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Clinical Value of Colposcopy in the Diagnosis of Cervical Disease

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Keywords: Colposcopy, Cervical disease, Diagnosis, HPV

Abstract: To explore the clinical diagnostic value of colposcopy in cervical diseases. 82 suspected cervical disease patients admitted to our hospital from February 2011 to February 2013 were selected for retrospective analysis of their clinical data diagnosed using colposcopy. After colposcopy examination, 60 patients were found to have cervical diseases, including 4 cases of genital warts, 10 cases of cervical polyps, 6 cases of cervical cancer, 34 cases of cervical precancerous lesions, and 6 cases of cervical submucosal fibroids; According to pathological examination, 73.2% (60/82) of patients with cervicitis have a high coincidence rate. The application of colposcopy in clinical diagnosis of cervical diseases has a significant effect, improves the diagnostic accuracy, and is worthy of widespread use and promotion in clinical practice.

1. Introduction

Cervical disease is a common gynecological disease in clinical practice. If not treated promptly and effectively, it can have a significant impact on the physical health of female patients. Timely and accurate clinical diagnosis and diagnosis of patients can provide better basis for clinical treatment. With the continuous progress of medical technology and the continuous development of clinical diagnostic techniques, colposcopy is widely used in the diagnosis of cervical diseases. Colposcopy examination can magnify the mucosa of the uterus and vagina to 10-40 times, observe small lesions on the surface of the cervix that cannot be observed by the naked eye, and timely detect abnormal epithelium, abnormal transformation areas, and atypical blood vessels that are difficult to observe by the naked eye. The most important step in observing epithelial morphology and vascular reactions is acetic acid test. The stromal blood vessels of normal squamous epithelium are spider like or reticular, and the epithelial layer is relatively thick, so they are not exposed under colposcopy. Abnormal blood vessels mainly include punctate blood vessels, atypical blood vessels, and inlaid blood vessels, all of which are formed by terminal blood vessels. The normal squamous epithelium of the cervix remains unchanged after adding acetic acid. For columnar epithelium and epithelial cells with light intercellular adhesion, adding acetic acid can cause epithelial whitening, vascular contraction, and swelling. The more atypical the epithelium is, the more white it becomes. Combining iodine test positive areas and microscopic acetic acid biopsy greatly improves the

accuracy of tissue biopsy, which is of great significance for diagnosing asymptomatic cervical diseases [1-3].

Colposcopy is increasingly accepted by patients and widely used in clinical diagnosis. The value of colposcopy mainly includes the following aspects: early diagnosis of cervical cancer, examination of cytologically positive or suspicious patients with colposcopy, early determination of the location, scope, and size of the lesion, early diagnosis for patients, and thus improving the cure rate; Colposcopy can provide guidance for localized biopsy, thereby improving the accuracy of early diagnosis. The conventional four point biopsy method in clinical practice is somewhat blind and often leads to missed diagnosis. Using colposcopy to observe fine structures can make the biopsy target more accurate, thereby improving the positive rate of biopsy. In clinical diagnostic tests, if vaginal medication is still unable to detect secretions, colposcopy can be used to directly observe the morphology of blood vessels in the cervix and fornix, providing a correct diagnosis. The application of colposcopy in clinical diagnosis of cervical diseases plays a very important role in screening for cervical cancer and screening for female diseases [4-5]. The above results show that after colposcopy examination, 60 patients showed cervical diseases, including 4 cases of genital warts, 10 cases of cervical polyps, 6 cases of cervical submucosal fibroids, 6 cases of cervical cancer, and 34 cases of cervical precancerous lesions. According to pathological examination, 73.2% (60/82) of patients with cervicitis have a high coincidence rate. The application of colposcopy in clinical diagnosis of cervical diseases has shown significant effectiveness, improved diagnostic accuracy, and is worthy of widespread use and promotion in clinical practice.

2. Materials and Methods

2.1. General Information

General data of patients who underwent cervical cancer screening and showed positive HR-HPV and negative cytology results in our gynecology clinic from January 2019 to December 2022 were collected as clinical diagnostic data. Clinical diagnostic data included patients' age, fertility status, contraceptive method, cervical cytology results, HR-HPV test results, colposcopy results and cervical biopsy pathology results. Inclusion criteria were: (i) married or sexually active women; (ii) positive HR-HPV and negative cytology results of cervical cancer screening; (iii) colposcopy and cervical biopsy performed in our hospital. Exclusion criteria were: ① women in pregnancy; ② gynecological diseases of the reproductive system; ③ previous history of cervical disease; ④ previous cervical surgery; ⑤ Patients with neurological disorders and unable to communicate properly; ⑥ Patients who were unable to sign the informed consent form. The study was approved by the hospital ethics committee.

2.2. Research Methodology

By observing the patients' HR-HPV-positive and cytology-negative cervical cancer screening results, the corresponding colposcopy and cervical biopsy results of similar patients were identified and comparatively analyzed. Observation of cervical cancer screening results was discarded for patients with missing or partially missing colposcopy and cervical biopsy results. For patients with both colposcopic findings and cervical biopsy findings, their clinical diagnostic data, including patients' age, fertility status, and contraceptive method, were collected to analyze the relationship between their colposcopic findings and HPV infection factors, and the degree of conformity between colposcopic findings and cervical disease findings, so as to further investigate the clinical value of colposcopy in the diagnosis of cervical disease.

2.3. Observed Indicators

HPV classification test and quantitative test: Before performing HPV classification and quantitative test, ensure that the patient has no sexual intercourse, no gynecological examination, no vaginal ultrasound and other behaviors within 24h, and send the cervical specimen for testing immediately after extraction. The classification test criteria are roughly divided into three categories: HPV-16, HPV-18 and others, and the quantitative test criteria are roughly divided into three categories: low viral load, medium viral load and high viral load.

Cervical cytology test indicators: cervical specimens were processed using the Thinprep2000 testing system, and the cervical cytology test diagnostic report used the TBS classification method revised in 2001 for cell classification. There were two main categories: (i) no intraepithelial lesions or malignant disease; and (ii) abnormal epithelial cell changes. In this study, all lesions with cytology test results suggesting greater than or equal to atypical squamous cells were determined as abnormal cervical cytology test.

Colposcopy index: Colposcopy is performed according to the relevant technical specifications, and colposcopic images are recorded and analyzed to make the proposed colposcopic diagnosis. Cervical transformation was distinguished into type I, type II and type III according to the colposcopic terminology published by the International Cervical Pathology and Colposcopy Consortium in 2011. The three main indicators used to determine colposcopic findings in this study were cervical columnar epithelial ectoplasia, cervical lesions to be excluded, and unsatisfactory colposcopic findings.

Colposcopic cervical biopsy: The pathological findings of colposcopic cervical biopsy used in this study were divided into four groups: chronic cervical inflammation group, cervical intraepithelial neoplasia group (CIN I), cervical intraepithelial neoplasia group II/III (CIN II/III), and infiltrating carcinoma group. Among them, CIN Ⅰ, CIN Ⅱ/Ⅲ and infiltrating carcinoma groups can be uniformly recorded as CIN lesion group.

2.4. Statistical Data Processing Methods

The data generated during this experiment were used to construct a database using Microsoft Excel software, while SPSS23.0 was applied for statistical analysis of the data in the database. All count data were expressed using (number of cases n, proportion %), while the χ^2 test was used for comparison between groups. All measurement data were expressed using (mean x ± standard deviation S), while t-test was used for independent sample analysis, and $P<0.05$ indicated that the statistical results were significantly different.

3. Results

3.1. Results of Basic Information of Included Patients on Cervical Lesions

The total number of cervical cancer screenings performed at our gynecology clinic from January 2019 to December 2022, presenting positive HR-HPV and negative cytology, referred to colposcopy and with cervical biopsy was 230 cases. A total of 125 patients were diagnosed with chronic cervical inflammation, 42 with CIN I, 39 with CIN II/III, and 24 with invasive cancer. The age of the patients was found to be between 20 and 60 years old for those diagnosed as HR-HPV positive and cytologically negative, accounting for 94.52% of the patients. The effect of fertility status and contraceptive status on cervical lesions in the included patients was statistically calculated, and the results are shown in Table 1.

Table 1 Effect of fertility status and contraceptive status on cervical lesions

Influence mode		Number of examples	Chronic cervicitis group	CIN lesion group	t	*P*
Fertility	Production	128	1.36±0.86	1.05±0.82	-1.701	0.055
	Pregnancy	102	2.35±1.26	2.61±1.38	-1.412	0.152
Contraceptive methods	Condoms	119	78.21±26.33	76.65±25.25	-1.215	0.124
	Contraceptives	45	56.21±12.06	61.45±15.12	1.652	0.136
	Surgical birth control	15	1.02±0.25	1.06±0.31	1.257	0.251
	Physical birth control	22	1.18±0.68	1.24±0.54	1.364	0.147
	No contraception	29	26.28±8.86	26.17±9.11	1.289	0.203

As can be seen from Table 1, the number of births and pregnancies in the patients under the chronic cervicitis group and the CIN lesion group, respectively, were tested using independent samples t. It was found that there was no significant difference between the two groups ($P>0.05$). In addition to this, there was no significant difference in the number of times that patients under the chronic cervicitis group used various forms of contraception or did not use contraception compared to the CIN lesion group ($P>0.05$).

3.2. HR-HPV Infection Classification Test Results

HPV testing was performed on all included patients before colposcopic cervical biopsy was performed. Among them, 159 patients were tested for HR-HPV classification and 71 patients were tested for HR-HPV quantification, and the results are shown in Table 2.

Table 2 HR-HPV classification test and quantitative test results

HPV testing		HPV-16 (n, %)	HPV-18 (n, %)	Other types (n, %)	Total Number of infections
Classification Testing	Single infection	(58, 92.06%)	(35, 92.11%)	(46, 79.31%)	139
	Mixed infections	(5, 7.94%)	(3, 7.89%)	(12, 20.69%)	20
	Number of infections	63	38	58	159
Quantitative Testing	Virus Low load capacity	(21, 70.00%)	(13, 56.52%)	(7, 38.89%)	41
	Virus Medium load capacity	(8, 26.67%)	(5, 21.74%)	(3, 16.67%)	16
	Virus High load capacity	(1, 3.335)	(5, 21.74%)	(8, 44.44%)	14
	Number of infections	30	23	18	71

As can be seen from Table 2, after the HR-HPV classification test was performed on 159 patients, no statistically significant differences were found in the data between the various types of infection (P>0.05). After quantitative HR-HPV testing in 71 patients, no statistically significant differences were found in the data between the various types of viral load (P>0.05).

3.3. Comparison of HR-HPV Classification Test and Colposcopy Diagnostic Results

HR-HPV classification tests were performed in 159 patients, and colposcopic diagnosis was also performed on them, and the results of the proposed colposcopic diagnosis for different HR-HPV infection types are shown in Table 3.

Table 3 HR-HPV classification test and colposcopic diagnosis results

HPV	Colposcopic diagnostic results (n, %)			Total number of infections
	Unsatisfactory colposcopy	Ectopic cervical columnar epithelium	Cervical lesions	
Single HPV-16 infection	(16, 28.57%)	(4, 17.39%)	(15, 25.00%)	35
Single HPV-18 infection	(23, 41.07%)	(16, 69.57%)	(38, 63.33%)	77
Single other infection	(17, 30.36%)	(3, 13.04%)	(7, 11.67%)	27
Total number of infections	56	23	60	139
Mixed HPV-16 infection	(2, 25.00%)	(1, 20.00%)	(2, 28.57%)	5
Mixed HPV-18 infection	(3, 37.50%)	(1, 20.00%)	(4, 57.14%)	8
Mixed other infections	(3, 37.50%)	(3, 60.00%)	(1, 14.29%)	7
Total number of infections	8	5	7	20

As can be seen from Table 3, comparing the three single test results, it was found that the detection rate of single HPV-18 infection was highest when the colposcopic diagnostic result was cervical lesion, with a statistically significant difference (P<0.05) compared to the other two single infections. When the colposcopic diagnosis was cervical columnar epithelial ectopic, the detection rate of single HPV-18 infection remained the highest, with a statistically significant difference compared to the detection rate of other types of infection (P<0.05). When the colposcopic diagnosis was unsatisfactory colposcopy, the difference in detection rate among the three was not significant (P>0.05).

3.4. Comparison of HR-HPV Quantitative Test and Colposcopy Diagnostic Results

Quantitative HR-HPV testing was performed in 71 patients, who were also diagnosed colposcopically, and the results of the proposed colposcopic diagnosis in different HR-HPV infection viral load groups are shown in Table 4.

Table 4 Quantitative HR-HPV testing and colposcopic diagnostic results

HPV load	Colposcopic diagnostic results (n, %)			Total number of infections
	Unsatisfactory colposcopy	Ectopic cervical columnar epithelium	Cervical lesions	
Low viral load	(5, 26.32%)	(16, 66.67%)	(9, 32.14%)	30
Viral midload	(8, 42.11%)	(3, 12.50%)	(4, 14.29%)	15
High virus load	(6, 31.57%)	(5, 20.83%)	(15, 53.57%)	26
Total infections	19	24	28	71

As can be seen from Table 4, when the colposcopic diagnosis was cervical lesions, the detection rate was highest in the high viral load group, which had a statistically significant difference ($P<0.05$) compared to the other two groups. When the colposcopic diagnostic result was cervical columnar epithelial ectoplasia, the detection rate was highest in the low viral load group, which had a statistically significant difference compared with the other two groups ($P<0.05$). When the colposcopic diagnosis was unsatisfactory colposcopy, the detection rates of the three groups with low viral load, medium viral load, and high viral load were not significantly different ($P>0.05$).

3.5. Comparison of HR-HPV Infection Type and Pathological Diagnostic Results of Colposcopic Biopsy

HR-HPV classification test was performed on 159 patients, and cervical biopsy pathology diagnosis was also performed on them, and the results of cervical biopsy pathology diagnosis under different HR-HPV infection types are shown in Table 5.

Table 5 Results of HR-HPV classification test and cervical biopsy pathology diagnosis

HPV	Pathological findings (n, %)			Total number of infections
	Chronic cervicitis	CIN lesions	Infiltrating cancer	
Single HPV-16 infection	(17, 44.74%)	(9, 23.68%)	(12, 31.58%)	38
Single HPV-18 infection	(12, 57.14%)	(6, 28.57%)	(3, 14.29%)	21
Single other infection	(53, 66.25%)	(35, 43.75%)	(2, 2.50%)	80
Total	72	50	17	139
Mixed HPV-16 infection	(5, 71.44%)	(1, 14.28%)	(1, 14.28%)	7
Mixed HPV-18 infection	(3, 37.50%)	(3, 37.50%)	(2, 25.00%)	8
Mixed other infections	(3, 60.00%)	(1, 20.00%)	(1, 20.00%)	5
Total	11	5	4	20

As can be seen from Table 5, comparing the percentage of three different pathological findings in different types of single infections separately, it was found that in chronic cervicitis, the highest

detection rate was 66.25% for single other infections and there was no statistically significant difference in the detection rate values for the three infections (P>0.05). In CIN lesions, the detection rate of single other infection remained the highest at 66.25%, with no statistically significant difference in the detection rate values compared to the other two single infections (P>0.05). In infiltrating carcinoma, the detection rate of single HPV-16 infection was significantly higher than the other two groups, with a statistically significant difference in the detection rate value compared to single other infection (P<0.05).

3.6. Comparison of HR-HPV Viral Load and Pathological Diagnostic Results of Colposcopic Biopsy

Quantitative HR-HPV testing was performed in 71 patients, and cervical biopsy pathology diagnosis was also performed on them, and the results of cervical biopsy pathology diagnosis under different HR-HPV infection viral load groups are shown in Table 6.

Table 6 Results of HR-HPV quantitative testing and cervical biopsy pathology diagnosis

HPV load	Colposcopic diagnostic results (n, %)			Total number of infections
	Chronic cervicitis	CIN lesions	Infiltrating cancer	
Low viral load	(25, 75.76%)	(7, 21.88%)	(1, 16.67%)	33
Viral midload	(3, 9.09%)	(12, 37.50%)	(4, 66.66%)	19
High virus load	(5, 15.15%)	(13, 40.62%)	(1, 16.67%)	19
Total infections	33	32	6	71

As shown in Table 6, in chronic cervicitis, the highest detection rate was 75.76% in the low viral load group, with statistically significant differences in the detection rate values compared to the other two groups (P<0.05). In CIN lesions, there was no statistically significant difference in the detection rate values among the three viral load groups (P>0.05). In infiltrating carcinoma, the detection rate was significantly higher in the viral midload group than in the other two groups, and their detection rate values were statistically significantly different compared with the other two groups (P<0.05).

3.7. Comparison of Colposcopic Diagnostic Results with Cervical Biopsy Pathological Findings

Based on the results of cervical biopsy pathology, the total number of cases that finally met the requirements was 103 out of 230 colposcopic examinations, and the overall colposcopic diagnostic compliance rate was 44.78% (103/230). The comparative analysis of colposcopic diagnostic results with cervical biopsy pathology results is shown in Table 7.

As can be seen in Table 7, a comparative analysis of the type of colposcopic diagnosis with the pathological findings of cervical biopsy revealed a compliance rate of 48.81% for colposcopic diagnosis of cervical lesions and 65.26% for colposcopic diagnosis of cervical columnar epithelial ectoplasia, while unsatisfactory colposcopic diagnosis could not be assessed for diagnostic accuracy. Comparing the diagnostic compliance rates of cervical lesions and cervical columnar epithelial ectoplasia, a statistically significant difference was found (P<0.05).

Table 7 Comparison of colposcopic diagnostic results with cervical biopsy pathology

Types of colposcopy diagnosis	Diagnostic pathology results of cervical biopsy			Total number of infections n	Compliance rate %
	Chronic cervicitis	CIN lesions	Infiltrating cancer		
Unsatisfactory colposcopy	39	10	2	51	/
Ectopic cervical columnar epithelium	62	29	4	95	65.26%
Cervical lesions	43	38	3	84	48.81%
Total	144	77	9	230	44.78%

3.8. Comparison of Conversion Zone Type and Cervical Biopsy Pathological Diagnosis Results

The cervical biopsy pathology control under different colposcopic transformation zones is shown in Table 8.

Table 8 Comparison of each transformation zone type with cervical biopsy pathology

Transformation zone type	Colposcopy for consultation	Number of Patients	Pathological findings (number)		Compliance rate (%)
			Chronic cervicitis	CIN and above	
Type I	Ectopic cervical columnar epithelium	37	27	10	66.67
	Possible cervical lesions	35	14	21	
	Unsatisfactory colposcopy	0	0	0	
Type II	Ectopic cervical columnar epithelium	39	24	15	54.67
	Possible cervical lesions	30	13	17	
	Unsatisfactory colposcopy	6	2	4	
Type III	Ectopic cervical columnar epithelium	8	6	2	22.89
	Possible cervical lesions	16	3	13	
	Unsatisfactory colposcopy	59	31	28	

As shown in Table 8, the compliance rate of the proposed colposcopic findings was 64.23% for patients in the type I transformation zone; 54.67% for patients in the type II transformation zone; and 22.89% for patients in the type III transformation zone. Comparing the compliance rates, we found that the differences among the conversion zones were significant ($P<0.05$). The accuracy of colposcopic fitting was further analyzed by comparing the sensitivity and specificity of colposcopic fitting in different transformation zones, and the results are shown in Figure 1.

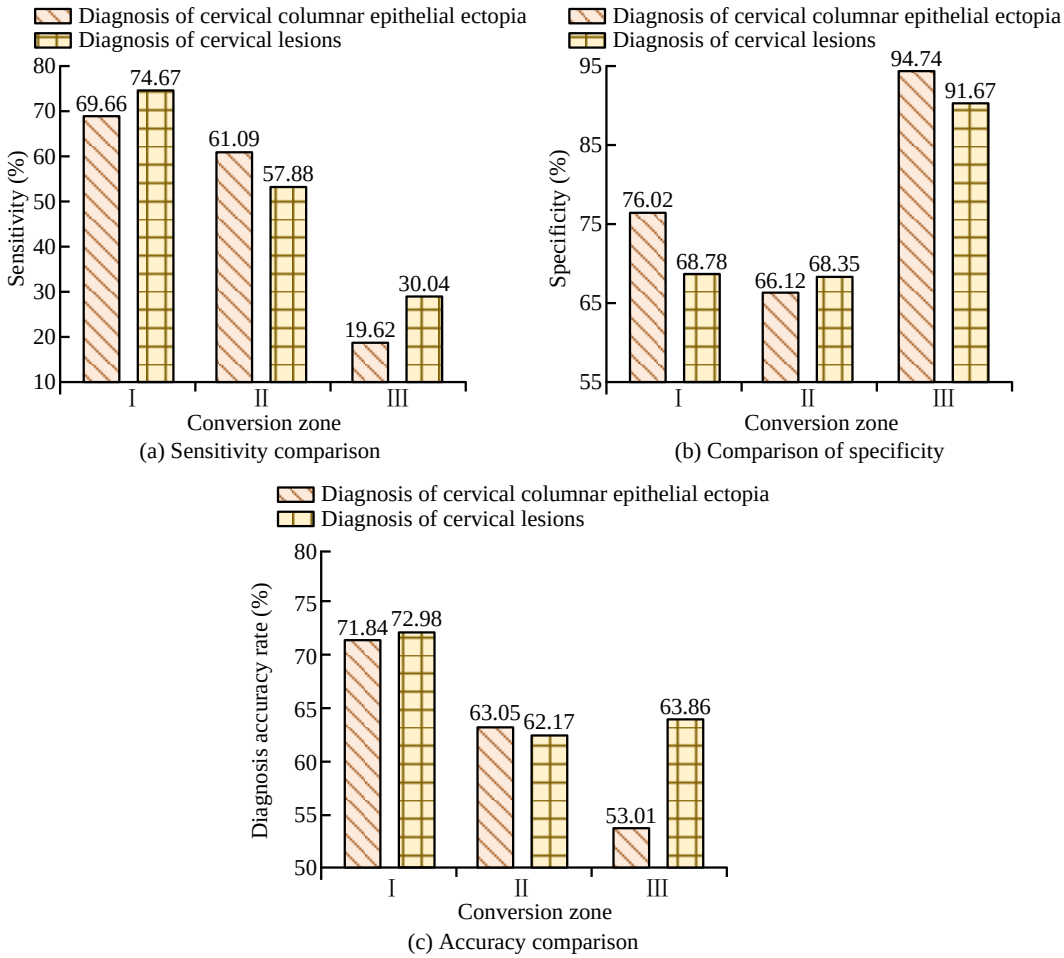

Figure 1 Comparison of sensitivity, specificity and accuracy of colposcopy fitting

As shown in Figure 1(a), when the proposed diagnosis results in cervical columnar epithelial ectopic or cervical lesion, the sensitivity of type I transformation zone is the highest and the sensitivity of type III transformation zone is the lowest. As shown in Figure 1(b), when the proposed diagnosis results in cervical columnar epithelial ectopic or cervical lesions, the type III transformation zone has the highest specificity and the type II has the lowest. As shown in Figure 1(c), when the proposed result was cervical columnar epithelial ectopic, the type I transformation zone had the highest proposed accuracy and the type III had the lowest; when the proposed result was cervical lesion, the type I transformation zone had the highest proposed accuracy and the type II had the lowest.

3.9. Analysis of the Relevance of Colposcopy in the Diagnosis of Cervical Disease

Further analysis of the factors associated with the influence of colposcopic compliance was performed and the results are shown in Table 9.

As shown in Table 9, univariate analyses were performed by examining patients' cervical transformation zone type, contraceptive method, age, HPV infection type, HPV viral load and reproductive history. The results showed that the type of cervical transformation zone and HPV viral load had a significant correlation ($P<0.05$) on the accuracy of colposcopy fitting.

Table 9 Correlation analysis of colposcopic compliance rates

Related Influencing Factors		Number of Patients	Colposcopy and cervical biopsy pathology (number)		*P*-value
			Conformity	Does not meet	
Cervical transformation zone	Type I/II	147	92	55	0.000
	Type III	83	19	64	
Contraceptive methods	Condoms	90	41	49	0.836
	Non-condom	132	62	70	
Age	<40 years old	117	64	53	0.637
	≧40 years old	113	48	65	
HPV type	Model 16/18	48	19	29	0.541
	Non-16/18 type	73	33	40	
HPV viral load	Low load capacity	64	39	25	0.016
	Medium and high load capacity	34	12	22	
Fertility history	There are	201	93	108	0.799
	None	23	10	13	

4. Discussion(2500~3000)

A variety of HPV detection techniques are currently available in the clinic, the most common of which are nucleic acid hybridization detection techniques and polymerase chain reaction [8-9]. Among the nucleic acid hybridization assays, Hybrid Capture II Test (HC2), one of the representative technologies, was approved by FDA as the first semi-quantitative HPV DNA assay in the clinic. This technology can detect 13 types of HR-HPV at the molecular level, with high sensitivity and reproducibility, but also has disadvantages such as inability to accurately identify HPV subtypes [10-11]. For quantitative HPV detection, the theory is that the higher the HPV viral load, the more rapidly the DNA replicates in the organism, and it is difficult to clear HPV infection by the organism's own immune mechanism. Therefore, the likelihood of cervical lesions in human body increases based on high HPV carrying capacity [12]. Based on the above theory, clinical studies have used HPV viral load as a clinical indicator of cervical lesions. Studies have also concluded through retrospective analysis that there is a positive correlation between cervical lesions and HPV viral load. However, the same has been confirmed for the lack of significant association between the two [13-14]. The study compared HR-HPV viral load at each grade with various histopathologies of the cervix and the results did not show a statistically significant association between viral load and the probability of developing CIN lesions in the cervix ($P>0.05$). The study examined the distribution of each viral load group by three colposcopes and found that the rate of cervical lesions was significantly higher in the high viral load group than in the low viral load group ($P<0.05$); when the study used colposcopy to examine cervical columnar epithelial ectoplasia, it was found that the low viral load group had the highest percentage, which was significantly different from both the medium and high load groups ($P<0.05$). The results of this study suggest that the probability of CIN lesions was higher in the medium- and high-load groups and that colposcopy was more accurate in the case of high viral load. medium- and high-viral load of HPV may have a high guiding value in clinical practice, but the data samples analyzed in the study were relatively small and the correlation between the probability of cervical lesions and HPV viral load still needs to be explored in more depth.

The HPV classification test is a representative PCR test that detects 18 high-risk and 6 low-risk HPV subtypes, and is also widely used in clinical settings [15-16]. Since it can identify specific HPV subtypes, it can be used to determine the conversion of HPV infection after follow-up or treatment, the presence of persistent infection or new infection by comparing the change of HPV infection types before and after treatment, and thus can indirectly predict the risk of cervical cancer, thus providing risk stratification management for HPV-infected people and developing more individualized and rational diagnosis. This provides a theoretical basis for risk stratification and the development of more individualized, rationalized diagnoses for HPV-infected populations, as well as for treatment options [17-18]. The type of HPV infection varies from country to country and region to region. The study was conducted in HPV typing test for common HPV subtypes in China. In the study, the prevalence of HR-HPV 16/18 reached 63.52% and 36.48% for other infection types, with a difference of 27.04% between them. Among the single infection types, HPV type 16 had the highest number of infections, followed by type 18, 52, 58, and 56, respectively, and the above results also meet the common HPV subtypes in our country [19]. Using the results of cervical biopsies as a criterion, the highest probability of causing CIN lesions was for non-HPV 16/18 types, which caused lesions with a probability of 43.75%; HPV-16 whose probability of causing lesions reached 23.68%; and finally, HPV-18 which caused lesions with a probability of 28.57%. The detection rate of HR-HPV 16/18 was found to be significantly higher than other infectious types in cervical invasive cancer tissues ($P<0.05$).

In recent years, scholars at home and abroad have conducted a large number of experiments on Pap smear method, and the results show that the method has a high false negative rate. At present, cervical cytology has been replaced by the new Pap smear liquid-based cytology technique, which can effectively solve the problems of leakage and underdiagnosis caused by overlapping cells, and apply the descriptive diagnostic system of TBS, which has greatly improved the incidence of early cervical lesions and reduced the incidence of cervical diseases [20]. However, TCT has its own drawbacks because the principle of TCT is to determine the pathological changes of the cervix based on the morphological changes of the cells in the cervix, which is highly dependent on the quality of the film and the skill of the reader and can easily lead to wrong diagnosis. It has been documented that its sensitivity and specificity varies widely among laboratories. The study tested 230 patients who were cytology negative and HR-PHV positive. Among the cervical biopsy pathology results, there were 125 patients with chronic cervicitis and the rest had varying degrees of cervical pathology, including 42 cases of CIN I lesions, 39 cases of CIN II/III lesions and 24 cases of invasive carcinoma. If economic and medical conditions allow, it is better to combine it with other tests such as HPV and colposcopy and avoid using a single cervical cytology as the main means of cervical cancer screening.

The diagnosis of high-risk PHV is based on etiology, which has a high specificity, but its positivity does not mean that there is a lesion in the cervix. Cervical cytology, on the other hand, is morphologically based and can determine the presence of cervical lesions through the observation of cervical cell morphology, thus largely compensating for the shortcomings of the former method. In response to abnormal screening results, which are a challenge encountered during clinical treatment, the study recommended direct colposcopy for the proposed diagnosis. HR-HPV classification test was performed in 159 patients, while cervical biopsies were performed for pathological diagnosis, comparing the percentage of three different pathological findings in different types of single infections, respectively, and it was found that in chronic cervicitis, the highest detection rate of single other infections was 66.25%, with no statistically significant difference in the detection rate values of the three infections ($P>0.05$). In CIN lesions, the detection rate of single other infection remained the highest at 66.25%, with no statistically significant difference in the detection rate values compared to the other two single infections ($P>0.05$). In

invasive carcinoma, the detection rate of single HPV-16 infection was significantly higher than the other two groups, with a statistically significant difference in the detection rate value compared to single other infection (P<0.05). The study found that the medium and high viral load groups were more likely to develop CIN lesions by comparing the pathological findings of each viral load group. Colposcopic findings varied by viral load, with our proposed colposcopic examination being more inclined to cervical columnar epithelial ectoplasia when the viral load was less than 100 RLU/C0, while when the viral load was greater than 1000 RLU/C0, the proposed colposcopic examination was likely to be inclined to cervical lesions. In conclusion, in our study center, non-HPV 16/18 persistently infected patients or those with slightly higher viral load should also be referred for colposcopy as early as possible, and clinical management of such patients should not be neglected to minimize the possibility of missing cervical carcinoma.

To sum up, cervical cancer is a common malignant tumor with a high incidence rate and a young trend in recent years. In order to reduce the incidence rate of cervical cancer, it is necessary to strengthen the screening of cervical cancer and cervical lesions, detect and treat them as soon as possible. Among them, pathological biopsy under colposcopy is an effective method for screening and diagnosing cervical lesions and early cervical cancer. It can clearly display the condition of the lesion, assist in disease diagnosis, and provide a basis for formulating feasible treatment plans, which is worthy of promotion and reference.

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If any, should be placed before the references section without numbering.

Data Availability

The datasets used during the current study are available from the corresponding author on reasonable request.

Conflict of Interest

The author states that this article has no conflict of interest.

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