International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Rita D et al. Int J Reprod Contracept Obstet Gynecol. 2022 Jun;11(6):1698-1702
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20221442

Original Research Article

Visual inspection on cervix with acetic acid and Lugol's iodine as a screening tool in detection of carcinoma cervix

Rita D., Soumya R.*, Pushpalatha V. S.

Department of Obstetrics and Gynecology, Navodaya Medical College Hospital and Research Centre, Raichur, Karnataka, India

Received: 31 March 2022
Revised: 05 May 2022
Accepted: 04 May 2022

***Correspondence:**
Dr. Soumya R.,
E-mail: soumyarajolle1994@gmail.com

ABSTRACT

Background: Cervical cancer is a preventable and curable disease. In Indian women cervical malignancy accounts for 26.1–43.8% of all cancers. Visual inspection with acetic acid (VIA) or visual inspection with Lugol's iodine (VILI) are considered to be a promising screening tools alternative to cervical cytology for primary cervical cancer screening in low resource setting. The purpose of the study is to evaluate VIA and VILI as cervical cancer screening tools in low resource setting; and to compare the efficacy of VIA and VILI in early detection of cancer cervix via colposcopy.
Methods: The clinical study was conducted on 80 gynecological patients with history of heavy menstrual bleed and post-coital bleeding are included in study. Unmarried women patients, and active vaginal bleeding, were excluded. A biopsy was taken in patients with abnormal findings or suspicious findings of VIA/VILI.
Results: In the present study, sensitivity of VIA and VILI is 90% and 50% respectively, specificity of VIA and VILI is 98.57% and 100% respectively, positive predictive value of VIA and VILI are 90%, 100% respectively, negative predictive value of VIA and VILI are 98.57% and 93.3% respectively with biopsy as the reference standard.
Conclusions: It is concluded that VIA and VILI are good screening test in low resource setting as it can used in strategy of see and treat and screen and treat since there is low compliance of follow up of patients.

Keywords: Cervical cancer, VIA, VILI, Screening, Colposcopy

INTRODUCTION

Cervical cancer continues to be a significant public health problem and a major cause of premature mortality among women, disproportionately affecting the socioeconomically disadvantaged population in low- and middle-income countries (LMICS). Cervical malignancy is third most common malignancy in southeast Asia region. Cervical cancer is preventable and curable if detected early and adequately treated and yet it is one of the most common causes of cancer-related death globally. The World Health Organization (WHO) south-east Asia region accounts for an estimated 32% of incident cervical cancer cases globally, and 34% of cervical cancer deaths.[3] Cervical cancer is the second most common cancer in the India. Cervical cancer mortality is 12.43/100000 per year. Due to lack of an organized cervical screening program, the disease burden is high in India. Shortage of trained manpower and infrastructure has limited the establishment of effective, standardized, cytology-based screening program, which is currently used only for opportunistic screening. Therefore, there is a need to develop good clinical practice recommendation (GCPR) that are evidence based and applicable to all possible clinical situations. The primary target for screening the pre invasive stage of cervical carcinoma is that it has very long invasive period approximately 10-15 years, so that treatment follow up is very much feasible and the impact of carcinoma cervix has been reduced. Moreover,

screening of carcinoma is essential to understand whole pathology of carcinogenesis.[1,2]

At the turn of the millennium, cervical cancer ranked as one of the most common cancers amongst women worldwide. Its prevalence is much more in developing countries where it is the most common rampant female cancer.[3]

Since over 70% of the Indian population resides in the rural areas, cancer cervix still continues to be the number one cancer. However, this 70% population coverage is difficult to achieve in developing countries. In India, Pap smear facilities are largely restricted to urban areas only.[7]

The 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.[8]

Visual methods like visual inspection of cervix with Lugol's iodine (VILI) are alternative screening modalities with the advantage that the results are immediately available and one can apply "see and treat" policy in suitable cases. However, whether VILI alone can be used for early detection of premalignant cervical lesions in low resource settings is yet to be determined.[9]

Objectives

The main objectives of the study were: to evaluate visual inspection with acetic acid (VIA) and VILI as cervical cancer screening tools in low resource setting; to compare the efficacy of VIA and VILI in early detection of cancer cervix; and colposcopy to decide whether a small biopsy or a cone biopsy is required.

METHODS

After approval from institutional ethical committee, the study conducted is prospective observational study done in 80 gynecological women who attended our outpatient department (OPD) at Navodaya Medical College and Hospital, research centre, Raichur in between April 2019-April 2020.

Inclusion criteria

Women who were sexually active more than 21 year willing for screening, patients with complaints of white discharge per vagina, patient with heavy menstrual bleed, post coital bleeding, and post-menopausal bleeding were included in the study.

Exclusion criteria

Unmarried women, patients with active vaginal bleeding, frank growth on cervix, pregnant and puerperal women, and women allergic to iodine were excluded from the study.

VIA/VILI examination and interpretation

Patient must be in lithotomy position, cuscos speculum was inserted carefully. The cervix and discharge were noted. First the unstained cervix was inspected, and the discharge was washed away with normal saline. A cotton swab with acetic acid was placed on cervix for one minute and inspection of cervix was done with acetic acid. Acetowhite areas were noted and its margins and surface were also noted. Inspection with Lugol's iodine was done, inspection of fornices and vaginal walls were also done. Findings were recorded and all the patients were subjected to colposcopy. Cervix, vagina and vulva were inspected. Green filters were used to find out the atypical vessels. Colposcopy form was filled up and abnormal areas were located in Oddell's diagram. Colposcopic guided biopsy is done and sent for histopathological examination (HPE) correlation. Results were obtained and compared.[4]

VIA negative

No acetowhite areas, polyp in the os with acetowhite areas, cysts were nabothian, faint areas were not well defined acetowhite areas in SCJ. Pinkish white and bluish white with ill-defined margins which blends with cervix, streak areas of acetowhite areas in the cervix, dot like areas in the columnar epithelium, reddish spots on the cervix, ill-defined patch with faint acetowhite areas in ulcerated, bleeding cervix with mucopurulent discharge were all characterized. [4]

VILI positive

The bright mustard yellow/saffron yellow-iodine non uptake areas. They were present in the squamocolumnar junction in the transformation zone.[4]

VILI negative

No yellow areas were seen in the cervix when the normal cervix turns mahogany brown or black. The columnar epithelium did not change color. When in an ectropion, the columnar epithelium on the ecto-cervix did not change the color. Leopard skin like was associated with T. vaginalis infection.

Pepper like non iodine areas were present in the squamous epithelium away from the SCJ. Ill-defined, and poorly defined areas in the cervix were present which were partially brown. Satellite thin yellow non iodine areas with angulating margins which resembles geographical areas which were far away from SCJ were also observed.[4]

Statistical analysis

All statistical calculations were done using statistical package for the social sciences (SPSS) 21 version (Inc., Chicago, IL, USA) statistical program for Microsoft windows.

RESULTS

Total 80 women undergoing for colposcopic examination including reproductive age group and post-menopausal women.

Majority of age group lies between 31-50 years which accounts for 63% (Figure 1).

In present study 28.8% were HMB, 10% were postcoital bleed, 61.3% were white discharge PV (WDPV) cases.

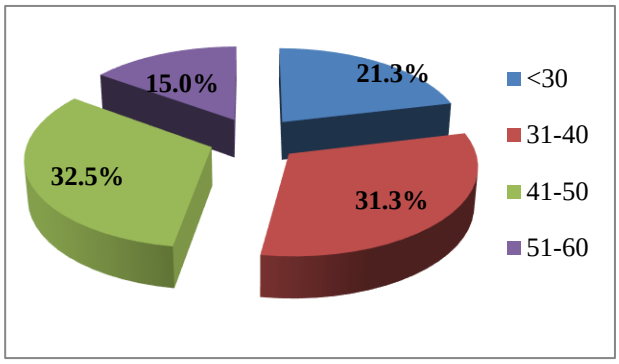

Figure 1: Distribution of cases according to age.

In present study 66.3% cases were NILM, 10% cases were ASCUS, 5% cases were HSIL, 12.5% cases were inflammatory, and 6.3% cases were LSIL (Table 1).

Table 1: Distribution of cases according to pap smear report.

Pap smear	No. of cases	Percentage
ASCUS	8	10.0
HSIL	4	5.0
Inflammatory	10	12.5
LSIL	5	6.3
NILM	53	66.3
Total	80	100.0

In present study 87.5% cases were negative for VIA and 12.5% cases were positive for VIA (Table 2).

Table 2: Distribution of cases according to VIA.

VIA	No. of cases	Percentage
Negative	70	87.5
Positive	10	12.5
Total	80	100.0

In present study 93.8% cases were negative for VILI and 6.3% cases were positive for VILI (Table 3).

Table 3: Distribution of cases according to VILI.

VILI	No. of cases	Percentage
Negative	75	93.8
Positive	5	6.3
Total	80	100.0

In present study 87.5 % cases biopsy was not taken, 12.5% cases biopsy was taken (Figure 2).

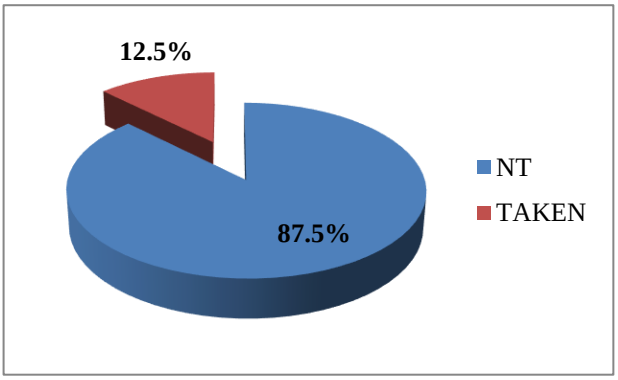

Figure 2: Distribution of cases according to biopsy status.

In present study HMB with biopsy positive were 20%, postcoital bleed with biopsy positive were 70%, WDPV with biopsy positive were 10%. In present study HMB with biopsy negative were 30%, post coital bleed with biopsy negative were 1%, WDPV with biopsy negative were 69%.

In present study ASCUS with biopsy positive were 20% and biopsy negative were 9%, HSIL with biopsy positive were 40% and negative were 0%, inflammatory smear with biopsy positive were 0% and biopsy negative were 14%, LSIL with biopsy positive were 40% and negative were 1%, NILM with biopsy positive were 0%, and negative were 76% (Figure 3).

In present study VIA positive with biopsy positive were 90 % and biopsy negative were 10%, VIA negative biopsy positive is 10%, and biopsy negative is 90% (Table 4).

Table 4: Comparison of VIA with biopsy outcome.

VIA	Biopsy				Total
	Positive	Positive (%)	Negative	Negative (%)	
Negative	1	10	69	99	70
Positive	9	90	1	1	10
Total	10	100	70	100	80

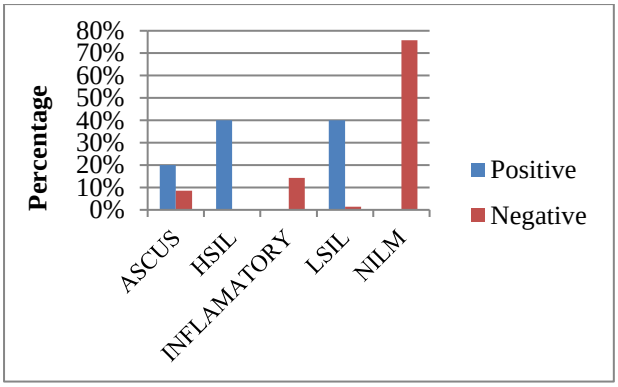

Figure 3: Comparison of pap smear report with biopsy outcome.

In present study VILI positive with biopsy positive were 50% and biopsy negative were 0%, VILI negative biopsy positive is 50%, and biopsy negative is 100% (Table 5).

Table 5: Comparison of VILI with biopsy outcome.

VILI	Biopsy				Tot-al
	Positi-ve	Positive (%)	Negat-ive	Negative (%)	
Negat-ive	5	50	70	100	75
Positi-ve	5	50	0	0	5
Total	10	100	70	100	80

Table 6: Sensitivity, specificity, PPV, and NPV of VIA.

Statistic	Value (%)	95% CI (%)
Sensitivity	90.00	55.50 to 99.75
Specificity	98.57	92.30 to 99.96
Positive likelihood ratio	63	8.90 to 445.87
Negative likelihood ratio	0.1	0.02 to 0.65
Disease prevalence (*)	12.50	6.16 to 21.79
PPV (*)	90.00	55.98 to 98.45
NPV (*)	98.57	91.49 to 99.77
Accuracy (*)	97.50	91.26 to 99.70

Table 7: Sensitivity, specificity, PPV, and NPV of VILI.

Statistic	Value (%)	95% CI (%)
Sensitivity	50.00	18.71 to 81.29
Specificity	100.00	94.87 to 100.00
Positive likelihood ratio		
Negative likelihood ratio	0.5	0.27 to 0.93
Disease prevalence (*)	12.50	6.16 to 21.79
PPV (*)	100.00	
NPV (*)	93.33	88.28 to 96.30
Accuracy (*)	93.75	86.01 to 97.94

DISCUSSION

Cervical cancer is a potentially preventable cancer. It is preceded by premalignant lesions which may take 5-15 years to progress to invasive cancer.

In present study the age group <30-60 years, major age group were 31-50 accounting for 63%. In present study 28.8% were HMB, 10% were postcoital bleed, 61.3% were white discharge PV (WDPV) cases.

In present study 66.3% cases were NILM, 10% cases were ASCUS, 5% cases were HSIL, 12.5% cases were inflammatory, 6.3% cases were LSIL. In present study 87.5% cases were negative for VIA and 12.5% cases were positive for VIA and 93.8% cases were negative for VILI and 6.3% cases were positive for VILI. And biopsy status in present study was 87.5% cases biopsy was not taken, 12.5% cases biopsy was taken.

In present study HMB with biopsy positive were 20%, postcoital bleed with biopsy positive were 70%, WDPV with biopsy positive were 10% and HMB with biopsy negative were 30%, post coital bleed with biopsy negative were 1%, WDPV with biopsy negative were 69%.

In present study VIA positive with biopsy positive were 90 % and biopsy negative were 10%, VIA negative biopsy positive is 10%, and biopsy negative is 90% and VILI positive with biopsy positive were 50% and biopsy negative were 0%, VILI negative biopsy positive is 50%, and biopsy negative is 100%.

In present study sensitivity of VIA is 90% and specificity of VIA is 98.57% when compared with Sankarnaryan et al study sensitivity of VIA is 82.6% and specificity of VIA is 86.5%, Snehil et al study sensitivity and specificity of VIA is 88.23% and 78.68% respectively.[5,6]

In present study sensitivity of VILI is 50% and specificity of VILI is 100% when compared with Sankarnarayan et al sensitivity of VILI 87.2% and specificity of VILI is 84.7%, In Snehil et al study sensitivity and specificity of VILI is 88.23% and 78.68% respectively with biopsy as standard reference.[5,6]

Limitations

This study represents only a small population with sample size of 80. And many patients with symptoms but did not gave consent for colposcopy examination are excluded from the study. So, the results will surely vary if study would have been conducted on large population and it will help us in understanding the burden of ca. cervix disease on large population.

CONCLUSION

The majority of women in India who belong to low socioeconomic strata of society remain devoid of any

screening test as pap smear has its own limitation like difficult to reach remote area which comprise the majority of Indian population. There is always constraint of infrastructure and resources required for cytological screening in developing countries. In our study, comparing the results of VIA and VILI and pap smear, the sensitivity of VIA and VILI was comparable to pap smear. Hence, VIA and VILI can be used as an alternative for the screening of carcinoma cervix especially in PHC's, camps. Through screening tools such as VIA and VILI a large number of populations that go undetected can be screened at an affordable cost with higher sensitivity and specificity.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. FOGSI - GCPR Screening & Management of Preinvasive Lesions of Cervix and HPV Vaccination. 2018. Available at: https://www.fogsi.org/wp-content/uploads/2018/03/FOGSI-GCPR-March-2018-final.pdf. Accessed on 15 January 2022.
2. WHO Guidelines On WHO's global strategy for cervical cancer elimination. 2020. Available at: https://www.who.int/initiatives/cervical-cancer-elimination-initiative. Accessed on 15 January 2022.
3. Yeole BB, Kumar AV, Kurkureet A, Sunny L. Population-based survival from cancers of breast, cervix and ovary in women in Mumbai, India. Asian Pac J Cancer Prev. 2004;5:308-15.
4. Dr. S. Lujim Mala and 2 *Dr. M. Keerthana,, Department of Obstetrics & Gynecology, Tirunelveli Medical College, Tirunelveli,2021.
5. Sankaranarayanan R, Wesley R, Thara S, Dhakad N, Chandralekha B, Sebastian P, et al. NAIR International Agency for Research on Cancer, Lyon 69008, France. Regional Cancer Centre, Thiruvananthapuram (Trivandrum), Kerala, India. 2003.
6. Sinha S, Singh V, Mishra B. Comparing the efficacy of visual inspection of cervix with acetic acid and Lugol's iodine with Pap smear cytology in screening for cancer cervix. J Curr Res Sci Med. 2018;4(1):10-6.
7. Singh A, Singh K, Agarwal NR. Correlation of Pap smear and visual inspection with acetic acid for screening of premalignant and malignant lesion of cervix. Int J Res Med Sci. 2015;3:2382-5.
8. Bhattacharyya AK, Nath JD, Deka H. Comparative study between Pap smear and visual inspection with acetic acid (via) in screening of CIN and early cervical cancer. J Midlife Health. 2015;6:53-8.
9. Ghosh P, Gandhi G, Kochhar PK, Zutshi V, Batra S. Visual inspection of cervix with lugol's iodine for early detection of premalignant & malignant lesions of cervix. Indian J Med Res. 2012;136:265-71.

Cite this article as: Rita D, Soumya R, Pushpalatha VS. Visual inspection on cervix with acetic acid and Lugol's iodine as a screening tool in detection of carcinoma cervix. Int J Reprod Contracept Obstet Gynecol 2022;11:1698-702.