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Visual Inspection with Acetic Acid (Via) is Comparable to Colposcopy for Detection of Precancerous Cervical Lesions

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Abstract

Background: Cervical cancer has a huge emotional and financial burden on the society. To curb the disease, there is a need to develop a cost-effective screening tool with good sensitivity and specificity. The present study is aimed to find out effectiveness of Visual Inspection with Acetic Acid (VIA) in picking up premalignant and malignant lesions of the cervix after comparing it with colposcopy and histopathology.

Aims and objectives: 1. To screen women of 30-45 years of age for precancerous cervical lesions with VIA., 2. To compare accuracy of VIA with Colposcopy., 3. To confirm the findings with histopathology examination.

Material and Methods: This was a prospective observational study conducted in the Department of Obstetrics and Gynecology among 500 women of 30-45 years of age group. VIA was carried out and all VIA positive women were subjected to colposcopy. All women with colposcopy interpretation as CIN I, CIN I -II, CIN II-III and as unsatisfactory underwent cervical biopsy. Later on, colposcopy findings were correlated with histopathological findings.

Results: Out of 500 study group, 364 (72.8%) women were VIA negative and 136 (27.2%) were VIA positive. Out of 136 VIA positive women, 65 (47.8%) women were positive on colposcopy (either of CIN I/I-II/II-III) and after biopsy 50 (82%) women had positive reports. (either of intraepithelial or invasive cervical lesions)

Conclusion: These results establish VIA as an effective screening test for cancerous and precancerous conditions of the cervix. Colposcopy can further interpret the VIA positive lesions with almost 100 % sensitivity, specificity, NPV in high grade lesions.

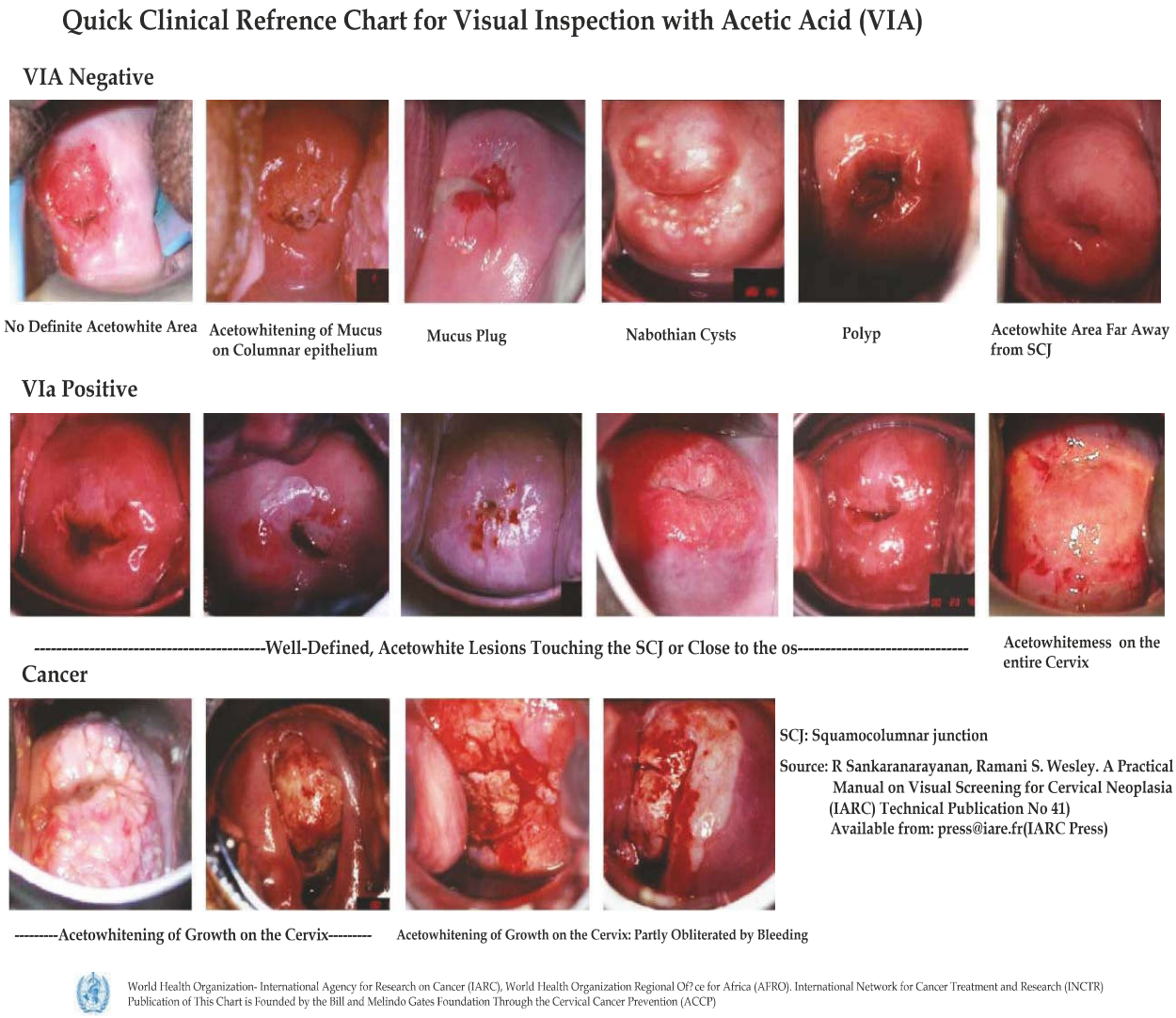
Keywords: VIA; Colposcopy; Precancerous Lesion of Cervix; CIN I; CIN I-II; CIN II-III

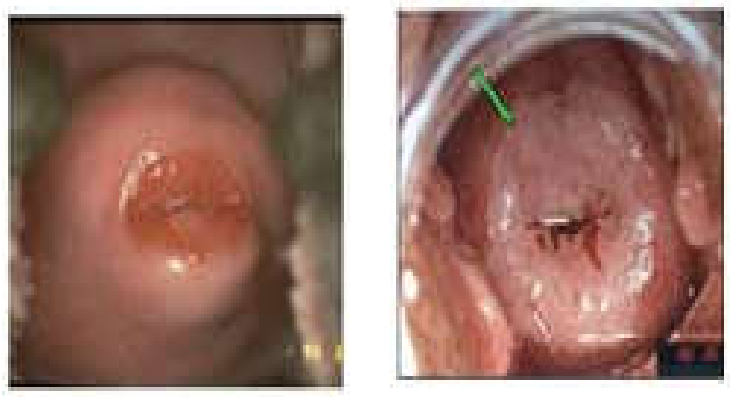
Introduction

In India cancer cervix stands one of the most common causes of death amongst women because of non-communicable diseases such as malignancies and it stands second most common worldwide. In developing countries like India, eighty per cent new cases emerged with total number of 529,400 cases, with 72,825 deaths against 274,800 women dying globally. 1 Global distribution of cervical cancer varies, with Africa, Asia, and Latin America bearing a substantial burden of this disease.[1,2]

Cervical cancer prevention programs in both developed and developing nations generally have relied on cytological testing using the Papanicolaou (Pap) smear test. Such screening programs can be expensive, prone to error, and logistically difficult to implement—particularly in developing countries. The direct detection of HPV in cervical specimens may offer an alternative or complement population-based cytological screening. But using

1. WHO referral chart for VIA





VIA Negative VIA Positive

HPV testing as a primary screening modality is expensive.

Thus, there is a need to validate a cost-effective screening tool for cancer cervix with good sensitivity, specificity. VIA has been studied against cytology with almost comparable results.[3-7] Conventionally what we follow is after getting cytology report which generally takes 3-4 working days we post a woman for colposcopy directed cervical biopsy and thereafter as per histopathological report treatment is offered to a woman. In this study women were screened with VIA and all VIA positive women were subjected to colposcopy directly (which has saved almost 3-4 days with less hospital visits) and later on these results were validated by correlating with histopathological reports which is a known gold standard for diagnosis.

Aims and Objectives

1. To screen women of 30-45 years of age for precancerous cervical lesions with VIA.
2. To compare accuracy of VIA with Colposcopy.
3. To confirm the findings with histopathology examination.

Materials and methods

A prospective observational study was carried out in 500 women visiting gynecological OPD between 30-45 years of age group. The data was collected from Bharati Hospital, OPD, department of Obstetrics and Gynecology, 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
- Cervical ectopy or hypertrophied cervix

Exclusion Criteria

- With any local (vaginal, cervical) infection or bleeding
- Pregnancy
- IUCD (Intrauterine Contraceptive Device)
- Previous surgery on cervix like cautery or LEEP (Loop Electrosurgical Excision Procedure)

After taking detailed history and thorough systemic examination, VIA (visual inspection of cervix with acetic acid) was carried out. For all VIA

Colposcopy signs	Zero point	One point	Two points
Colour	Low-intensity acetowhitening (not completely opaque); indistinct acetowhitening; transparent or translucent Acetowhitening beyond the margin of the transformation zone, Pure snow-white colour with intense surface shine	Intermediate shade - grey/white colour and shiny surface (most lesions should be scored in this category)	Dull, opaque, oyster white; grey
Lesion margin and surface configuration	Microcondylomatous or micropapillary contour1 Flat lesions with indistinct margins Feathered or finely scalloped margins Angular, jagged lesions3 Satellite lesions beyond the margin of the transformation zone	Regular-shaped, symmetrical lesions with smooth, straight outlines	Rolled, peeling edges2 Internal demarcations between areas of differing colposcopy appearance-a central area of high-grade change and peripheral area of low-grade change
Vessels	Fine/uniform-caliber vessels4- closely and uniformly placed Poorly formed patterns of fine punctation and/ or mosaic Vessels beyond the margin of the transformation zone Fine vessels within microcondylomatous or micropapillary lesions6	Absent vessels	Well defined coarse punctation or mosaic, sharply demarcated5 - and randomly and widely placed
Iodine staining	Positive iodine uptake giving mahogany-brown colour Negative uptake of insignificant lesion, i.e., yellow staining by a lesion scoring three points or less on the first three criteria Areas beyond the margin of the transformation zone, conspicuous on colposcopy, evident as iodine-negative areas (such areas are frequently due to parakeratosis)7	Partial iodine uptake - variegated, speckled appearance	Negative iodine uptake of significant lesion, i.e., yellow staining by a lesion already scoring four points or more on the first three criteria

positive women colposcopy was offered which was interpreted with Reid's colposcopy index. After RCI scoring all women with CIN of any grade, cervical biopsy was carried out for tissue diagnosis.

VI A

Cervix need to be visualized thoroughly by per speculum examination for any Nabothian cyst, polyp, infection, leukoplakia, growth. (No use of any antiseptic solution is must) Afterwards, 5%Acetic Acid (AA) was applied to cervix for 1 min and later on observe for any cervical changes.[8-11] VIA is interpreted as either negative or positive.

Colposcopy

All VIA positive patients were further screened by colposcopy, in 3 steps,

- Normal saline application
- 5% Acetic acid application,
- Lugol's iodine application

On colposcopy patient were scored as per Reid's Colposcopy Index. [12-16]

RCI (overall score)	Histology
0 – 2	Likely to be CIN 1
3 – 4	Overlapping lesion: likely to be CIN 1 or CIN 2
5 – 8	Likely to be CIN 2-3

Colposcopy Images

Normal Study

CIN II-III

Saline Application 5% AA Application Lugol's Iodine

Results of VIA, Colposcopy and histopathology were then compared and correlated by using statistical methods of analysis.

Results

Out of 500 women, 364 (72.8%) women were VIA negative and 136 (27.2%) were VIA positive.

Table 1: Age distribution of the women participated in the study.

Age group	Number	Percent
30-35 years	166	33.2
36-40 years	122	24.4
41-45 years	212	42.4
Total	500	100.0

Table 1 shows that maximum recruitment was from higher age group 40-45 years (42.4%) followed by 30-35 years of age group. Mean age found was 38.71 years.

Table 2: VIA among the study group.

Examination	Diagnosis	Number of Women	Percentage
VIA (n=500)	Negative	364	72.8
	Positive	136	27.2

Table 2 shows that Out of 500 women, 72.8% (364) were VIA negative and 27.2% (136) were VIA positive.

Table 3: Colposcopy examination among the study group

Examination	Diagnosis	Number of Women	Percentage
Colposcopy (n=136)	Normal	17	12.5
	Cervicitis	48	35.2
	Ectopy	10	7.3
	CIN I	19	13.9
	CIN I-II	25	18.3
	CIN II-III	15	11.0
	Unsatisfactory	02	1.6

Out of 136 women, 14% were CIN I, 11% turned as CIN II-III, 18.3 % were CIN I-II and 2 women had unsatisfactory colposcopy. Those were subjected to cervical biopsy (Table 3).

Table 4: Biopsy examination among the study group

Examination	Diagnosis	Number of Women	Percentage
Biopsy (n=61)	Cervicitis	11	18.0
	CIN I	12	19.7
	CIN I-II	7	11.5
	CIN II	20	32.8
	CIN II-III	3	4.9
	CIN III	4	6.6
	SCC	3	4.9
	ADENO CA	1	1.6

This table shows cervical biopsy reports, which states that 20 (32.8%) women were CIN II after histopathological examination.

CIN III was found in 6.6% women and CIN II-III in 4.9 %. Three women had biopsy proved squamous cell carcinoma and one had adeno carcinoma. (Table 4)

Table 5: Correlation between Colposcopy (overall) and biopsy (n=61)

Col-poscopy	Biopsy		Total	Pearson chi-square test	Cohen's Kappa
	Positive	Negative			
Positive	50 (92.5)	9 (7.5)	59 (96.7)	$\chi 2$= 9.399	Kappa= 0.267
Negative	0 (36.4)	2 (63.6)	2 (3.3)	p=0.002*	p=0.002*

* Statistically significant as p<0.05 (Table 5).w

Table 6: Predictive value of Colposcopy

Colposcopy (overall)	Biopsy		Total
	Positive	Negative	
Positive	50 (a)	9 (b)	59 (a+b)
Negative	0 (c)	2 (d)	2 (c+d)
Total	50 (a+c)	11 (b+d)	61

Sensitivity = a/ (a+c) X 100 = 50 / 50 X 100 = 100.0

Specificity = d/ (b+d) X 100 = 2 / 11 X 100 = 18.2

Predictive value of positive test = a / (a+b) X 100 = 50 / 59 X 100 = 84.7

Predictive value of negative test = d / (c+d) X 100 = 2 / 2 X 100 = 100.0

Percentage of false negative = c/ (a+c) X 100 = 0 / 50 X 100 = 0.0

Percent of false positive = b/ (b+d) X 100 = 9 / 11 X100 = 81.8

Colposcopy is 100 % sensitive as Table 15 shows but if we consider and compare overall colposcopy from CIN I to II-III its specificity is very low about 18 % only (Table 6).

Table 7: Correlation between Colposcopy (CIN I) and biopsy

Colposcopy (CIN I)	Biopsy		Total	Pearson chi-square test	Cohen's Kappa
	Pos-itive	Neg-ative			
Positive	6 (100.0)	7 (77.8)	13 (86.7)	$\chi 2$= 1.538 p=0.343ns	Kappa= 0.186
Negative	0 (0.0)	2 (22.2)	2 (13.3)		p= 0.215ns

ns statistically non-significant as p>0.05 (Table 7).

Table 8: Predictive value of Colposcopy (CIN I)

Colposcopy (CIN I)	Biopsy		Total
	Positive	Negative	
Positive	6 (a)	7 (b)	13 (a+b)
Negative	0 (c)	2 (d)	2 (c+d)
Total	6 (a+c)	9 (b+d)	15

Sensitivity = a/ (a+c) X 100 = 6/6 X 100 = 100.0

Specificity = d/ (b+d) X 100 = 2/9 X 100 = 22.22

Predictive value of positive test = a / (a+b) X 100 = 6/13 X 100 = 46.1

Predictive value of negative test = d / (c+d) X 100 = 2 / 2 X 100 =100.0

Percentage of false negative = c/ (a+c) X 100 = 0 / 6 X 100 = 0.0\Percent of false

positive = b/ (b+d) X 100 = 7/9 X100 = 77.77

Table 8 claims that colposcopy is 100 % sensitive with 100% negative predictive value for CIN I lesions.

Table 9: Correlation between Colposcopy (CIN I-II) and biopsy.

Colposcopy (CIN I- II)	Biopsy		Total	Pearson chi-square test	Cohen's Kappa
	Positive	Negative			
Positive	22 (100.0)	3 (60.0)	25 (92.6)	$\chi 2$= 9.504 p=0.028*	Kappa= 0.521 p= 0.002*
Negative	0 (0.0)	2 (40.0)	2 (7.4)		

* Statistically significant as p<0.05 (Table 9).

Table 10: Predictive value of Colposcopy (CIN I-II)

Colposcopy (CIN I- II)	Biopsy		Total
	Positive	Negative	
Positive	22 (a)	3 (b)	25 (a+b)
Negative	0 (c)	2 (d)	2 (c+d)
Total	22 (a+c)	5 (b+d)	27

Sensitivity = a/ (a+c) X 100 = 22 / 22 X 100 = 100
Specificity = d/ (b+d) X 100 = 2 / 5 X 100 = 40.00
Predictive value of positive test = a / (a+b) X 100 = 22 / 25X 100 = 88.00
Predictive value of negative test = d / (c+d) X 100 = 2 / 2 X 100 = 100
Percentage of false negative = c/ (a+c) X 100 = 0 / 22X 100 = 0.0
Percent of false positive = b/ (b+d) X 100 = 3 / 5 X100 = 60.00

Specificity of colposcopy has been increased to 40 % with 100 % sensitivity for CIN I-II lesions (Table 10).

Table 11: Correlation between Colposcopy (CIN II-III) and biopsy

Colposcopy (CIN II - III)	Biopsy			Pearson chi-square test	Cohen's Kappa
	Positive	Negative	Total		
Positive	15 (100.0)	0 (0.0)	15 (88.2)	$\chi 2$= 17.000	Kappa= 1.00
Negative	0 (0.0)	2 (100.0)	2 (11.8)	p=0.007*	p= 0.000*

* Statistically significant as p<0.05 (Table 11).

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