Indian Journal of Basic and Applied Medical Research; March 2023: Vol.-12, Issue- 2 , P. 269 - 275
DOI: 10.36855/IJBAMR/2022/98215.5710

Original article

Study on cytopathological features of uterine cervix with analysis of ASC/SIL Ratio as a quality control measure in a tertiary care center

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Date of submission: 28 January 2023

Date of Final acceptance: 18 March 2023

Date of Publication: 30 March 2023

Source of support: Nil

Conflict of interest: Nil

Abstract:

Introduction: Cervical cancer is a preventable disease due to long preinvasive stage.[1] Even though cervical cytology is the most used strategy to detect cervical cancer and its precursor lesion, its effectiveness is still questioned because many women are still developing cancer.

Methodology: This prospective study was carried out on patients referred to pathology department of JJM Medical College, Davanagere for cytology interpretation of uterine cervix during the two year period from August 2020 to August-2022.

Results: In the present study, on routine screening epithelial cell abnormalities were found in 2.4 % smears. Prevalence of ASCUS was 0.9% (7 cases),ASC-H was 0.5% (4cases), LSIL was 0.25% (2cases), HSIL was 0.5% (4 cases), AGC – NOS was 0.25% (2 cases). So SIL was seen in 0.75% (6 cases). According to Bal MS et al.[6] epithelial cell abnormalities were found in 5% smears. Prevalence of ASCUS was 0.3% (1 case), SIL was seen in 3.4% (10 cases), out of which LSIL was 2.7% (8 cases) and HSIL accounted for 0.7%. Invasive cancer was seen in 1.3% cases.

Conclusion: An effective marker for assessing cytopathologists' sensitivity is the ASC/SIL ratio. If an individual cytopathologist's ASC/SIL ratio is higher than the upper standard, confidential comments can assist them lower it. It serves as a motivating factor for cytopathologists whose ratio complies with the defined benchmark and aids in the maintenance of a steady ratio.

Keywords: ASC/SIL Ratio , cytopathological features

INTRODUCTION

Cervical cancer is a preventable disease due to long preinvasive stage.[1] Even though cervical cytology is the

most used strategy to detect cervical cancer and its precursor lesion, its effectiveness is still questioned because many women are still developing cancer. This is due to the high rate of false negative results which can range from 2% to 62%. The reasons for this huge variation in range are errors in collection, screening and diagnostic interpretation.[2] Monitoring the relative frequency of the interpretations of atypical squamous cells (ASC) and squamous intraepithelial lesions (SIL) has been proposed as a quality control measure.

Atypical squamous cells (ASC) are the most common epithelial abnormality reported in Papanicolaou (Pap) test results. These cells show cytologic abnormalities suggestive of squamous intraepithelial lesion (SIL) but with insufficient evidence, qualitative or quantitative, for a definite diagnosis of SIL.ASC is essentially a diagnosis of uncertainty. It is a diagnosis of uncertainty and is used as an intralaboratory and interlaboratory comparison tool for quality control purpose. This is done to ensure that the interpretation ASC is not overused. To control for differences in the frequency of cervical dysplasia in different populations, the ratio of ASC to SIL interpretations has been adopted as the preferred measure, especially for interlaboratory comparisons.

Since the diagnosis of ASC is dependent on the laboratory patient population, a higher rate can occur if there is a larger proportion of high-risk patients. In response to this, the ASC/squamous intraepithelial lesion (SIL) ratio was introduced as a quality control measure that was less dependent on the patient population, because the ASC and SIL rates would both increase in a laboratory with more high-risk patients. The ASC/SIL ratio can be calculated for the entire laboratory or for individual cytopathologists. This ratio can be used as a surrogate marker for the level of certainty and for specificity. Current recommendations are for a laboratory or cytopathologist to maintain a ratio of less than 2:1 or 3:1.[3,4] The objective of the study is to evaluate the cytological features of uterine cervical smears and ASC/SIL ratio as quality control measure in cervical cytopathology.

METHODS

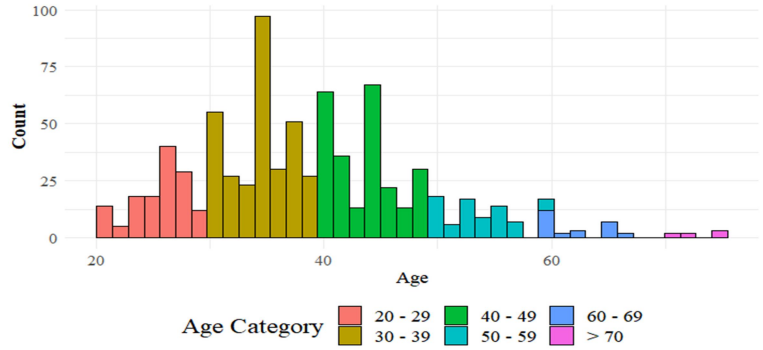
This prospective study was carried out on patients referred to pathology department of JJM Medical College, Davanagere for cytology interpretation of uterine cervix during the two year period from August 2020 to August-2022. We screened 1000 sexually active women who were more than 18 years of age. Relevant clinical history was taken from clinical forms that included the chief complaint. The endocervical brush was introduced into endocervix until the junction of the bristles of the brush with the end of the handle is approximately with the external os. After insertion the brush was rotated 180 degrees in the endocervical canal. For pregnant women saline moistened swab was used. The slide was labelled on its frosted section with the cytology number as per the register maintained for cervical cytology at our institution. The endocervical brush sample was rolled at right angles to the long axis of the slide near the frosted end.The spatula sample was quickly applied, through a rotating motion of the cervical sampling face of the spatula across the glass slide. After preparing the smear with the spatula and the brush, the slide was rapidly fixed with a spray fixative/95% ethanol. The endocervical brush component will dry more slowly than the spatula component, and that is why it was applied first. Then the smears were stained with Papanicolaou, H&E, Giemsa.Laboratory results were reported according to the new Bethesda System for Reporting Cervical Cytology 2014. The system broadly divides lesions into those negative for intraepithelial neoplasia and epithelial cell abnormalities (ECA) that include squamous and glandular cells.

RESULTS

TABLE 1: AGE DISTRIBUTION OF CASES. N = 800

Characteristic	N = 800	Percent
Age		
Mean (SD)	39 (10)	
Range	21 – 75	
Median, (IQR)	38, (32, 45)	
Age (Category		
20 – 29	136	17%
30 – 39	310	39%
40 – 49	245	31%
50 – 59	76	9.5%
60 – 69	26	3.2%
> 70	7	0.9%

CHART 1: HISTOGRAM SHOWING AGE DISTRIBUTION OF THE PARTICIPANTS. N = 800



The present study shows the distribution of age among participants. The overall mean age of participants was 39 with a standard deviation of 10. The range of age within participants was from 21 to 75. Maximum number of patients (39%) were in the age group 30-39 years (fourth decade) followed by 31% in the fifth,17% in the third, 9% in the sixth,3% in the seventh, and 1% the in the eighth decade. The presenting complaints were vaginal discharge, pain abdomen, and abnormal uterine bleeding.(**Table 1 and chart 1)**

TABLE 2 : CYTOLOGY INTERPRETATION USING BETHESDA SYSTEM 2014

Cytology interpretation			**BETHESDA SYSTEM OF REPORTING 2014**					
	US	**NILM**	**ASCUS**	**ASCH**	**LSIL**	**HSIL**	**AGC**	**TOTAL**
No of patients	**67**	**714**	**7**	**4**	**2**	**4**	**2**	**800**
Percentage	**8.4**	**89.2**	**0.9**	**0.5**	**0.25**	**0.5**	**0.25**	**100**

NEGATIVE FOR INTRAEPITHELIAL LESION OR MALIGNANCY

The present study shows the distribution of case based on Bethesda 2014 Routine screening. Out of 800 participants, Smears from 733(91.6%) patients were found satisfactory for reporting while the remaining 8.4% was unsatisfactory. Of the 714 NILM Pap smears, the most common finding was non-specific inflammation which was present in 286 Pap smears. Among these 286 inflammatory Pap smears, 51 were associated with infection with the most common infection being bacterial vaginosis in 36 followed by candidiasis in 13 cases.4 cases were of trichomonas vaginalis and 2 cases of herpes simplex virus infection. **(Table 3)**

TABLE 3 : Negative for intraepithelial lesion or malignancy

Sl. No.	**Diagnosis**	**Total**
1.	Atrophic cervicitis	**80**
2.	Chronic Cervicitis	**198**
3.	Chronic Cervicitis with squamous metaplasia	**8**
4.	Chronic Cervicitis with candidiasis	**13**
5.	Chronic Cervicitis with gardnerella vaginalis infection (Bacterial vaginosis)	**36**
6.	Chronic Cervicitis with trichomonas vaginalis infection & infestation	**4**
7.	Smear are negative for malignant cells	**428**
TOTAL		**714**

Specific organisms obtained were Gardnerella vaginalis, Trichomonas vaginalis, fungal organisms morphologically consistent with Candida.

ASC/SIL ratio

ASC/SIL ratio correlate with screening sensitivity. In the present study , ASC/SIL ratio was 1.5: 1. This is below the upper benchmark of 3:1.[5]

DISCUSSION

Cancer cervix is considered to be an ideal gynecological malignancy for screening as it meets both test and disease criteria for screening. It has a long latent phase during which it can be detected as identifiable and treatable premalignant lesions which precede the invasive disease and the benefit of conducting screening for carcinoma cervix exceeds the cost involved.[6] In the present study maximum number of patients (39%) were in the age group 30-39 years (fourth decade) followed by 31% in fifth,17% in third, 9% in sixth ,3% in seventh and 1% in eighth decade. The most common presenting complaint was discharge per vaginum (96%) followed by intermenstrual bleed (2%)and pain in lower abdomen (2%).In the study by Bal MS et al. [6] maximum number of patients (45.3%) were in the age group of 31-40 years (fourth decade) followed by 33.3% in third, 17.7% in fifth, 2% in sixth decade and 1.7% in seventh decade. The most common presenting complaint was discharge per vaginum present in 177 (59%) patients. History of pain in the lower abdomen was present in 58 (19.3%), inter menstrual bleeding in 30 (10%), and 17 (5.7%) patients had complaint of dyspareunia. Post-coital bleeding was the chief complaint in 15 (5%) patients. Only three patients (1%) presented with post menopausal bleeding.

In the present study, on routine screening epithelial cell abnormalities were found in 2.4 % smears. Prevalence of ASCUS was 0.9% (7 cases),ASC-H was 0.5% (4cases), LSIL was 0.25% (2cases), HSIL was

0.5% (4 cases), AGC – NOS was 0.25% (2 cases). So SIL was seen in 0.75% (6 cases). According to Bal MS et al.[6] epithelial cell abnormalities were found in 5% smears. Prevalence of ASCUS was 0.3% (1 case), SIL was seen in 3.4% (10 cases), out of which LSIL was 2.7% (8 cases) and HSIL accounted for 0.7%. Invasive cancer was seen in 1.3% cases.

In the present study out of 800 cases, smears from 733(91.6%) patients were found satisfactory for reporting while the remaining 8.4 % was unsatisfactory. According to Kapila k et al.[7] out of 86434 smears, smears from 83,052 (96.09%) patients were found satisfactory for reporting while the remaining 3.9% was unsatisfactory. Atypical squamous cells of undetermined significance (ASCUS) were seen in 1,790 (2.2%) cases, atypical glandular cells of undetermined significance (AGUS) in 630 (0.8%) cases, low grade squamous intraepithelial lesion including human papillomavirus changes (LSIL) in 824 (1.0%) cases, high grade squamous intraepithelial lesion (HSIL) in 189 (0.2%) cases, and carcinoma in 79 (0.1%) cases of which 44 (0.05%) were squamous cell carcinoma were found in the study by Kapila et. Al.[7]

COMPARISON OF DISTRIBUTION OF FREQUENCY OF UNSATISFACTORY IN ROUTINE SCREENING AND FINAL DIAGNOSIS WITH OTHER STUDIES

	Unsatisfactory
Kapila K et al[7]	3.9%
Kumari M et al.[8]	5.19%
Present study	8.4 %

Most smears were classified unsatisfactory due to scant cellularity, obscuring by inflammatory cells and mucus.

COMPARISON OF EPITHELIAL CELL ABNORMALITIES DETECTED BY ROUTINE SCREENING WITH OTHER STUDIES

	Abnormal (%)	ASC-US (%)	ASC-H(%)	LSIL(%)	HSIL(%)	SCC (%)	AGC-NOS (%)	AGC-FN (%)	Adenocarcinoma (%)
Kapila et al.[7]	4.1	2.2	-	1	-	0.05	0.8	-	0.05
Kumari M et al.[8]	2.13	0.66	0.163	0.366	0.209	0.25	0.268	0.137	0.059
Bal MS et al.[6]	5	0.3	-	2.7	0.7	1.3	-	-	-
Elhakeem HA et al.[9]	7.9	2.76	0.19	1.3	0.66	0.33	-	-	-
Present study	2.4	0.9	0.5	0.25	0.5	-	0.25	-	-

COMPARISON BETWEEN DISTRIBUTION OF INFLAMMATORY SMEARS WITH A SIMILAR STUDY

	NILM	Inflammatory smears (NILM)	Inflammatory smears associated with infection	Bacterial vaginosis	Candidiasis	Trichomonas vaginalis	Herpes simplex
Kumari M et al.[8]	92.68%	21.6%	13.8%	9.6%	2.4%	1.5%	0.16%
Present study	89.2 %	40%	19.2%	12.6%	4.5%	1.4%	0.7%

COMPARISON OF ASC/SIL RATIO WITH OTHER STUDIES

Study	ASC/SIL RATIO
Renshaw AA et al[10]	3.2
Renshaw A A et al[4]	2.5
Davey D D et al[11]	2
Davey D D et al[12]	1.3
Nascimento A F et al[5]	1.9
J H et al[13]	1.1
Present study	1.5

Calculation of ASC/SIL ratio is a simplest measure for assessing the quality of reports by pathologists and as well as laboratory. The findings of our study were consistent with those of Nscimento. et al.[5] who found a ratio of 1.9. To prevent term misuse, the prevalence of ASCUS interpretation in the general community shouldn't be higher than 5%. Since the ASC/SIL ratio is less influenced by the patient population, it rises as the number of high-risk patients in a laboratory increases. Although the ASC/SIL ratio measures a cytopathologist's uncertainty, it is unquestionably not a gauge of how accurately they can diagnose a patients. It's a good idea to keep an eye on the ASC/SIL ratio because it gives CPs the chance to compare their ratio to the laboratory as a whole and to the 3:1 standard. According to the Bethesda method, the ratio should be less than 3, and smaller ratios are preferable as they reduce laboratory uncertainty and perhaps lessen the proportion of women who receive negative biopsy results. A laboratory depends on both its cytopathologists and its cytotechnologists to maintain proper specificity and sensitivity.

CONCLUSION

An effective marker for assessing cytopathologists' sensitivity is the ASC/SIL ratio. If an individual cytopathologist's ASC/SIL ratio is higher than the upper standard, confidential comments can assist them lower it. It serves as a motivating factor for cytopathologists whose ratio complies with the defined benchmark and aids in the maintenance of a steady ratio.

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