ORIGINAL ARTICLE

Comparative study between pap smear and visual inspection with acetic acid (via) in screening of CIN and early cervical cancer

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ABSTRACT

Background: Cervical cancer is the second most common among women globally. In most cases of Assam, Ca Cervix is detected late due to lack of effective screening programme.
Aim: To screen the patient at Gynaecology OPD at the age 18-60 yrs by doing pap smear, VIA (Visual Inspection with Acetic Acid) and to detect sensitity and specificity for detecting CIN and early Ca Cervix.
Material and Method: It is a cross sectional study of 300 women (18- 60 yrs) who fulfill selection criteria. The pap smear and VIA are done in these cases. In positive cases, cervical biopsy and histopathological studies are done, The sensitivity and specificity of each test are determined and compared.
Result and observation: The positive result detected from cytology are 22, VIA was positive in 52 cases. The histology of 19 cases are suggestive of CIN and Ca Cervix.
Discussion: The findings were compared with other studies and evaluated.
Summary: The most common finding in per speculum examination is cervical erosion. The sensitivity of VIA is 89% (versus pap smear-52%) the specificity of VIA is 87% (versus pap smear-95%). The accuracy VIA is 87% compared to pap smear-93%.
Conclusion: The lack of effective and implementable screening programme lead to reporting of advanced cases of Ca Cervix. If detected at CIN or early Ca cervix stage, effective treatment can be provided with encouraging results. Therefore effective & implementable Ca Cervix screening need to be provided in our country.

Key Words: Ca Cervix, Pap Smear, VIA

INTRODUCTION

Cervical cancer is the second most common cancer among women globally. An estimated 550,700 new cases and 286,823 deaths due to cervical cancer are estimated to have occurred in 2010. More than 85% cases and 88% deaths from cervical cancer occur in developing countries, where women often lack access to cervical cancer screening and treatment. India alone accounts for one-fourth of the global cervical cancer burden. Although advanced cervical cancer cases have become very rare in developed countries, most cases in Assam are detected late (stage 3 or 4) due to lack of effective screening program.

The incidence in the developed world is only 1.8 per lakh women (24-64 years) in contrast to 18.9 per lakh women in Kamrup Metro District in 2006 (ICMR).

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Despite the importance of public health, there are no effective prevention programs in the northeastern part of India and hence the risk of and death from cervical cancer remain largely uncontrolled.

Invasive cervical cancer is preceded by a long phase of precancerous lesion that can be detected by screening and treated effectively by simple treatment, which can prevent invasive cancer.

The cytology-based screening is effective but beyond the capacity of health services in Assam. Interpretation of cytology is difficult as cytologists are not easily available in periphery. Moreover, patient's need to come to collect report may lead to loss of the patient for follow-up. Hence other methods of early detection of cervical neoplasm, particularly those based on visual inspection are being investigated.

A simple low-cost technique screening test, namely visual inspection with acetic acid (VIA), which is based on the ability of the trained health care personnel to detect acetowhite in the cervical transformation zone, is currently being evaluated in the experimental setting as a potential alternative to cervical cytology.

Published results show that VIA has similar sensitivity but somewhat lower specificity when compared to quality cytology.

The screening program should involve women between ages of 18 and 55 years at three-year intervals.

Aim and Objective of the Study
To screen patients coming to gynecology OPD between ages of 18 and 60 years by Pap smear and VIA and to detect the specificity and sensitivity of each test for identifying cervical intraepithelial neoplasia (CIN) and cervical cancer by comparing with the histology from positively screened women in all three, so that we can apply VIA at grass-roots level (where Pap smear is not feasible) and to detect CIN and cervical cancer at the earliest stage.

MATERIALS AND METHODS

The present study was conducted in the Department of Obstetrics and Gynecology, Gauhati Medical College and Hospital, Guwahati, from June 1, 2012 to May 31, 2013 at the Gynecology OPD. This was a cross-sectional study conducted in 300 women (18-60 years) who fulfill the selection criteria after taking proper consent. The average number of women who attended Gynecology OPD was 60 per day. Among them, women who fulfilled the selection criteria were randomly selected. Positive tests for cytology were CIN 1 or above, VIA showing opaque aceto white lesion on applying 4% acetic acid or VILI (visual inspection with Lugol's Iodine) detection of definite yellow iodine non-uptake areas with Lugol's iodine

in the transformation zone or close to touching the squamo-columnar junction. The study was combined with VIA, VILI, Pap smear in finding lesion in the cervix for doing large study with different techniques. In this study, the comparison was done between Pap smear and VIA. Positive cases were scheduled for biopsies and histological evaluation.

SELECTION CRITERIA

Inclusion criteria
Patients in the age group of 18-60 years were included in the study and priority was given to patients with the following risk factors:
- Early marriage.
- Early pregnancy (teenage pregnancy).
- Sexual activity at early age.
- Multiparity.
- Multiple sexual partners.
- Women with STI, leukorrhea, abnormal vaginal bleeding.

Exclusion Criteria
- Unmarried patients.
- Patients below 18 years and above 60 years.
- Patients with bleeding P/V and active infection at the time of examination.
- Women with frank invasive cervical cancer.

RESULTS AND OBSERVATIONS

The present study 'Comparative study among PAP smear and VIA in screening of CIN and early cervical cancer' was carried out in the Department of Obstetrics and Gynecology, Gauhati Medical College and Hospital from June 1, 2012 to 31 May, 2013. The results and observations of the study are presented below. Positive results obtained from cytology were 22. VIA was positive in 52 women and VILI was positive in 26. Cervical biopsy was done in 62 women who had positive results (10 were positive for all three tests, 4 were positive for VIA and Pap smear, 14 were positive for VIA and VILI, 24 were positive for only VIA, 2 were positive for only VILI, and 8 were positive for only Pap smear). Histology in 19 cases was suggestive of CIN and carcinoma. Although not included in the present study, VILI was added to make the study large and to include a different technique.

Relation with age [Figure 1a]
In our study, 14% of the cases were in the age group of 18-29 years, 34% in the age group of 30-39 years, 36% in the age group of 40-49 years and 16% in the age group of 50-59 years. In CIN group, 3% were in the age group of 18-29 years, 3% in 30-39 years, 24% in 40-49 years and 18% in 50-59 years. In cervical cancer group, 1 (3%) was in the age group of 40-49 years while 2 (6%) were in the age group of 50-59 years.
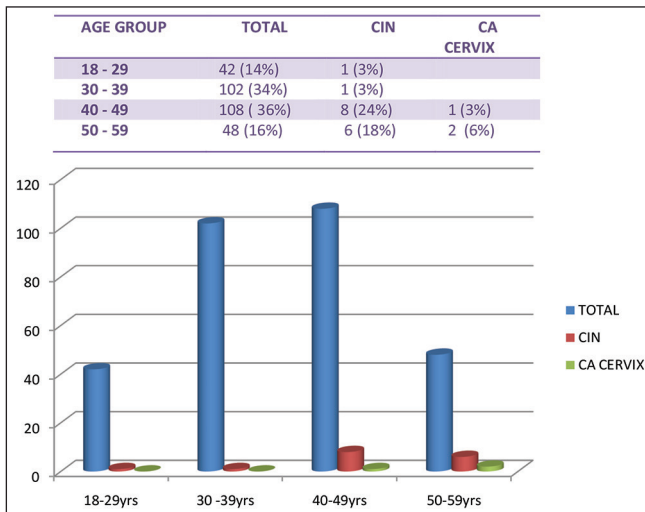
AGE GROUP	TOTAL	CIN	CA CERVIX
18 - 29	42 (14%)	1 (3%)	
30 - 39	102 (34%)	1 (3%)	
40 - 49	108 (36%)	8 (24%)	1 (3%)
50 - 59	48 (16%)	6 (18%)	2 (6%)

Figure 1(a): Relation with age

Relation with parity [Figure 1b]

In our study, 45 cases had parity 2 while 255 cases had more than parity 2. The incidence of CIN was more in cases with parity more than 2 (54%). There were no cases reported of cervical cancer with parity 2 or less; the incidence of cervical cancer was 6% in parity above 2.
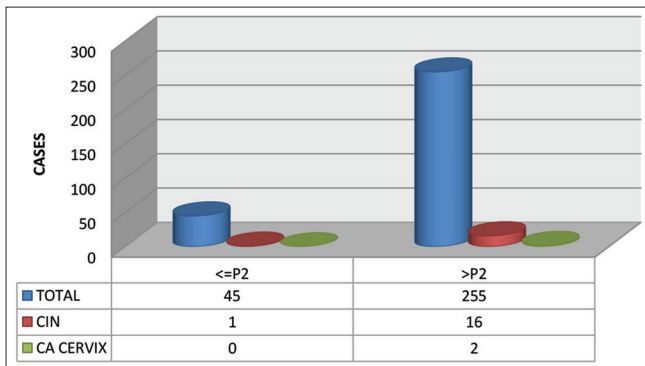

	<=P2	>P2
TOTAL	45	255
CIN	1	16
CA CERVIX	0	2

Figure 1(b): Parity

Relation with literacy [Figure 1c]

In this study, 156 (52%) cases were illiterate while 144 cases were literate. The literacy rate was not seen to affect the result.
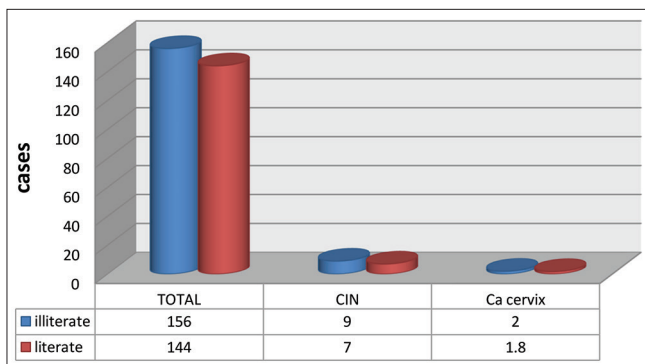

	TOTAL	CIN	Ca cervix
illiterate	156	9	2
literate	144	7	1.8

Figure 1(c): Relation with education status

Relation with duration of marriage [Figure 1d]

In this study, 21 cases were married for less than 10 years, 129 cases were married for 10-20 years, while 150 cases were married for more than 20 years. The highest number of CIN (30%) and cervical cancer (6%) are in the group married for more than 20 years.
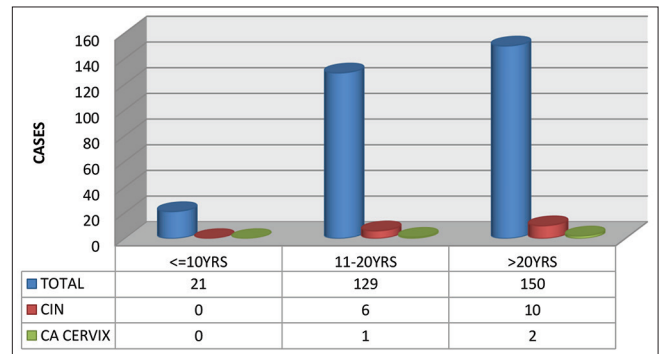

	<=10YRS	11-20YRS	>20YRS
TOTAL	21	129	150
CIN	0	6	10
CA CERVIX	0	1	2

Figure 1(d): Duration of marriage

Relation with age of marriage [Figure 1e]

In our study, 243 cases were married at the age of 18 years or less and 57 cases were married at more than 18 years of age. The incidence of CIN was more (46%) in cases married at 18 years or less, while the incidence of cervical cancer was 6% in the early marriage group.
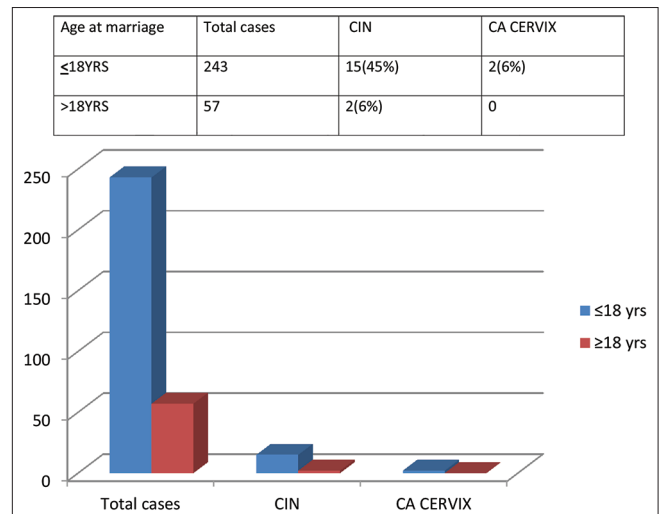
Age at marriage	Total cases	CIN	CA CERVIX
≤18YRS	243	15(45%)	2(6%)
>18YRS	57	2(6%)	0

Figure 1(e): Age at marriage

Relation with socio-economic status [Figure 1f]

In our study, 180 cases belonged to low socio-economic status, 108 cases belonged to middle class, while 12 cases belonged to high class. Incidence of CIN was found to be higher (30%) in the low socio-economic group. As the case of cervical cancer is low, it is difficult to comment on the effect of socio-economic status in cervical cancer [Tables 1-4].

Table 1: association between cervical biopsy report with the result of PAP SMEAR test (d.f.-degree of freedom, **-highly significant

Cervical biopsy report Pap smear test	Positive	Negative	Total	d.f.	X²-value	Significance
Positive	10 (true+) positive in pap smear	12 (false+) Positive in pap smear	22 (total +ve in Pap)	1	61.25**	P<0.01
Negative	9 (false-) Negative in pap smear	269 (true-ve Negative in Pap)	278 (total-ve in Pap)			
Total	19 (Biopsy+ actually)	281 (Biopsy -ve actually)	300			

The PAP SMEAR negative result correlate well with biopsy negative cases. So the negative predictive value PAP SMEAR is good(96%). But PAP SMEAR positive result does not correlate well with biopsy positive result. So the positive predictive value of PAP SMEAR is not so good(45%)

Table 2: sensitivity ans specificity of PAP SMEAR with cervical biopsy report Interpretation-it has been found that there is significant association between the histopathology report and PAP SMEAR report (as $P<0.01$)

Variable	Values
Sensitivity	52%
Specificity	95%
+ve predictive value	45%
-ve predictive value	96%
% of false positive value	4%
% of false Negative value	47%
Accuracy	93%

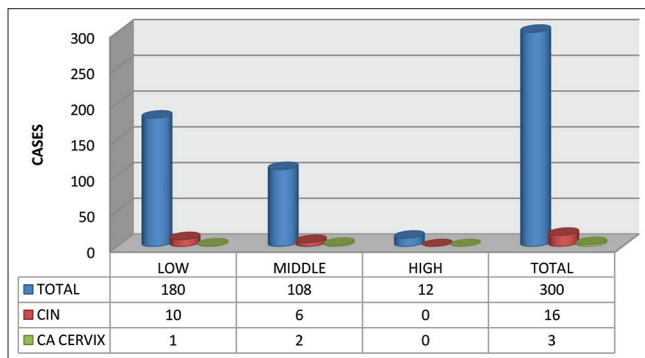|	LOW	MIDDLE	HIGH	TOTAL
TOTAL	180	108	12	300
CIN	10	6	0	16
CA CERVIX	1	2	0	3

Figure 1(f): Socio economic status

DISCUSSION

Age distribution

In the present study, high incidence of CIN was found in the age group of 40-49 years (36%).

Studies	Common age group (CIN)
Juneja A, 1993[1]	>40 years
Kustagi P and Feunardes P, 2002[2]	>3o years
Shrewani RK, 2007[3]	>31 years
Present study	>40 years

Parity status

In the present study, incidence of CIN was found more in cases with parity >2 (54%); also the incidence of cervical cancer increased with parity more than 2(6%).

Study	Parity status with Cin
Kustagi and Fernandes (2002)	>2
Shalini et al (2007)	>4
Desai et al (1993)[4]	>4
Padmanabhan (1990)[5]	>3
Das (1970)	>3
Juneja (1993)	>3
Present study 2012-2013	>2

Socio economic status

In the present study it was found that the incidence of CIN was higher in lower socio economic class (30%) along with increased incidence of carcinoma ceiTix in this group (3%).

The factor responsible for higher incidence of CIN and ca cervix in lower economic group include poor personal hygiene, poor living condition. Illiteracy, unstable marriage, early age at first intercourse.

Study	Socioeconomlc Group with Incidence of CJN
Juneja A. 1993	Low
Juneja A.Shehgal A et al (2003)[6]	Low
Vaidya 2003[7]	Low
Sherwanti et al 2007	Low
Present study 2012-2013	Low

Duration of marriage

Duration of marriage and duration of exposure to sexual intercourse has an important role in the genesis of cervical dysplasia.

In our study, the highest number of CIN cases (30%) and ca cervix (6%) are in the age group married for more than 20yrs. It was also found earlier the age of marriage (age<l8) more is the incidence of CIN.

Pap smear findings

Positive results obtained from Pap were 7.3%(22). Sensitivity of Pap smear was found to below -52%

Table 3: showing the association between cervical biopsy report with result of VIA

Cervical biopsy report VIA	Positive	Negative	Total	d.f.	X²-value	Significance
Positive	17 (true +ve) Positive in VIA	35 (false +ve) Positive in VIA	52(Total +ve in VIA)	1	73.674**	P<0.01
Negative	2 (False-ve) Negative in VIA	246 (true –ve) Negative in VIA	248 (Total Negative in VIA			
Total	19 (Biopsy+ve)	281 (Biopsy –ve)	300			

The VIA result correlate well with biopsy negative cases. So, the negative predictive value of VIA is good (99%). But VIA positive result does not correlate well with biopsy positive result.

Table 4: Sensitivity & Specificity Of VIA with Cervical Biopsy Report

Variability	Values
Sensitivity	89%
Specificity	87%
+ve predictive value	32%
-Ve predictive value	99%
% of false positive value	12%
% of false negative value	10%
Accuracy	87%

compared to specificity which was 95%. This was attributed to high number false negative smear.

SLNO.	Authors	Sensitivity	Specificity
1	LondheM George S, Sesha dri 1997	13.2%	96.3%
2	P. Gosh, et al 2012[8]	52.6%	99%
3	Basu PS and Sankarnararayanan 2004	29.5%	92.3%
4	Shuchi consul et al 2012[9]	84.2%	62.1%
5	Present study (2012-2013)	52%	95%

VIA finding

VIA was positive in 52 women out of 300 cases.

Sensitivity of VIA was found to be 89% compared to specificity, which was 87%.

Authors	Sensitivity (%)	Specificity (%)
Londhe et al (1997)	72	54
Belinson et al (2001)	71	74
Sankarnararayanan (2007)	90	92
Denny et al (2000)	67	83
Megevand et al (1996)	65	98
Consul et al (2012)	84.2	55.2
Ghosh et al 2012 (R.2)[8]	89.5	91.2
Present study (2012-2013)	89	87

SUMMARY

Comparative study between pap smear and VIA with cervical biopsy

In the present study, a comparison was done between Pap smear and VIA with histopathology. The sensitivity of VIA was found to be 89% (versus Pap smear, which had 52%) while the specificity of VIA was 87% (versus Pap smear, which had a specificity of 95%).

Thus, VIA showed higher sensitivity compared to Pap smear, whereas VIA had lower specificity compared to Pap smear. Lower specificity of VIA when compared to Pap smear was due to the high incidence of suspected acetowhite epithelium, which might be inflammation, immature metaplasia or latent HPV infection.

The results were tabulated and analyzed.
- Incidence of pre-invasive carcinoma cervix is more in the 40-49 years group.
- Incidence of CIN and carcinoma cervix is more in women married for more than 20 years.
- Incidence of CIN and carcinoma cervix is more in low socio-economic class.
- Incidence of CIN and carcinoma cervix is more in parity more than 2.
- Incidence of CIN and carcinoma cervix is more in the cases married at 18 years or less.

The most common finding in per speculum examination is erosion. In the present study, comparison was done between Pap smear and VIA with histopathology. Sensitivity of VIA was found to be 89% (versus Pap smear, which had 52%) and specificity of VIA was 87% (versus Pap smear, which had specificity of 95%).

Thus, VIA showed higher sensitivity compared to Pap smear. VIA has low specificity as compared to Pap smear. It was observed that there is a significant association between the histopathology report and the Pap smear report as far as the negative predictive value is concerned. Accuracy of VIA is 87% compared to 93% in Pap smear. Negative predictive value of VIA is 99% as compared to 96% in Pap smear. Positive predictive value is 45% in Pap smear as compared to 32% in VIA.

CONCLUSION

This high incidence of cervical cancer may be attributed to the lack of awareness among the masses as well as even in some of the doctors working in the periphery. The lack of effective

screening program leads to reporting of very advanced cases of cervical cancer cervix where mortality and morbidity is very high. It is a fact that many cases reporting for vaginal bleeding or discharge are not even examined vaginally, thus, missing the diagnosis at an early stage. Advanced diseases involve high financial burden, limited treatment options, stress, loss to the family and higher mortality. This grim scenario prevalent in our society is preventable provided we can create awareness and implement effective screening program as a public health measure.

PAP smear screening needs good infrastructure, trained manpower to make & interpret the slides which is not feasible considering the facilities available in the periphery.

The patient also usually does not come back to collect the report and may be lost to follow up.

There is also interpersonal interpretation variation in case of Pap smear.

However VIA can be done even by sisters in the remotest place with minimum facilities & patient is diagnosed .So patient compliance is also better. The VIA is accurate screening test and suitable alternative to pap smear. So we want to include VIA in screening programme.

From the results of this study it is evident that VIA is more sensitive than Pap smear and specificity of VIA is slightly less to Pap smear(generally speaking Pap smear is more specific).

Thus by combining VIA along with Pap smear we can maximize the sensitivity and specificity of cancer cervix screening, which are more cost effective and practically implementable.

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