

Evaluation of the diagnostic accuracy of the cervical biopsy under colposcopic vision

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Abstract

This study was conducted to evaluate the diagnostic accuracy of the cervical biopsy under colposcopic vision. This retrospective study was performed on 190 women, who were selected from a total of 412 cases referring for colposcopy in one year. All patients underwent colposcopy and loop electrosurgical excision procedure (LEEP). After the investigation of demographic characteristics and data confirmation, colposcopic characteristics were examined. Then, the diagnostic indicators and diagnostic accuracy of the cervical biopsy under colposcopic vision were determined. The mean age of patients was 35.51 ± 5.91 years. In smokers, the percentage of cancer and CIN3 cases was higher than in normal individuals, and this difference was statistically significant in terms of the frequency of cancerous lesions ($P = 0.2$). A comparison of colposcopic biopsy with LEEP has shown that the frequency of advanced cases in LEEP has been detected more, and the correlation coefficient (kappa) indicated the weak agreement between the findings of colposcopically directed biopsy (CDB) and LEEP methods. ($k = 0.23$). The diagnostic accuracy of the cervical biopsy under colposcopic vision for cervical cancer is effectively high. It is recommended that this procedure be performed to diagnose cancerous lesions; however, contrary to what is seen in colposcopy, malignant cases may be spreading and follow-up of patients can affect therapeutic performance.

Key Words: Cervical cancer; colposcopy; colposcopic biopsy; excisional biopsy; biopsy.

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Cervical cancer is one of the most common cancers in women, and in 2018, the rate of mortality due to this cancer was more than 311 thousand people worldwide.¹ The prevalence of cervical cancer in Iran is increasing and as a result, the rate of morbidity and mortality had also increased.² The incidence and mortality of cervical cancer have decreased primarily due to Pap smear screening programs. With more information available regarding the outcomes, screening and treatment guidelines for cervical intraepithelial neoplasia (CIN) have evolved.³ Diagnosis of the disease in precancerous conditions, careful monitoring, and treatment are of great importance in the prevention of cervical cancer. The cervical cancer screening process involves cervical Pap smear cytology with human papillomavirus (HPV) testing in specific conditions.⁴ But one of the concerns of

specialists is abnormal Pap smear and method of follow-up.⁵ Misdiagnosis of lesions may lead to over-treatment, and naturally, the use of excisional methods is associated with increased maternal morbidity, including preterm delivery, premature rupture of membranes, cesarean section, and neonatal morbidity, considering that most of these women are of reproductive age. On the other hand, if high-grade lesions are not diagnosed and treated in time, they can lead to advanced cancer or even cause death.^{6,7} Therefore, diagnosis of abnormal cytological findings during screening, appropriate and timely evaluation of these findings by biopsy under cervical colposcopy, and necessary treatment of the diagnosed lesions lead to early detection of precancerous lesions and consequently reduce the prevalence of this cancer.⁸ One of the most common methods of predicting cervical lesions is cervical biopsy under the colposcopic view.

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The related reports have shown this method to have acceptable diagnostic accuracy, while in different studies, the diagnostic criteria of this method, especially in the detection of high-grade lesions, have been reported to be different.⁹⁻¹² Punch biopsy under the guidance of colposcopy is one of the major methods of assessing cervical precancerous lesions. However, despite its widespread use, concerns about the diagnostic accuracy of this method, especially in the detection of high-grade lesions, are increasing. Studies have shown conflicting results regarding its diagnostic accuracy.¹¹⁻¹³ According to the cases stated in this study, we will examine the set of factors affecting the accuracy of colposcopy-guided biopsy so that we can prevent delays in the proper treatment of high-grade intraepithelial lesions. Therefore, this study was performed to determine the diagnostic accuracy of the cervical biopsy under colposcopic vision in diagnosing precancerous lesions of the cervix.

Materials and Methods

Study Design

This retrospective study was performed on the records of patients referred to the gynecological clinic of Amir Al-Momenin Hospital in Semnan for cervical biopsy under

colposcopic vision. After approval of the ethical cases from the hospital officials, and considering the inclusion criteria, the cases were reviewed. During the review, the information recorded in the files was kept with the researcher and no new intervention was made on the persons.

Inclusion and exclusion criteria

Inclusion criteria included patients between 20 and 74 years of age who were referred for biopsy under the guidance of cervical colposcopy and underwent subsequent excision. Exclusion criteria included incompleteness of colposcopy chart, history of chronic diseases, age over 74 years, multiple active cancers, pregnancy and lactation.

Method description and data collection

In Amir Al-Momenin Hospital in Semnan, the Pap smear method is routinely used to screen for cervical cancer, and then, if there is a finding of a precancerous lesion, a colposcopic examination is performed in the next stage, and at the discretion of the examiner, one or more specimens would be collected with a punching tool. If a high-grade intraepithelial lesion is reported in pathology reports, or if a high-grade lesion is not reported but there

Table 1. Frequency distribution of demographic characteristics and clinical stage of the tumor.

Characteristics		N	%
Age group	<35	99	52.1
	35 - 49	86	45.3
Smoking	<50	5	2.6
	+	96	50.5
	-	94	49.5
HPV	HR	109	57.4
	LR	9	4.7
	no	72	37.9
Colposcopic observation	Grade1	45	23.7
	Grade2	114	60.0
	Atypical ves	31	16.3
Colposcopic biopsy	CIN1	45	23.7
	CIN2	85	24.7
	CIN3	55	28.9
	AIS	2	1.1
	Adenocarcinoma	2	1.1
	SCC	1	0.55
LEEP	CIN1	25	13.2
	CIN2	67	35.3
	CIN3	64	33.7
	AIS	6	3.2
	SCC	17	8.9
	normal	8	4.2
	Adenocarcinoma	3	1.6

SCC: Squamous cell carcinoma; CIN: cervical intraepithelial neoplasia; AIS: adenocarcinoma in situ.

Table 2. Relationship between smoking and the type of lesion.

Characteristics		Smoking				Total	p
		NO		YES			
		N	%	N	%		
LEEP	Normal	3	3.2	5	5.2	8	0.02
	CIN1	17	18.1	8	8.3	25	
	CIN2	38	40.4	29	30.2	67	
	CIN3	29	29.8	35	37.5	64	
	cancer	8	8.5	18	18.8	26	
Total		94	49.5	96	50.5	190	

is strong clinical suspicion, excision of the area using the cold knife cone (CKC) or electro-surgical method is considered. For this purpose, the surface of the cervix is cleaned with normal saline to remove mucosa and secretions, and then, it is carefully examined by colposcopy. The characteristics of the cervix are examined colposcopically and are considered positive if there is a colposcopic lesion, and then a biopsy of the lesion is performed by punch biopsy forceps. It should be noted that all cases related to bleeding control and hygiene are performed at all stages. In this study, related data were extracted from the patients' files and were entered into a preset checklist.

Statistical analysis

All statistical analyses were performed by SPSS statistical software version 25. Statistical analyses were performed using the T-test and kappa correlation coefficient. Frequency, percentage, and mean were used to describe the data, and the simultaneous effect of variables was investigated through logistic regression. The level of significance was set at $p = 0.05$.

Results

A total of 190 cases were studied, and the mean age of patients was 35.51 ± 5.91 years. The frequency distribution of demographic and clinical characteristics of the cases can be seen in Table 1. More than 50% of patients were smokers. 57.4% of patients had high-risk cases of papillomavirus. Also, 60% of patients were in Grade 2. Colposcopic biopsy showed that 28.9% had CIN3 and 24.7% had CIN2, but LEEP showed that 33.7% had CIN3 and 35.3% had CIN2. According to Table 2, the findings related to the relationship between smoking and the type of lesion showed that in smokers, the percentage of cancer and CIN3 was higher than in normal individuals, and a comparison of the pathological findings showed a statistically significant difference between these groups in terms of the frequency of cancerous lesions ($p = 0.02$). Table 3 shows the findings of colposcopically directed biopsy (CDB) and LEEP, and the comparison of the findings of colposcopic biopsy and LEEP demonstrated that the frequency of advanced type cases in LEEP was detected to a greater extent, and the correlation coefficient (kappa) showed a weak statistical correlation between the findings obtained using the two methods ($k = 0.23$).

Table 3. Comparison of the findings of colposcopic biopsy and LEEP.

Methods		LEEP					Total
		Normal	CIN1	CIN2	CIN3	cancer	
Colposcopy	CIN1	1	5	17	17	5	45
	CIN2	2	14	33	28	8	85
	CIN3	5	6	17	19	8	55
	cancer	0	0	0	0	5	5
Total		8	25	67	64	26	190
Kappa correlation coefficient				0.23			

Discussion

Detection of abnormal cytological findings during screening, appropriate and timely evaluation of these findings by biopsy under cervical colposcopy, and necessary treatment of the diagnosed lesions lead to early detection of precancerous lesions and consequently reduce the prevalence of this cancer.¹⁰ The present study showed that the cervical biopsy method under colposcopic vision was highly effective in diagnosing cervical lesions. In this regard, different studies have shown that biopsy under cervical colposcopy gives an accurate estimate of the grade of intraepithelial neoplasia.¹¹⁻²¹ In contrast, several studies have demonstrated only a moderate correlation between histological diagnosis using biopsy under colposcopy and the final standard diagnosis, reporting significant differences between these methods.¹⁴⁻¹⁶ A Norwegian study showed that out of 520 women who did not have any high-grade lesions on colposcopy biopsy, about 23.8% had grade 2 neoplasia based on the final standard biopsy.¹⁷ In a systematic study and meta-analysis, Underwood M et al. (2012)¹⁸ reported the high sensitivity (about 88%) of colposcopic biopsies. In another study, this method was found to be effective in the accurate detection of lesions, and its specificity, sensitivity, and positive predictive value in the detection of high-grade lesions were reported to be 66.2, 98.5, and 35.5, respectively.¹⁹

In the present study, the CDB method was compared to the LEEP method, and the results showed a significant difference between the two methods, and the correlation coefficient of the two methods was less than acceptable (0.6). In this regard, a study was conducted in 2020 and compared the CDB method with the LEEP method. The results showed that the colposcopy method in people over 50 years of age had less diagnostic accuracy and the sensitivity of the LEEP method was about 87% in the diagnosis of cancerous lesions.²⁰ Another study in this regard considered the colposcopy method useful in identifying precancerous lesions of the cervix.²¹ Findings have shown that accurate identification of lesions in the early stages and application of proper treatment can greatly contribute to the reduction of complications and mortality.^{22,23}

The present findings showed that the percentage of cancer and CIN3 was higher in smokers than in normal individuals and this difference was statistically significant. In this regard, various studies have demonstrated the relationship between smoking and cervical lesions.^{24,25} Recent findings in 2020 indicate that smoking affects the population of high-risk viruses, and that continued smoking will gradually increase the degree of lesions in patients.²⁵ The findings of a study by Jung et al. (2018) showed that recognizing the effective clinical factors can be effective in achieving better colposcopic results.²⁶ In another study that examined the factors affecting the accuracy of the punch biopsy diagnostic method under colposcopy, it has been shown

that over 40 years of age, the presence of abnormal blood vessels in the lesion, and the increase in the number of samples taken were three factors that could increase the sensitivity of this diagnostic method.¹⁹ However, despite the coronavirus outbreak, it is very important to provide practical therapies and effective follow-up with the least contamination during a pandemic.²⁷ Early check-ups can confidently detect cervical cancer in time and increase the effectiveness of treatment. Patients should refer to a specialist if they notice any signs of cancer so that the doctor can choose the best treatment for them by performing related tests. The results show that screening patients and using biomarkers related to papillomavirus can also be helpful in predicting malignancy and ensuring diagnosis.²⁸ Findings have shown that screening patients and using biomarkers related to papillomavirus can also be helpful in predicting malignancy and ensuring diagnosis.²⁸ It has been stated that updating screening methods and related knowledge is effective in identifying progressive cases and reducing mortality.²⁹ In general, the findings of our study showed that biopsy should be considered for abnormal cases, and subsequent follow-up is important if the CIN does not rise and does not turn into cancer, because in the majority of cases, the advanced types of lesions were diagnosed more frequently. This suggests that, contrary to what is seen in colposcopy, malignant cases may be spreading, and follow-up of these patients is important for increasing the response to treatment. One of the limitations of the present study was the incompleteness of some clinical files in terms of variables, which was eliminated by contacting the patients. One of the strengths of the present study was the sample size, and a lot of effort was taken to examine a sufficient number of samples.

In conclusion, the cervical biopsy under colposcopic vision is highly effective in identifying precancerous lesions of the cervix. This method can be performed to diagnose cancerous lesions, and in cases of suspected high-grade lesions, the results of the cervical biopsy under colposcopic vision is helpful in determining the type of tumor and the treatment strategy. However, considering the comparison of the results of CDB and LEEP, there is a possibility of errors in some cases and only follow-up of patients can be effective in increasing diagnostic accuracy and therapeutic effectiveness.

List of acronyms

AIS - adenocarcinoma in situ
CDB - Colposcopically directed biopsy
CIN - cervical intraepithelial neoplasia,
LEEP - loop electrosurgical excision procedure
SCC - Squamous cell carcinoma

Contributions of Authors

All authors were involved in the conception, drafting and critical revision of the manuscript. All authors read and approved the final edited typescript.

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Conflict of Interest

The authors declare no conflict of interests.

Ethical Publication Statement

We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

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