% as normal, 9.1% as inflammatory 0.6% as LGSIL, 0.3% as HGSIL, and 3.4% as inadequate to opine. In Kamal Patil et al [13] Pap smear detected 5.5% as normal, 76.5% as inflammatory, 9.5% as LGSIL, 7.5% as HGSIL.

Summary

This prospective, descriptive comparative study analysis of the efficacy of visual inspection by application of acetic acid with cytology and to choose VIA as an easily interpretable, low cost but effective method for screening of cervical cancer.

- Majority of patients belonged to 30 -40 yrs. age (61.9%)
- 51.6% of the study attained menarche by 12-14 years.
- Most of the marriages in this study were around 18-20 years (52.6%)
- Most of the patients in this study belong to the parity of 3 (46.8%)

Visual inspection of cervix with acetic acid 39.80% was positive and 60.20% were negative. The sensitivity of VIA test is about 43.58% and specificity is about 41.70%. All patients were subjected to Pap smear cytology. There were 134 cases (56.8%) with no detectable lesion findings, 98 cases (41.6%) showed inflammatory findings, 3 cases (1.2%) showed LSIL / atypical changes, 1 case (0.4%) showed HSIL changes.

Hence visual inspection of cervix with acetic acid can be used as an alternative strategy to Pap smear cytology in a country where adequate cytology techniques are not available.

Conclusion

- Visual inspection with acetic acid is simple and easy.
- Minimally dependent on infrastructure.
- Low start up and sustaining cost.
- Results available immediately.
- May be possible to integrate into primary health care.
- Can be done by paramedical trained staff.
- It is effective and can be used as an alternate strategy in low resource settings where screening for cancer cervix by Pap smear is not always possible due to inadequate cytologists.

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