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Original Article

Predictive Value of Swede Colposcopy Score for Predicting Cervical Premalignant and Malignant Lesions in Patients with Postcoital Bleeding

Rania Tarek Fathy Shehata [*1], **Ahmed Mahmoud Elshorbagy** [2], **Mahmoud Farouk Midan** [2]

[1] Department of Obstetrics and Gynecology, Sherbin General Hospital, Ministry of Health, Egypt.
[2] Department of Obstetrics and Gynecology, Damietta Faculty of Medicine, Al-Azhar University, Damietta, Egypt.

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*Corresponding author

Email: gad20121530@gmail.com

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ABSTRACT

Background: Postcoital bleeding [PCB] is defined as any bleeding or spotting unrelated to menstruation that occurs during or after sexual intercourse. It is a relatively common complaint presenting to general practice, and can sometimes prove challenging to diagnose and manage, due to the number of conditions that can cause PCB.

Aim of the work: To investigate the value of using Visual Inspection with Acetic Acid [VIA] of cervix and the swede colposcopy score in cases with postcoital bleeding in detecting cervical premalignant lesions. Specifically, the study aims to assess the sensitivity, specificity, Positive Predictive Value [PPV], and Negative Predictive Value [NPV] of the swede colposcopy score in predicting premalignant lesions by correlating the colposcopic findings with histopathological results obtained through colposcopy-guided biopsies.

Patients and methods: This cross-sectional study was conducted at the Obstetrics and Gynecology department of Al Azhar University Hospitals, Damietta, Egypt. This study was conducted on 54 patients with postcoital bleeding. First, all were assessed in a standard protocol, followed by acetic acid 5.0% for visual inspection, calculation of Swede score and results were compared to the results of histopathology.

Results: There was highly statistically significant relation between histopathological result of biopsy and swede colposcopy score. At cutoff point ≥5, Swede score had sensitivity of 72.72% and specificity of 76.7% with highly significance for the detection of premalignant lesions.

Conclusion: The swede colposcopy score has significant predictive value for identifying cervical premalignant and malignant lesions in patients presenting with Postcoital Bleeding [PCB].

Keywords: Swede Score; Colposcopy; Cervical Neoplasia; Postcoital Bleeding.

INTRODUCTION

Postcoital Bleeding [PCB] is defined as a spotting or bleeding occurs after intercourse with no relation menstruation. It is one of common gynecological symptoms. It affects the patient and may cause concern to her physician. The reported prevalence varies from 0.7% to 9% among women in their childbearing age. It may be due to a benign condition [e.g., infection]. However, it can also reflect a serious problem [e.g., pre-malignant condition or cervical cancer] **[1-4]**.

In women, cervical cancer is a major health problem, as it is the third most common cancer in women. In addition, it is the seventh cancer of all cancers. It is estimated that 530000 new cases were discovered in 2020. Developing countries represent 85.0% of the global burden of the condition, with higher rate of mortality [represent 80.0% of overall mortality due to cervical cancer], irrespective that, it is a preventable condition. The highest burden of cervical cancer was recognized in Asia, followed by Latin America and Africa **[5-8]**.

In Egypt, the incidence of cervical cancer increases with the advancement of age [e.g., it was 18.8 per 100000 women in females aged 20 to 24 years. But, it increased to 373.8 per 100000 in the age group 60 to 64 years]. No consensus exists regarding the when PCP needs more investigation if women stick to routine gynecological follow up **[9-11]**.

Colposcopy has been introduced as an appropriate investigative aid to rule out premalignant lesions of the cervix as well as to rule out cervical cancer. However, the infrastructure, supplies or equipment's as well as trained personnel are lacking in most of the developing countries to permit accurate, timely and reliable results of the first screening or period testing visits. It is essential to know that a separate visit is required to acquire cytological results. This leads to an increase of women who lost the follow up **[12-14]**.

The use of acetic acid 5.0% for visual inspection [VIA] is a possible alternative to colposcopy for detection of cervical neoplastic causes of PCB. The VIA test includes washing of the cervix by 5% acetic acid solution. Then, the cervix is visually inspected for acetowhite areas, one minute later. It had the advantages of readily available requirements, immediate results and easily training. In addition, it is a cost-effective test **[15,16]**. However, the accuracy of VIA for detection of neoplastic and premalignant conditions associated with PCB is still questioned. This leads to higher false positive results with excessive referrals and unnecessary treatment and load on the healthcare system **[17]**.

THE AIM OF THE WORK

This study aimed to investigate the value of Visual Inspection with Acetic Acid [VIA] and the Swede Colposcopy Score in cases with postcoital bleeding in the detection of cervical premalignant lesions, taking histopathological results as the gold standard.

PATIENTS AND METHODS

This cross-sectional study was conducted at the Obstetrics and Gynecology department of Al-Azhar University Hospitals [Damietta, Egypt]. It was completed from September 2023 to March 2024. The study protocol was approved by the Research Ethics Committee of Al Azhar University and written informed consent was obtained from all participants prior to enrollment.

To ensure participant confidentiality, unique identifier codes were assigned for each patient, and all data were stored in password-protected files. Participants were fully informed of their right to withdraw from the study at any time without affecting their medical care. All procedures adhered to the ethical standards of the institutional research committee and were conducted in accordance with the 1964 Helsinki Declaration and its subsequent amendments.

Sample Size Calculation: the sample was calculated using the formula [$n = [DEFF \times Np[1-p]] / [[d^2/Z^2_{1-\alpha/2}] \times [N-1] + p[1-p]]$], where DEFF stands for design effect [assumed to be 1 for random sampling], N for population size [assumed to be large], p for estimated prevalence of the condition [9% based on **Bidhuri *et al.*** **[18]**, d for precision [set at 5%], $Z_{1-\alpha/2}$ for standard normal variance [1.96 for 5% α error] provided that, confidence level of 80% and the study power 80%, with α error of 5%. The calculated sample size was 54 cases. Accounting for a potential 10% dropout rate, the final sample size was determined to be 60 cases.

The inclusion criteria were 1] age 18 to 55 years old, married, presenting with a complaint of postcoital bleeding, who had visual inspection with acetic acid [VIA] positive results. On the other side, the **exclusion criteria** were 1] known allergy to acetic acid, 2] history of treatment for cervical precancerous or cancerous lesions, 3] pregnant [confirmed by urine pregnancy test], 4] active vaginal bleeding at the time of examination, 5] refusal to participate in the study, and 5] known allergy to lugol iodine.

Eligible patients were evaluated by the standard protocol including history taking with stress over menstrual and sexual history, general and local gynecological examinations [inspection of external genitalia, and speculum examination]. Finally, laboratory tests were performed at the hospital's central laboratory using standardized procedures. The laboratory workup included complete blood count, hemoglobin, hematocrit, white blood cell count, coagulation profile, liver and renal function tests.

Procedure of VIA: the cervix was exposed using a sterile speculum, 5% acetic acid was applied to the cervix using a sterile cotton swab, observations were made after 1 minute of application, the cervix was examined under adequate light source. When there were no abnormal acetowhite areas, the test is negative. However, positive test is indicated by sharp, distinct, well-defined dense acetowhite areas near the squamocolumnar junction [SCJ]**[19]**.

Swede Colposcopy Score Assessment: Patients with positive VIA results underwent colposcopy examination using a YKD-9001 colposcope [Sony CCD color camera and digital zoom]. The Swede score was used to evaluate five parameters: acetowhite uptake, margins surface, vessels, lesion size and iodine staining. Each item scored 0,1 or 2 and the total score of 10, as described previously **[20]**.

Histopathological Confirmation: Colposcopy-guided biopsies were obtained from suspicious areas. The specimens were immediately fixed in 10% neutral buffered formalin and sent to the pathology laboratory. Histopathological examination was performed by two independent pathologists blinded to the clinical and colposcopic findings. In case of discrepancy, a third pathologist was consulted to reach a consensus. Premalignant and malignant diseases were confirmed after a diagnosis of [CIN 1- CIN 2- CIN 3 or Cervical Cancer]. Sensitivity, Specificity, PPV & NPV for each score were calculated and area under the ROC curve [AUROC] for Swede score predicting premalignant and malignant histopathology [≥ CIN 1] was estimated.

Statistical Analysis: Data analysis was performed using SPSS Version 25 [IBM Corp., Armonk, NY, USA]. Continuous variables were summarized by means, standard deviations, medians and ranges according to normality of data. Categorical variables were presented by relative frequencies and percentages. Groups were compared by independent

samples [t]-tests for comparing means of normally distributed continuous variables, while Mann-Whitney U tests for comparing medians of non-normally distributed continuous data. Chi-square test [or Fisher's exact test when appropriate] for the association between categorical variables. To estimate diagnostic performance, the sensitivity, specificity, positive predictive value [PPV], and negative predictive value [NPV] of Swede colposcopy score were calculated with 95% confidence intervals. Receiver Operating Characteristic [ROC] curve analysis was performed to determine the optimal cut-off point for the Swede colposcopy score. Area Under the Curve [AUC] was calculated to assess the overall diagnostic performance of the Swede score. Finally, Spearman's rank correlation coefficient was calculated to assess the relationship between Swede score and histopathological findings. A p-value <0.05 was considered statistically significant for all analyses.

RESULTS

Women in the current work mean age was 40.0±7.8 years and the mean age of marriage was 19.9±3.14 years, and parity was 2.64±0.95. The higher percentages of women were from rural area [55.5%]. The history of chronic medical diseases was positive for 27.8% and hypertension was the commonest and 70.3% had regular menstruation. The commonest contraception method was intrauterine device [13; 24.3%] followed by the combined oral contraceptive pills [10; 18.5%] [Table 1]. Table [2] showed that majority of patients had score [1] of Aceto uptake, majority of patients had Score [1] Margin/surface, majority of patients had score [0] of Vessels, majority of patients had score [0] of lesion size, and majority of patients had score [1] of Iodine staining. In addition, 66.7% of patients had total score [0-4], 29.6% of patients had total score [5-7] and 3.7% of patient had total score [8-10] in studied group. Table [3] showed that 79.6% of patients had Cervicitis, 16.67% of patient had CIN 1, 1.85% of patient had CIN 2 and 1.85% cancer cervix in studied group.

In addition, there was highly statistically significant relation between histopathological result of biopsy and swede colposcopy score [Table 4]. At cutoff point ≥5, Swede score had sensitivity of 72.72% and specificity of 76.7% with highly significance for the detection of premalignant lesions [Table 5, Figure 1].

Table [1]: Distribution of characteristic data in studied group.

		Study group [n=54]
Age [years]	Mean ± SD	40.0±7.8
Age of marriage	Mean ± SD	19.9±3.14
Parity	Mean ± SD	2.64±0.95
Residence [n,%]	Rural	30[55.5%]
	Urban	24 [44.5%]
Medical history [n,%]	Free [negative]	39 [72.2%]
	Hypertension	6 [11.4%]
	Bronchial asthma	1 [1.8%]
	Hypothyroidism	5 [9.2%]
	Hypertension with hypothyroidism	1 [1.8%]
	Diabetes mellitus with hypertension	1 [1.8%]
	Diabetes with Familial Mediterranean fever	1 [1.8%]
Menstruation [n,%]	Regular	38[70.3%]
	Irregular	12 [22.2%]
	Menopause	4 [7.5%]
Contraception method [no,%]	None	18 [33.3%]
	Combined oral contraceptive pills	10 [18.5%]
	Combined injectable contraceptives	1 [1.8%]
	Progestin-only oral contraceptive pills	3 [5.5%]
	Intrauterine device	13 [24.3%]
	Tubal ligation	2 [3.7%]
	Progesterone only injection	4 [7.4%]
	Contraceptive Implant	2 [3.7%]
	Hormonal IUD	1 [1.8%]

Table [2]: Distribution of Swede colposcopy score in studied group.

		Studied group [n=54]	
		n	%
Aceto uptake	Score [1]	46	[85.2%]
	Score [2]	8	[14.8%]
Margin/surface	Score [0]	23	[42.6%]
	Score [1]	30	[55.6%]
	Score [2]	1	[1.9%]
Vessels	Score [0]	40	[74.1%]
	Score [1]	6	[11.1%]
	Score [2]	8	[14.8%]
Lesion size	Score [0]	26	[48.1%]
	Score [1]	19	[35.2%]
	Score [2]	9	[16.7%]
Iodine staining	Score [0]	1	[1.9%]
	Score [1]	46	[85.2%]
	Score [2]	7	[13%]
Total score	**[0-4]**	36	[66.7%]
	[5-7]	16	[29.6%]
	[8-10]	2	[3.7%]

Table [3]: Distribution of histopathological result of biopsy in studied group.

		Studied group [n=54]	
		n	%
Biopsy Result [n,%]	Cervicitis	43	[79.6%]
	CIN 1	9	[16.67%]
	CIN 2	1	[1.85%]
	Cancer Cervix	1	[1.85%]

Table [4]: Relation between histopathological result of biopsy and swede colposcopy score in studied group.

		Histopathological result of biopsy				P-value
		Cervicitis [n=43]	CIN 1 [n=9]	CIN 2 [n=1]	Cancer Cervix [n=1]	
SCS	Mean ±SD	3.60 ±1.42	4.67 ±1.32	8 ±0	9 ±0	<0.001*
	Min.-Max.	1-6	3-7	8	9	

Table [5]: ROC analysis for Swede score for the detection of premalignant lesions.

		Swede score
AUC		0.823
Cutoff value		≥5
Sensitivity		72.72%
Specificity		76.7%
PPV		44.4%
NPV		91.7%
Accuracy		75.9%
Std. Error[a]		0.066
Asymptotic Sig.[b]		0.001
Asymptotic 95% Confidence Interval	Lower bound	0.694
	Upper bound	0.953

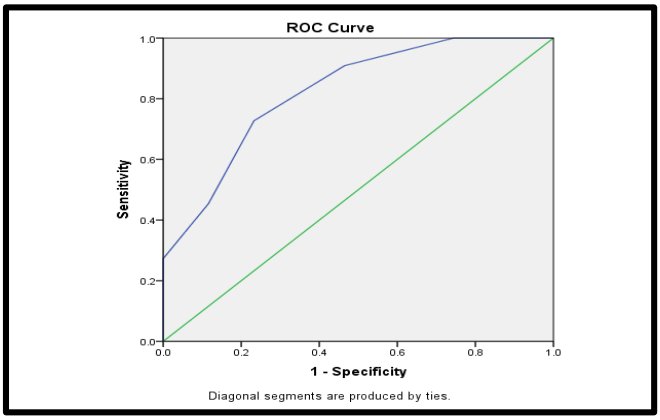

Figure [1]: ROC curve for Swede score for the detection of premalignant lesions.

DISCUSSION

The present study aimed to investigate the value of using visual inspection with Acetic Acid [VIA] of cervix and the Swede Colposcopy Score in cases with postcoital bleeding in detecting cervical premalignant lesions. The study participants were mainly in their fourth and fifth decades of life and most of them married in their late second and early third decades, and 55% come from rural areas.

Bidhuri *et al.* [18] reported that the mean age of participants was 40.5 years. In addition, **Rahman *et al.*** [20] included women with slightly younger age [37.63±6.71] than the current work, while the mean age at marriage was slightly higher [21.23±2.47] years.

The current study showed that, Swede score at Cutoff point 5 had sensitivity of 72.72%, specificity of 76.7%, PPV of 44.4% and NPV of 91.7% with highly significance for the detection of premalignant and malignant lesions.

These results are slightly lower than that reported by **Agarwal *et al.*** [21] who reported that for detection of high grade cervical lesions CIN 2+ Swede score of 5 and above has a sensitivity of 100%, specificity of 85.23% with an accuracy of 86.73%; Swede score of 8 or above has 100% specificity, 80% sensitivity with an accuracy of 97.96%. This can be used to guide the decision treatment [e.g., treating the patients by excision or cryotherapy as a "see and treat" method, sparing the need for cervical biopsy].

In addition, **Rahman *et al.*** [20] reported that, Swede scores of 5 or more had sensitivities, specificity, positive and negative predictive values of 94.9%, 88.4%, 75.5% and 92.9% respectively.

Bidhuri *et al.* [18] carried out a study aimed to assess the predictive value of Swede score with VIA as the screening method and recognize a cut-off score which can predict high grade CIN. They revealed that at score ≥ 5, suggested CIN 2+ lesion, the Sensitivity was [82.60 %], specificity was 45.40 %, PPV was 73.30 % and NPV was 59.50 %. In addition, at the score ≥ 8 the sensitivity was 6.90%, the specificity was 90% for high grade lesion thus "See & Treat" was advised at this score.

As well, the obtained values were in line with the original study by **Strander *et al.*** [22] who reported that, the sensitivity to predict CIN grade 2 and higher [CIN2+] with a Swede score ≥5 was 100%, and the specificity was 90% with a score ≥8. **Campos *et al.*** [23] recommended that biopsy must be reserved for a Swede score ≥ 5**.**

In terms of the lesion Size, 48.1% [26 cases] were scored 0, 35.2% [19 cases] scored 1, and 16.7% [9 cases] were given a score of 2. Lastly, Iodine Staining showed that 1.9% [1 case] had a score of 0, 85.2% [46 cases] had a score of 1, and 13% [7 cases] had a score of 2. 66.7% of patients had total score [0-4], 29.6% of patients had total score [5-7] and 3.7% of patient had total score [8-10] in studied group.

These results agree with **Agarwal *et al.*** [21] who revealed that [76.5%] of patients had total score [0–4], [13.7%] of patients had total score [5–7], [10.2%] of patients had total score [8–10]. As well, **Rahman *et al*.** [20] demonstrated that [57.3%] of patients had total score [0–4], [24.3%] of patients had total score5–7 and [18.4%] of patients had total score 8–10.

The present results showed that 79.6% of patients had Cervicitis, 16.67% of patient had CIN 1, 1.85% of patient had CIN 2 and 1.85% cancer cervix in studied group**.** This is in line with **Rahman *et al.*** [20] who concluded that The Swede score by just incorporating one additional variable that is size of the lesion, showed better correlation with histopathology, as they reported that [39.3%] had Chronic cervicitis, [21.4%] had CIN 1 and [25.0%] had CIN 2.

The histopathological results aligned with **Siddiqui *et al.*** [24] who evaluated the role of VIA, Pap smear and colposcopy in the diagnosis of precancerous and cancerous lesions of uterine cervix as they reported that [39.2%] of patients had CIN I and [10.5%] of patients had CIN II.

Velpula & Yerrapragada [25] concluded that Colposcopy and colposcopy directed biopsy should be included in screening for early detection of cancer of cervix since the accuracy of detection of cervical abnormalities is higher. Colposcopy plays a very important role in the evaluation of VIA positive cases of unhealthy cervix, they reported that [78.75%] of patients had Chronic cervicitis, [15%] of patients had CIN I and [3.75%] of patients had CIN II.

In agreement with results of the current work, **Bidhuri *et al.*** [18] demonstrated that most of the women had Swede scores between 5-7;127[39.1%] had a score of<5,197[60.8%] had a scoreof≥5. In the group with a score of<5[n=127];3.8%[n=43] had normal histology, 46.4% [n=59] had CIN1,18.1%[n=23] had CIN 2 and 1.6%[n=2] had CIN3.In the group with a Swede score of≥5 [n=197],3.5%[n=7] had normal histology, 36% [n=71] had CIN 1,43.6%[n=86] had CIN 2 and 16.7% [n=33] had CIN 3.

Similarly, the current findings agreed with **Rahman *et al.*** [20]. Using this scoring system, cervical biopsy was unnecessary in almost one half of the patients, reserving biopsy for score [5-7]. In the present study, when Swede score ≥ 5 was chosen as the criteria for cervical biopsy. Thus, by using Swede score lesser number of cervical biopsies was indicated with a higher case detection rate.

Furthermore, the current study was supported by **Siddiqui *et al.*** [24] whose study provided good cyto-histopathology correlation in detecting different cervical lesions and malignancy with colposcopy. Although colposcopy sensitivity was low but it can be increased by adequate training and avoiding technical errors. Early and regular screening should be advised for reduction of mortality rates from cervical carcinoma. They revealed that there was highly statistically significant relation [p<0.001] between histopathological result of biopsy and swede colposcopy score.

Conclusion:

The Swede colposcopy score has significant predictive value for identifying cervical premalignant and malignant lesions in patients presenting with postcoital bleeding [PCB]. By combining various colposcopic findings into a structured scoring system, the Swede score provides an effective tool for distinguishing between benign and premalignant lesion. Thus, it is recommended to use the score for screening as well as follow up for treatment of premalignant cervical lesions. **However**, the sample size – irrespective of justification- is relatively small to generalize results. Thus, future studies should be large enough to provide meaningful conclusions and to control for confounding factors.

Conflict of interest: none

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