



CORRELATION OF STATISTICAL PERFORMANCE OF COLPOSCOPIC SWEDE SCORE WITH HISTOPATHOLOGICAL DIAGNOSIS OF CERVICAL LESIONS

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ABSTRACT Cervical cancer is one of the leading causes of morbidity and mortality world wide .A highly sensitive and specific diagnostic test can detect large number of precancerous lesions accurately . our study aimed at determining the effectiveness of Swede score by colposcopy in detecting these lesions . **Materials and Methods :** This study was conducted in the department of Obstetrics and Gynaecology KGMU, Lucknow over a period of 1 year from August 2018 to September 2019 .the sample size was 158 .It was a prospective comparative study .Recruitment of cases was done from women presenting with symptoms like discharge per vaginum, bleeding and menstrual abnormalities with abnormal pap smear reports in Gynaecology OPD. **Results:** In our study we found a significant association between Swede score (7-10) and histopathological diagnosis of CIN 3 and SCC where $p < 0.001$, while for low Swede score (5-6)no significant association was seen . **Conclusion:** In our study we can conclude that for Swede score > 6 although the sensitivity and specificity is good for high grade cervical lesions but still we could not discriminate on this basis that whether the lesion is CIN 3 or SCC ,histopathological diagnosis remains the gold standard for diagnosing precancerous cervical lesions

KEYWORDS :

INTRODUCTION

Colposcopy is a medical diagnostic procedure to examine an illuminated , magnified view of cervix and the tissues of vagina and vulva¹.

It is done using a colposcope , which provides an enlarged view of the areas , allowing the colposcopist to visually distinguish normal from abnormal appearing tissue and take directed biopsy for further histopathological examination². Colposcopic evaluation and guided biopsy are important diagnostic steps and standard management for abnormal cytology smear findings³. Colposcopy and if needed directed biopsy picks up the maximum number of cases of premalignant lesions⁴.

The accuracy of colposcopy has recently been called into question particularly with regard to determining the site requiring biopsy and the agreement between colposcopists is less reliable than once presumed⁵.The modified RCI(Reid Colposcopic Index) is the most widely used scoring system for colposcopy and it consists of four parameters (color of acetowhite area ,acetowhite lesion margin and surface configuration , appearance of blood vessels and pattern of iodine staining) that are graded 0, 1 or 2. the sensitivity of RCI with the threshold for any lesion detected was 89% but fell to 56% when the threshold was raised to high grade lesion.The specificity for low grade lesion was lower at 57.5% which increased to 92.9% for high grade lesion^{6,7}.

A multivariate analysis by Shaw et al and Strander et al , have devised a new scoring system , the Swede score in an attempt to standardize. This includes lesion size as a variable in addition to the 4 variables used in RCI, along with modifications to definitions of the scores for the remaining variables . Their results showed that the specificity for a total score of 8 or higher was 90 % and that no lesion of CIN2 or higher resulted in a score of less than 5⁸.

Bethesda system is the most widely used and accepted classification to report cervical smear samples. In this system squamous epithelial cell abnormality is divided into five categories including Atypical Squamous Cells of undermined Significance (ASC-US) , Atypical squamous cells - cannot rule HSIL(ASC-H), low grade squamous intraepithelial lesion(LSIL), high grade squamous intraepithelial lesion(HSIL) and Squamous cell carcinoma (SCC).In this system ,mild dysplasia (CIN 2) and severe (CIN 3) dysplasia patients are

included in HSIL⁹.

Among patients with a diagnosis of ASCUS with high risk HPV infection, colposcopy and guided biopsy if needed is the gold standard strategy for determining if the biopsy is needed¹⁰.however prevalence of pap smear positive (ASCUS) is 3-4% in western population and high risk HPV DNA positive is 11.7%^{11,12}.taking a biopsy of all screen positive population will required lot of man power. Therefore, the screen positive population needs to be triaged with the help of a modality which will narrow down our intervention to a population which actually requires it¹³.

Colposcopy is the unchallenged standard for evaluating cervical abnormalities. Colposcopic evaluation and guided biopsy are important diagnostic steps in standard management for abnormal cervical smear findings and pick up maximum number of premalignant lesions¹⁴.

MATERIAL AND METHODS

This study was conducted in the department of Obstetrics and Gynaecology KGMU, Lucknow over a period of 1 year from August 2018 to September 2019 .the sample size was 158 .It was a prospective comparative study .Recruitment of cases was done from women presenting with symptoms like discharge per vaginum, bleeding and menstrual abnormalities with abnormal pap smear reports in Gynaecology OPD.

Women with unhealthy cervix and abnormal cytology and those with Swede score ≥ 6 were enrolled and cervical biopsies were obtained and tissues were sent for histopathology.

Inclusion Criteria

- 1.Persistent vaginal discharge
- 2.Post coital bleeding
3. Menstrual irregularities
4. Early age of marriage
- 5.Multiple sex partners
6. Unhealthy looking cervix
- 7.Abnormal pap smear report

Exclusion Criteria

1. Frank growth on cervix
2. Actively bleeding cervix
3. Acute infection of cervix

4. known or treated case of cervical cancer

Measurable Outcomes

1. Association of Swede score with cytology findings especially low-grade lesions.
2. Association of Swede score with histopathology especially high-grade lesions.

After taking consent and emptying bladder the patients were asked to lie down in lithotomy position. After insertion of Cusco's speculum, vagina and cervix were inspected.

Then visualization under magnification was performed using the Colposcope (pro MIS full HD COL pro 222 DX-HD , SONY). First the squamo-columnar junction was visualized and Transformation zone classified as type 1, 2 or 3 accordingly. Then the cervix was examined under green filter to note any vascular abnormality. Further after application of freshly prepared 5% acetic acid, presence of any acetowhite area was noted after one minute and scored as per Swede score under following parameters of shape, color and size. Lastly, 3% Lugol's iodine solution was applied on the cervix and iodine negative areas were noted. All findings were charted on the Odelle's diagram and Swede score was calculated according to the findings.

	Score		
	0	1	2
Uptake of acetic acid	0 or transparent	Shady, milky	Distinct, stearin like
Margins and Surface	0 or diffuse	Sharp, but irregular, jagged, "geographical" satellites	Sharp and even, difference in surface level such as "cutting"
Vessels	Fine, regular	Absent	Coarse or atypical
Lesion size	< 5mm	5-15 mm or spanning 2 quadrants	>15mm or spanning 3-4 quadrants or endocervically undefined
Iodine staining	Brown	Faintly or patchy yellow	Distinct yellow

In patients with swede score more than or equal to 5 and with abnormal cytology, cervical biopsy was taken and sent for histopathology.

In some patients where colposcopy guided biopsy was not done as Swede score was 4 or less than 4 later turned up in Gynecology OPD with cytology report with low- and high-grade lesion. Those patients were also included in the present study and treated accordingly.

The statistical analysis was done using SPSS Version 21.0 statistical analysis software. The values were represented in Number(%) and Mean=SD.

OBSERVATION AND RESULTS

The present study was conducted from August 2018 to September 2019 in the department of Obstetrics and Gynecology, King George Medical University, Lucknow with the objective to assess correlation of statistical performance of Colposcopic Swede score with histopathological diagnosis of cervical lesions. The recruitment of cases for our study was done from 786 colposcopies performed for various indications in our department over one year. Among those 159 cases were enrolled for our study, biopsy was done in 80 cases out of which 4 were lost to follow up and biopsy reports were obtained for 76 cases and cytology reports were available for 91 cases only.

The age groups included in the study were 20 – 29 year, 30 -39 year, 40 -49 year, 50 -59 year and >= 60 year with proportion 5.6%, 16.4%, 26.4%, 25.8% and 25.8% respectively. The mean age of cases was 49.76+ 12.90 year as shown in Table 1.

Table1: Distribution Of Cases According To Age

AGE GROUP	N(159)	PERCENTAGE (%)
20- 29 year	9	5.6%
30-39 year	26	16.4%
40-49 year	42	26.4%
50-59 year	41	25.8%
>=60 year	41	25.8%

Most of the cases had age at marriage 18 – 24 year(84.3%), there were

12 (7.5%) cases with age at marriage <18 year while 13(8.2%) cases had age of marriage >= 25 year as shown in Table 2.

Table 2: Distribution Of Cases According To Age At Marriage

Age at marriage	N (159)	PERCENTAGE (%)
< 18	12	7.5
18 – 24 years	134	84.3
>= 25year	13	8.2

Most of the cases had parity between 2 and 3 (58.5%), there were 11(6.9%) cases with parity 0 or 1 while 55 (34.6%) cases had parity >=4 as shown in Table 3.

Table 3: Distribution Of Cases According To Parity

Parity	N(159)	%
0 - 1	11	6.9
2 - 3	93	58.5
>=4	55	34.6

Cases were also classified according to chief complaints such as pain, menstrual irregularities and vaginal discharge. Total 35(22%) patients had pain, 92 (57.8%) had menstrual irregularities and 149 (91.2%) had vaginal discharge as shown in Table 4.

Table 4: Distribution Of Cases According To Complaints

Complaints	N (159)	Percentage (%)
Discharge	145	91.2
Menstrual irregularities	92	57.8
Pain	35	22

The indications of colposcopy are shown in Table 5. The major indication of colposcopy was abnormal cytology as found in 47.2% cases, unhealthy looking cervix was the indication in 32.1% cases. Other indications were persistent discharge per vaginum (13.8%) and post coital bleeding(6.9%).

Table 5: Indication of Colposcopy

Indication of Colposcopy	N (159)	Percentage (%)
Abnormal cytology	75	47.2
Unhealthy looking cervix	51	32.1
Persistent vaginal discharge	22	13.8
Post coital Bleeding	11	6.9
Total	159	100.0

The distribution of cases according to colposcopy, cytology and histopathology are shown in Table 6 and Figure 6. Colposcopy was done in 159 cases, among them cytology was available in 91 cases while biopsy was available in 76 cases.

Table 6: Distribution Of Cases According To Colposcopy, Cytology And Histopathology

Final Description	Number	Percentage (%)
Cytology Available	91	57.23
Biopsy Available	76	47.77

Cytological diagnosis were performed only in 91 patients. Distribution of cytological diagnosis of patients were shown in Table 7. Total 7(7.6%) patients were NILM, 6(6.6%) patients were Reactive Cellular Change, 27(29.7%) patients were ASCUS, 24(26.4%) patients were LSIL, 22(24.2%) patients were HSIL (including ASC-H) and 5(5.5%) patients had inadequate cytology smears.

Table 7: Distribution Of Cases According To Cytology Report

Cytology Report	N (91)	Percentage
NILM	7	7.6
Reactive Cellular Change	6	6.6
ASCUS	27	29.7
LSIL	24	26.4
HSIL (including ASC-H)	22	24.2
Inadequate	5	5.5

The Swede score was divided into three categories as shown in Table 8. The lower Swede category with Swede score 0-4 contained 49.6% cases, the middle category with Swede score 5-6 contained 34.0% cases while the higher category with Swede score was contained in 16.4% cases.

Table 8: Distribution Of Cases According To Swede Score

Swede Score	N (159)	Percentage (%)
0-4	79	49.6

5-6	54	34.0
7-10	26	16.4
Total	159	100.0

The association of Swede score with cytology findings were shown in Table 9. With respect to NILM findings, the reactive cellular changes were observed more in upper Swede categories (≥ 5), though no significant association was found between reactive cellular change finding with Swede score ($p=0.040$).

The ASCUS was observed more in lower Swede categories (< 5), though no significant association was found between ASCUS finding with Swede score ($p=0.628$).

The LSIL were observed more in middle Swede categories (5-6) , though no significant association was found between ASCUS finding with Swede score ($p=0.131$).

The ASC H were observed in equal proportion in all Swede categories which is different from NILM proportions. So, the significant association was found between ASC-H finding with Swede score ($p=0.011$).

The HSIL were observed more in upper Swede category which is different from NILM proportions.

So, the significant association was found between HSIL finding with Swede score ($p<0.001$).

Table 9: Association Of Swede Score With Cytology Findings

Cytology Report	Swede score (0-4) n=18 N(%)	Swede score (5-6) n=49 N(%)	Swede score (7-10) n=24 N(%)	Chi sq	P value
NILM	4(22.2%)	4(18.4%)	0		
Reactive Cellular changes	0(0.0%)	6(12.2%)	0	4.20	0.040
ASCUS	9(50.0%)	17(16.3%)	1	0.93	0.628
LSIL	4(22.2%)	17	3	4.06	0.131
ASC-H	0(0.0%)	4	1	9.00	0.011
HSIL	1(5.6%)	1	19	21.0	<0.001

When taking cut off for Swede score ≥ 5 , the maximum sensitivity was observed for Reactive cellular changes while minimum for ASCUS. The specificity was 25% equal for all the types of findings. The maximum diagnostic accuracy was detected for LSIL (61.8%).

When taking cut off for Swede score ≤ 7 , the maximum sensitivity was observed for HSIL while maximum for Reactive cellular changes. The specificity was 100% equal for all the types of findings. The maximum diagnostic accuracy was detected for HSIL (94.3%).

For three score categories, there were two cut offs ≥ 5 and ≥ 7 as shown in table 10.

Table 10: Validity Parameters For Swede Score With Respect To Cytology Findings

Parameter	Reactive cellular change	ASCUS	LSIL	ASC-H	HSIL
Cut off: Swede ≥ 5					
Sensitivity	100.0	52.9	81.8	75.0	95.7
Specificity	25.0	25.0	25.0	25.0	25.0
PPV	40.0	50.0	66.7	25.0	71.0
NPV	100.0	27.3	42.9	75.0	75.0
DA	50.0	41.4	61.8	37.5	71.4
Cutt off: Swede ≥ 7					
Sensitivity	0.0	5.9	4.5	25.0	91.3
Specificity	100.0	100.0	100.0	100.0	100.0
PPV	NA	100.0	100.0	100.0	100.0
NPV	66.7	42.9	36.4	80.0	85.7
DA	66.7	44.8	38.2	81.3	94.3

Distribution of patients according to HPE findings are shown in Table 11 . On the basis of HPE patients were distributed in normal , CIN 1, CIN 2, CIN 3 and SCC. Out of 76 cases in which biopsy was done ,HPE

was normal in 34.21% cases , CIN 1 was found in 34.21% cases, CIN 2 was in 14.47%, CIN 3 was found in 10.53% cases and SCC was detected in 6.58% cases.

Table 11: Distribution Of Patients According To HPE Findings

HPE	N (76)	PERCENTAGE (%)
Normal	26	34.21%
CIN 1	26	34.21%
CIN 2	11	14.47%
CIN 3	8	10.53%
SCC	5	6.58%
Total	76	100.0%

The sensitivity , specificity ,NPV and PPV were used to validate the Swede Score for cervical cancer grading with respect to HPE findings as a shown in Table 12 .The cut off score for Swede Score was > 5 to make diagnosis of CIN 1 , CIN 2, CIN 3 and SCC . With these cut off values ,Swede Score had less sensitivity of 53.8% , with less to high specificity of 46.2 – 100% ,PPV of 50.0 -100%,and NPV of 29.4 – 50% in the diagnosis of CIN 1 , CIN 2, CIN 3 and SCC grade lesion in cervical lesion. The cut off value for Swede Score was > 6 to make diagnosis of CIN 1 , CIN 2, CIN 3 and SCC lesions. With these cut off values , as the lesion becoming high grade Swede Score had high sensitivity of 84.6% with less to high specificity of 11.5 – 100% and NPV of 42.9 – 66.7% in the diagnosis of CIN1 , CIN 2, CIN 3 and SCC grade lesions. The cut value for Swede Score > 7 to make a diagnosis of CIN 1 , CIN 2, CIN 3 and SCC lesions. With these cut off values , Swede score had sensitivity of 84.6 % with less to high specificity of 3.8 – 80 % , PPV of 46.8-95.7% and NPV of 42.9-66.7% in the diagnosis of CIN 1, CIN 2, CIN 3 and SCC grade lesion in cervical lesion .

Table 12: Validity Of Swedes Score For Cervical Cancer Grading With Respect To HPE Findings

Score	Sensitivity	Specificity	PPV	NPV
Cut off value for Swede Score > 5				
CIN 1	53.8%	46.2%	50.0%	50.05
CIN 2	53.8%	63.6%	77.8%	36.8%
CIN 3	53.8%	100.0%	100.0%	40.0%
SCC	53.8%	100.0%	100.0%	29.4%
Cut off value for Swede Score > 6				
CIN 1	84.6%	11.5%	48.9%	42.9%
CIN 2	84.6%	27.3%	73.3%	42.9%
CIN 3	84.6%	100.0%	100.0%	66.7%
SCC	84.6%	100.0%	100.0%	55.6%
Cut off value for Swede Score > 7				
CIN 1	84.6%	3.8%	46.8%	20.0%
CIN 2	84.6%	9.1%	68.8%	20.0%
CIN 3	84.6%	75.0%	91.7%	60.0%
SCC	84.6%	80.0%	95.7%	50.0%

DISCUSSION

Cervical cancer is the second most common malignancy among women in India, mainly affecting the females of perimenopausal age group. Incidence and prevalence of cervical cancer remains high in developing countries due to lack of resources , lack of effective screening programmes.

Colposcopy is a useful screening tool owing to its high sensitivity at comparatively low cost.

In our study, in the initial phase a total of 159 cases were registered out of which 4 cases were lost to follow up and the rest of the study was conducted on 155 cases. The mean age of patients in present study was 49.76+ 12.90years. In the study conducted by Singhal et al¹⁵ mean age was 38.6+ 6.2 year. Orciani M et al¹⁶ mean age was 28+ 2 years. In the present study around two thirds of patients got married between 18-24 years and the mean age of marriage was 20.84+ 2.38 years. Bhatla et al¹⁷ reported a mean age of marriage was 19+ 3.3 years which was lower than our study population.

Parity influences chronic cervical lesions. Frequent coitus, poor sexual hygiene, repeated trauma due to frequent child births and increased risk of STDs seem to be contributory factors. In the present study 93(58.5%) had parity between 2-3 and 55 (34.60%) had parity ≥ 4 . Misra et al also reported increase in cytological abnormalities with increasing parity¹⁸.

A significant association was found between Swede score ≥ 7 and high grade cytology (HSIL) with sensitivity of 91.3%, specificity of 100%, PPV of 100% and diagnostic accuracy of 94.3 with $p < 0.001$, while Swede Score ≥ 5 for low grade cytology (LSIL) was 25% and maximum diagnostic accuracy for LSIL (61.8%) and p value increased which shows less association between cytology and Swede Scoring.

A correlation analysis between Swede Score and histopathological diagnosis was done in 76 cases. Swede score (5-6) for CIN 1 was found to be 23 (43.40%), CIN 2 8* (15.09%), CIN 3 and SCC no cases were reported. At Swede score (7-10) CIN 1 was 3 (13.04%), CIN 2 was 3 (13.04%), CIN 3 8 (34.78%) and SCC 5 (21.74%). In the study conducted by Bowring et al¹⁹ CIN 1 – 49% (98/200); at Swede score of ≥ 8 CIN 2- 15.5% (31/200); CIN 3- 24% (48/200).

In our study we found a significant association between Swede score (7-10) and histopathological diagnosis of CIN 3 and SCC where $p < 0.001$, while for low Swede score (5-6) no significant association was seen. In the study conducted by Karrberg C et al²⁰ low score of \leq biopsy was not required while Swede score of (≥ 8) required biopsy.

CONCLUSION

In our study we can conclude that for Swede score > 6 although the sensitivity and specificity is good for high grade cervical lesions but still we could not discriminate on this basis that whether the lesion is CIN 3 or SCC, histopathological diagnosis remains the gold standard for diagnosing precancerous cervical lesions but high Swede score can be taken as important indication for therapeutic intervention in spite of waiting for histopathological report.

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