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Comparison and correlation of VIA and Pap smear in detection of precancerous cervical lesions

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Abstract
Introduction: Cervical cancer is a huge emotional and financial burden on society. To curb the disease, there is a need to develop a screening test that has good sensitivity and specificity. The present study is aimed to compare the effectiveness of the Pap smear, Visual Inspection with Acetic Acid (VIA) for mass screening of premalignant and malignant lesions of the cervix.
Aims and objectives: 1. To screen women of 30-45 yrs. for precancerous or cancerous lesions of the cervix with VIA and Pap smear.
2. To compare and correlate the findings of Pap smear and VIA in detecting precancerous lesions of cervix.
Material and Methods: This was a prospective observational study conducted from 01/01/2015 in the Department of Obstetrics and Gynaecology among 200 women of 30-45 yrs. of age group. Pap smear was performed by the conventional method and VIA was carried out for all.
Results: The study group consisting of 200 women, 69% women were VIA negative and 31% were VIA positive. Out of 69% VIA negative patients pap results were supporting its interpretation as all pap tests were negative for precancerous and cancerous lesions of cervix. Out of VIA positive patients 66% were NILM and 34% were LSIL OR HSIL.
Conclusion: These results establish VIA as an effective screening test for cancerous and precancerous conditions of the cervix and thus VIA can be implemented as a single primary screening method.

Keywords: PAP smear, VIA, Premalignant Lesion of Cervix, NILM, LSIL, HSIL

Introduction

Cervical cancer has huge burden on national health system [1, 2]. Cancer cervix has been considered preventable because it has a long preinvasive state and availability of screening programs and treatment of preinvasive lesions is effective. Papanicolaou (Pap) smear is the primary screening tool for cervical intraepithelial neoplasia (CIN) and invasive cancer of the uterine cervix and its use has reduced morbidity and mortality from invasive cancer in various population groups [4, 5], Still, the assumed accuracy of it, (80 to 95%) has been questioned. Conversely, a false negative rate of the Pap smear has been reported under carefully controlled condition [6-10].

Alternatively we can use VIA (Visual Inspection of Cervix with Acetic Acid) as a primary screening method. It is cost effective, easy to perform and has on the spot interpretation. Also it has comparable sensitivity as pap as per reviews. Here we want to compare that even well-equipped hospitals can prefer VIA alone as a screening tool or not. Therefore we had planned this study to compare these screening methods.

Materials and Methods

A prospective observational study was carried out in 200 women visiting gynecological OPD between 30-45 years (opportunistic screening). The data was collected from Bharati Hospital, OPD, department of Obstetrics and Gynaecology, in Pune. The purpose and the procedure of the study was explained to them and a written consent was obtained.

Inclusion criteria
- Age between 30-45 yrs.
- Previous PAP report (if available) s/o inflammation (done 3-6 months back)
- Cervical ectopy or hypertrophied cervix.

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Exclusion Criteria
- With any local (vaginal, cervical) infection or bleeding
- Pregnancy
- IUCD
- Previous surgery on cervix like cautery or LEEP

For potential candidates after taking detailed history and thorough systemic examination, Pap smear was taken by conventional method and then VIA (visual inspection of cervix with acetic acid) was carried out.

Pap smear was taken by Ayers spatula with proper SCJ scraping for satisfactory smear, fixing and staining was done by conventional method.

Pap smear is interpreted as per Bethesda classification.

BETHESDA SYSTEM
Within normal limits.
Infections (Org. Should be specified.)
Reactive & Reparative changes.
Squamous Cell Abnormalities 1.ASC-US 2.ASC-H
LSIL(Low grade Squamous Intraepithelial Lesion)
HSIL(High grade Squamous Intraepithelial Lesion)
Squamous cell Carcinoma.

VIA
Cervix was visualized thoroughly after putting speculum (don't use any antiseptic solution) for any nabothian cyst, polyp, infection, leukoplakia, growth.5%Acetic Acid (AA) was applied to cervix for 1 min. VIA is interpreted as either negative or positive.

VIA negative

Acetowhite lesion
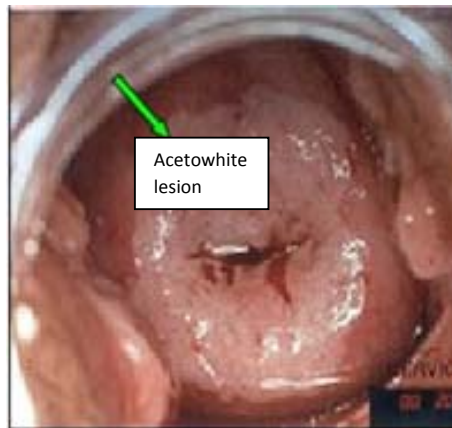
VIA positive

For all women results for Pap and VIA were compared by using statistical methods.

Results
Out of 200 women, 138 (69%) women were VIA negative and 62 were VIA positive.

Table 1: Correlation of age with result of VIA

Examination	Age group			Total
	30-35 yrs.	**36-40 yrs.**	**41-45 yrs.**	
VIA (200)				
Negative	40 (28.9%)	48 (34.8%)	50 (36.3%)	138 (69%)
Positive	20 (32.3%)	12 (19.3%)	30 (48.4%)	62 (31%)
Pearson chi-square test	$p=0.272^{ns}$			

ns statistically non-significant as $p>0.05$

Table 2: Correlation of age with result of Pap smear in VIA positive women

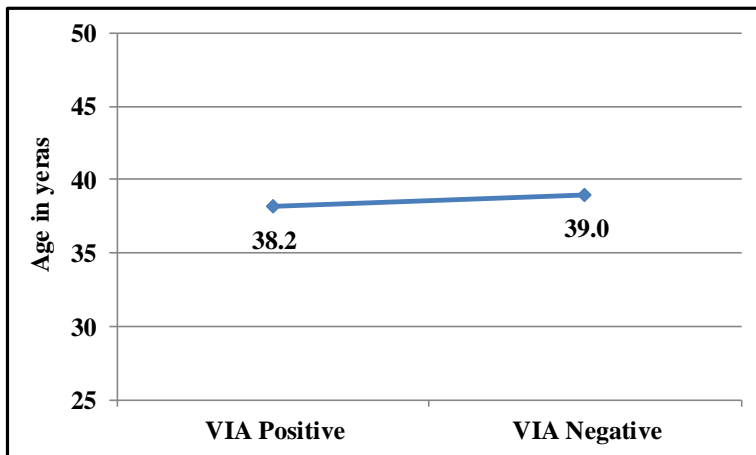| Pap smear (62) (VIA positive women)	Age Groups			Total
	30-35 yrs.	**36-40 yrs.**	**41-45 yrs.**	
NILM	19 (46.3)	9 (22.0)	13 (31.7)	41 (66.1)
LSIL	3 (23.1)	3 (23.1)	7 (53.8)	13 (21.0)
HSIL	2 (25.0)	1 (6.3)	5 (68.8)	8 (12.9)
Pearson chi-square test	p=0.041*			

* Statistically significant as $p<0.05$

Fig 1: Mean age of the women as per VIA interpretation

Differences in mean age of the women from VIA positive and negative group were not statistically significant (compared using independent sample t test) (t=1.228, p>0.05).
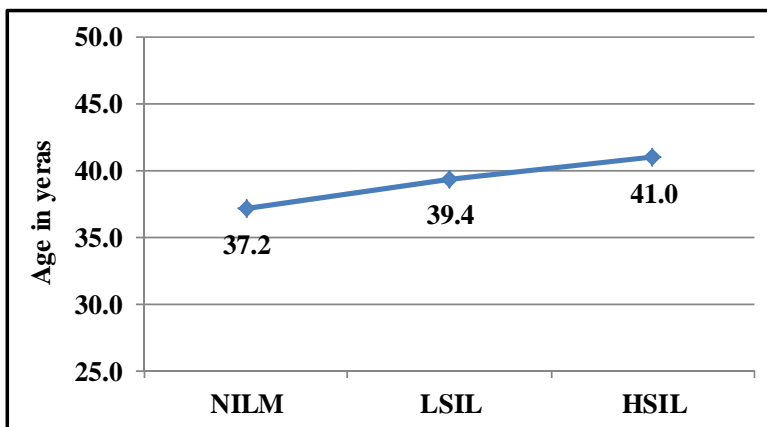

Fig 2: Mean age of the women by result of Pap smear

Comparison among mean age of the women across the groups using ANOVA test indicated statistically significant increase in age (F=5.326, p<0.05)

Table 3: Correlation between interpretations of VIA and Pap smear

VIA	Pap smear			Pearson chi-square test
	Positive	**Negative**	**Total**	
Positive	21 (33.9%)	41 (66.1%)	62 (31%)	χ2= 32.9699
Negative	0 (0.0%)	138 (100.0%)	138 (69%)	p=0.000*

* Statistically significant as *p*<0.05

Discussion
Table 1 correlates results of VIA with woman's age, which shows VIA interpretation (negative/positive) does not have any age correlation. Even differences in mean age for both test results were statistically not significant (Fig 1)
On the other hand there is statistically significant correlation with higher age and advanced lesion on Pap test by Bethesda classification. NILM, LSIL, HSIL in increasing trends. (Table 2, Fig.2)
Results obtained from the study after comparing VIA and Pap showed that though specificity of VIA is less (48.4%) as compared to Pap specificity (70%), sensitivity of VIA (100%) is almost comparable with sensitivity of Pap(90.2%) and VIA has 100% NPV (negative predictive value) in this study.

In 2011 Divya Hegade *et al* studied 225 cases and concluded that VIA and Pap sensitivity and specificity are almost comparable [11].
In 2012, Shuchi *et al* compared 200 patients with VIA, VILI and Pap, concluded that VIA and VILI had sensitivity comparable to Pap smear and can therefore be a suitable potential alternative/adjunctive screening test not only in resource-poor settings but also in well-equipped centers [12].

Conclusion
Even though cytology is available VIA can be used as a primary screening tool in detection of premalignant lesions of uterine cervix which is cost effective, and has on the spot results.

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