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Application Analysis of High Risk HPV Detection Combined with Cervical Cytology, Colposcopy and Pathology in Cervical Lesions of Women in Tiandeng County

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ABSTRACT

Purpose: To understand the application of high-risk HPV detection combined with cervical cytology, colposcopy and pathology in cervical lesions of women in Tiandeng County. Method: Women in the outpatient and inpatient departments of our hospital from January 2021 to October 2022 were collected for high-risk HPV testing, TCT, colposcopy and pathological examination according to their personal wishes, to understand the application of relevant examinations in cervical lesions. Result: In 2021, the number of patients was 5801, among whom 1743 patients had received cervical cancer examination in the past, accounting for 30.05% of the total number of patients, and 5795 who had volunteered for TCT examination this time, accounting for 99.90% of the total; A total of 289 cases of atypical squamous cells with unclear significance (ASC-US) were detected, excluding 11 cases of high-grade squamous intraepithelial lesions (ASC-H), 122 cases of low-grade squamous intraepithelial lesions (LSIL), 16 cases of high-grade squamous intraepithelial lesions (HSIL), 2 cases of squamous cell carcinoma (SCC), and 4 cases of atypical adenocyte (AGC); Atypical cervical adenocytosis and cervical carcinoma in situ were not detected. The number of people who volunteered for high-risk HPV testing was 4237, and the number of positive

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cases was 740, accounting for 17.47% of the screening population; Among 740 HPV-positive patients, 488 high-risk HPV-positive patients were selected for TCT examination, and 87 patients were found to be TCT positive; From 401 high-risk HPV-positive and TCT negative patients, 287 patients with possible lesions were screened out for colposcopy; The results showed that 60 patients may have certain cervical lesions and need further pathological examination and the results showed that 28 patients had CTN1 and 18 patients had CIN2 - 3. In 2022, 8840 patients received medical treatment, among which 3188 patients had received cervical cancer examination in the past, accounting for 36.06% of the total number of patients, and 8314 patients voluntarily underwent TCT examination, accounting for 94.05% of the total number of patients. 434 cases of atypical squamous cells with ambiguous meaning (ASC-US) were detected, excluding 13 cases of high-grade squamous intraepithelial lesions (ASC-H), 217 cases of low-grade squamous intraepithelial lesions (LSIL), 35 cases of high-grade squamous intraepithelial lesions (HSIL), 1 case of squamous cell carcinoma, and 4 cases of atypical adenocarcinoma (AGC); Atypical cervical adenocytosis and cervical carcinoma in situ were not detected. The number of volunteers for high-risk HPV testing was 3871 cases, and the number of positive cases was 654 cases, accounting for 16.89% of the screening number. 527 high-risk HPV-positive patients were selected from 654 HPV-positive patients for TCT examination, and the number of TCT-positive patients was found to be 49. From 478 high-risk HPV-positive patients with TCT negative, 276 patients with possible lesions were screened out for colposcopy; The results showed that 66 patients may have certain cervical lesions and need further pathological examination; and then the results showed that 31 cases of CTN1 and 6 cases of CIN2 - 3. Conclusion: Gynecological high-risk HPV examination can provide better etiological sources for cervical cancer screening; Cervical cytology examination has high sensitivity; Colposcopy examination has high specificity; Pathological examination can be used as an effective supplement for cervical cytology examination and colposcopy; So high-risk HPV combined with cytology examination, colposcopy examination and pathological examination has high clinical application value; It is worth popularizing and applying.

1. BACKGROUND INTRODUCTION

Cervical cytology usually refers to cervical TCT examination and high-risk HPV examination [1, 2]. The cervical exfoliated cells were examined to find whether the cervix had lesions or whether the cervical epithelium had HPV infection. It is generally recommended to conduct cervical cancer screening once a year, which can help us understand cervical lesions [3, 4]. If there are lesions, timely clinical intervention can prevent the occurrence of cervical cancer. Because so far, scientific research shows that the occurrence of cervical cancer is mainly caused by high-risk HPV infection [5]. Therefore, it should be checked once a year. If high-risk HPV infection is found, appropriate intervention or regular review should be given clinically. Cervical cytology is the cell in the cervical squamous column junction area, which is the main basis for observing whether the cervix has lesions [6-8]; For example, whether there are precancerous lesions, atypical hyperplasia, cancer or inflammation [9-11]; cervical cytology is only a screening test, and further colposcopy cervical biopsy is needed to confirm whether there is cervical lesion; if high-level lesions are found, conization surgery is required for cervical lesions [12]; In order to understand the cervical lesions of women in Tiandeng County, this study used cervical cytology (TCT) combined with high-risk HPV de-

tection to analyze cervical lesions. The results are reported as follows.

2. DATA AND METHODS

2.1. Research Objects

Collect the women who visited our outpatient and inpatient departments from January 2021 to October 2022 for cervical cytology according to their personal wishes. In 2021, there were 5801 patients, 1743 of whom had been examined for cervical cancer in the past, accounting for 30.05% of the total, and 5795 patients who have volunteered for TCT examination this time, accounting for 99.90% of the total; In 2022, 8840 patients received medical treatment, among which 3188 patients had received cervical cancer examination in the past, accounting for 36.06% of the total number of patients examined, and 8314 patients voluntarily underwent TCT examination this time, accounting for 94.05% of the total number examined; The specific results are shown in Table 1 below. All cases were discussed and approved by the Medical Ethics Committee of the hospital and approved by the patients themselves.

2.2. Research Method

2.2.1. Cervical Cytology

The test subject must be in the non-menstrual period when taking samples; sexual life, vaginal lavage and medication are prohibited within 24 hours before the collection of samples. Clean the secretions on the cervical surface of the subject; place the sampling brush into the cervical tube through the cervical opening until only the brush hair at the bottom is exposed to the external opening of the cervix; then slowly rotate the sampling brush 360 degrees in the same direction for 5 cycles and stay for several seconds; take out the brush and place the sampling brush head in the cell preservation solution provided by Hangzhou Haishijia Biotechnology Co., Ltd. for preservation; then make marks and send it to the cell room of Guangxi Jinyu Inspection Center; The preservation solution is subjected to shock treatment and then sectioned, and then is artificially stained and observed under a microscope.

2.2.2. High-Risk HPV Detection

The subject should avoid menstruation, and should not have sex, vaginal lavage or medication within 24 hours before collecting the specimen. The equipment for taking specimens must be sterile and dry, the vulval and cervical surface secretions should be wiped with a sterile cotton swab, and the special sampling brush provided by Shanghai Toujing Diagnostic Technology Co., Ltd. should be placed on the cervical opening to gently rotate 5 times clockwise to collect cervical exfoliated cells and cervical secretions. The sampling brush head should be placed in the special cell preservation solution for preservation, and the tube cap should be tightly screwed and marked; Then they were sent to Guangxi Jinyu Test Center for detection, and the test methods of PCR and flow fluorescence hybridization typing were used for detection.

Table 1. Comparison of the number of people examined in each category in 2021 and 2022.

Annual	Number of people inspected	Number of people who have been examined for cervical cancer in the past	Number of volunteers for TCT inspection
2021	5801	1743	5795
2022	8840	3188	8314
χ^2	1261.5970	28.4431	6.2899
P	0.0000	0.0000	0.0121

2.3. Statistical Analysis

SPSS24.0 version was used for statistical analysis, and the number of cases related to annual cervical cytology and high-risk HPV detection was compared by χ^2 Test; $P < 0.05$ was considered to be statistically significant.

3. RESULTS

3.1. Inspection Situation of Each Indicator in 2021

3.1.1. TCT Inspection Results in 2021

In 2021, among 5795 patients who underwent voluntary TCT examination, 289 cases of atypical squamous cells with unclear significance (ASC-US) were detected, excluding 11 cases of high-grade squamous intraepithelial lesions (ASC-H), 122 cases of low-grade squamous intraepithelial lesions (LSIL), and 16 cases of high-grade squamous intraepithelial lesions (HSIL); There were 2 cases of SCC in squamous cell carcinoma and 4 cases of atypical glandular cell AGC. No atypical cervical gland cell tendency to neoplasia and cervical carcinoma in situ were detected.

3.1.2. Results of HPV Combined with TCT, Colposcopy and Pathological Examination in 2021

In 2021, there were 4237 cases of high-risk HPV testing voluntarily, and 740 cases of high-risk HPV positive, accounting for 17.47% of the screening population; We screened out 488 high-risk HPV-positive patients from 740 HPV-positive patients for TCT detection, and 87 patients were found to be TCT-positive. From 401 TCT-negative patients with high-risk HPV-positive, 287 patients with possible lesions were screened out for colposcopy; and the results showed that 60 patients with possible cervical lesions needed further pathological examination; then the results showed that 28 patients had CTN1 and 18 patients had CIN2 - 3.

3.2. The Inspection Situation of Each Indicator in 2022

3.2.1. TCT Inspection Results in 2022

In 2022, among the 8314 patients who underwent voluntary TCT examination, 434 cases of atypical squamous cells were detected, with ambiguous significance (ASC-US), excluding 13 cases of high-grade squamous intraepithelial lesions (ASC-H), 217 cases of low-grade squamous intraepithelial lesions (LSIL), and 35 cases of high-grade squamous intraepithelial lesions (HSIL); there was 1 case with squamous cell carcinoma SCC and 4 cases with atypical glandular cell AGC; No atypical cervical gland cell tendency to neoplasia and cervical carcinoma in situ were detected.

3.2.2. Results of HPV Combined with TCT, Colposcopy and Pathological Examination in 2021

In 2022, 3871 cases were voluntarily tested for high-risk HPV, and 654 cases were positive for high-risk HPV, accounting for 16.89% of the screening population. 527 high-risk HPV-positive patients were screened out from 654 HPV-positive patients for TCT detection, and 49 patients were found to be TCT-positive. From 478 high-risk HPV-positive patients with TCT-negative, 276 patients with possible lesions were screened out for colposcopy; then the results showed that 66 patients had certain cervical lesions and needed further pathological examination; and the results showed that 31 patients had CTN1 and 6 patients had CIN2 - 3.

3.3. Comparison of Inspection Results of Various Indicators in 2021 and 2022

See Tables 2-5 below for details.

4. DISCUSSION

Cervical cancer is the most common malignant tumor of female reproductive tract. Clinical statistics show that the age of high incidence of carcinoma in situ is 30 - 35 years old, and the age of invasive cancer

Table 2. Comparison of TBS classification results of cervical cytology in 2021 and 2022.

Annual	Number of volunteers for TCT inspection	Atypical squamous epithelial cells with unclear significance (ASC-US)	Excluding highly squamous intraepithelial lesions (ASC-H)	Low-grade squamous intraepithelial lesion (LSIL)	High-grade squamous intraepithelial lesions (HSIL)	Squamous cell carcinoma SCC	atypical glandular cell AGC	Atypical cervical duct gland cells are prone to neoplasia	Cervical canal carcinoma in situ
In 2021	5795	289	11	122	16	2	4	0	0
In 2022	8314	434	13	217	35	1	4	0	0
χ^2	899.4771	0.3815	0.2251	3.7107	1.9900	0.0988	0.0245	-	-
P	0.0000	0.5368	0.6352	0.0541	0.1583	0.7533	0.8757	-	-

Table 3. Comparison of HPV detection results in 2021 and 2022.

Annual	Person-time of inspection	HPV-positive	HPV-negative
In 2021	4237	740	3497
In 2022	3871	654	3217
χ^2	33.0429	0.4622	
P	0.0000	0.4966	

Table 4. Comparison of positive TCT detected from HPV positive in 2021 and 2022.

Annual	HPV+	TCT+	TCT−
In 2021	488	87	401
In 2022	527	49	478
χ^2	8.1185	7.6069	17.4066
P	0.0044	0.0058	0.0000

Table 5. Comparison of colposcopy and pathology results in HPV-positive and TCT-negative cases in 2021 and 2022.

Annual	Person-time of inspection	Person time of colposcopy examination	Person time of pathological examination	CIN1	CIN2 - 3
In 2021	401	287	60	28	18
In 2022	478	276	66	31	6
χ^2	13.4903	18.1151	0.2369	0.0861	8.5850
P	0.0002	0.0000	0.6264	0.7692	0.0034

is 45 - 55 years old; Cervical cancer has a trend of younger development [13, 14]. There are no obvious symptoms in the early stage of cervical cancer. With the development of the disease, patients will gradually experience vaginal discharge, bleeding and other symptoms, which directly threaten their life safety, so early diagnosis and treatment are very important [15]. In recent years, cervical cytological screening has been widely used to detect precancerous lesions at an early stage, so that patients can receive treatment as early as possible and improve the diagnostic and examination effect [16-18]. At present, in the process of cervical cancer screening, cervical cytology plus HPV and colposcopy have become the main inspection means. In order to improve the accuracy of cervical cancer screening, clinical diagnosis should be combined with cervical cytology and HPV combined with colposcopy to further improve the accuracy of judgment and provide basis for clinical diagnosis [19, 20].

With the influence of people's living habits, geographical environment and other factors, the incidence rate of cervical cancer has increased, making it the most common malignant tumor in gynecology at present, which has a serious impact on the physical and mental health and life safety of patients [21]. The early clinical symptoms of cervical cancer are atypical and easy to be ignored during clinical examination. When symptoms are found, the patient's condition has reached a more serious stage. Therefore, strengthening the early screening and diagnosis of cervical cancer plays an important role in reducing the incidence rate and mortality of cervical cancer [22, 23]. Clinically, there is no systematic study on the predisposing factors of cervical cancer, but persistent infection of high-risk HPV is closely related to it. At present, in the screening and diagnosis of cervical cancer, cervical cytology and colposcopy are the most commonly used inspection methods, but different inspection and diagnosis methods have different effects [24]. Clinical practice shows that cervical cytology combined with HPV and colposcopy has important guiding significance in screening and diagnosis of cervical cancer [25, 26].

The results of this study showed that in the 5795 cases of voluntary TCT screening in 2021, there were 444 cases of positive TCT, accounting for 7.66% of the total number of screening. In 4237 cases of voluntary high-risk HPV testing, 740 cases were detected positive for high-risk HPV, accounting for 17.47% of the total number of screening; From 488 high-risk HPV positive cases, 87 cases were found to be TCT positive, accounting for 17.83% of the total number of screened cases. 287 cases were screened from 401 high-risk HPV-positive and TCT-negative cases for colposcopy; and the results showed that 60 cases had cervical lesions, accounting for 20.91% of the screening population; Further pathological examination showed that 28 cases were CTN1, accounting for 46.67%; There were 18 cases of CIN2 - 3, accounting for 30%, and the total detection rate was 76.67%. In 2022, among the 8314 patients who voluntarily underwent TCT examination, 704 cases were TCT positive, accounting for 8.47% of the total number screened. The number of people who volunteered for high-risk HPV testing was 3871, and 654 were high-risk HPV-positive, accounting for 16.89% of the screening population; Among 478 high-risk HPV-positive and TCT-negative patients, 276 patients were screened for colposcopy; The results showed that 66 patients had certain cervical lesions, accounting for 23.91% of the screening population; And the further pathological examination was needed; Then the results showed that 31 patients had CTN1, accounting for 46.97%, and 6 patients had CIN2 - 3, accounting for 9.09%; The total detection rate was 56.06%.

The results of this study also found that, compared with the examination results of various indicators in 2021 and 2022, there was no significant difference in the types of other lesions ($P > 0.05$), except for the comparison of the number of examiners which was statistically significant ($P < 0.05$) in the results of TCT examination and HPV examination; This indicated that the incidence of various types of lesions detected by TCT in the two years was consistent. The difference between TCT-positive cases and negative cases detected from HPV-positive cases was statistically significant ($P < 0.05$), which showed that the results of TCT-positive cases detected from high-risk HPV-positive cases in two years were inconsistent; The detection rate was high in 2021 and low in 2022, which may be related to the people's increasing attention to the disease and the incidence of the disease had gradually decreased; However, in HPV-positive and TCT-negative cases, colposcopy and pathological examination showed that there was no statistically significant difference between the number of pathological examinations and CTN1 results ($P > 0.05$), and other indicators were statistically significant ($P < 0.05$). As can be seen from the data results, the number of screen-

ing decreased in 2021 and increased in 2022, and the value of people's desire for health increased. In terms of the detection rate of lesions, the detection rate in 2022 is relatively low, and the number of people who need further colposcopy and pathological examination is relatively small. In the two years, the proportion of CTN1 with mild lesions detected by pathology is consistent, while the proportion of CIN2 - 3 with severe lesions detected by pathology in 2022 is small, which means that the number of people with severe diseases is small and the degree of health is relatively high.

5. CONCLUSION

In conclusion, gynecological high-risk HPV examination can provide better etiological sources for cervical cancer screening; Cervical cytology examination has high sensitivity and colposcopy examination has high specificity; Pathological examination can be used as an effective supplement for cervical cytology examination and colposcopy. Therefore, high-risk HPV combined with cytology examination, colposcopy examination and pathological examination has high clinical application value and is worth popularizing.

LIMITATIONS OF THE STUDY

In this study, although a large number of people were screened by TCT, they were not all screened for high-risk HPV, so some patients were still at risk of infection with high-risk HPV, so there were some limitations. In addition, for many high-risk cervical cancer patients screened in this study, due to the limitation of time and space, only part of the patients could be followed up in this study, and not all of them could be followed up as enrolled cases, so there are certain limitations. It is hoped that it can be more perfect in the future research.

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CONFLICTS OF INTEREST

For the publication of this paper, all members of the research team hereby declare that there is no conflict of interest in the ranking order among the authors.

REFERENCES

1. Yang, R., Dong, X.F., Zhao, Y. and Niu, Y.X. (2022) Analysis of Cervical Cytology and HPV Detection Results of Women in Jinan. *South China Preventive Medicine*, **48**, 351-354.
2. Luo, Y.J. and Zhu, J. (2021) Study on the Application Value of Cervical Liquid Based Cytology Combined with Cervical Biopsy in Cervical Cancer Screening. *Guizhou Medicine*, **45**, 1875-1876.
3. Fan, S.F., Zhao, Q. and Li, J.W. (2021) Analysis of the Clinical Value of Cervical Cytology Combined with Colposcopy in Screening Cervical Cancer in Outpatient Clinics. *Smart Health*, **7**, 7-9.
4. Hu, L.F. (2021) Application Value of Liquid Based Thin Layer Cytology in Gynecological Cervical Cytology Screening. *Heilongjiang Science*, **12**, 56-57.
5. Sun, W.Y. (2021) Analysis of the Difference between Cervical Cytology and Colposcopy Biopsy Pathology in

Cervical Lesions. Qingdao University, Qingdao.

6. Lan, L.F. and Yi, W.J. (2020) The Significance of Cervical Cytology and Human Papillomavirus Detection in Screening Cervical Lesions. *Journal of Armed Police Logistics College* (*Medical Edition*), **29**, 49-51.
7. Li, X.Y. (2020) Observing the Clinical Diagnostic Value of Cervical Cytology Combined with Colposcopy in Cervical Cancer Screening. *Medical Diet and Health*, **18**, 167-168.
8. Zhang, Y.Y. (2020) The Application Value of Cervical Liquid Based Cytology and High-Risk HPV Detection in Early Screening of Cervical Precancerous Lesions Complicated with Infection. *Practical Gynecological Endocrinnology Electronic Journal*, **7**, 137+141.
9. Li, S.F., Li, G.H. and Ye, Y.X. (2019) Diagnostic Value of Cervical Cytology Combined with HPV and Colposcopy in Cervical Cancer Screening. *Heilongjiang Traditional Chinese Medicine*, **48**, 177-178.
10. Li, X.M. (2019) Diagnostic Value of Cervical Cytology Combined with Colposcopy in Cervical Cancer Screening. *Practical Gynecological Endocrinology Electronic Journal*, **6**, 137.
11. Zhang, X.C. (2019) Diagnostic Value of Cervical Cytology Combined with Vaginal Examination in Cervical Cancer Screening. *Women's Health Research at Home and Abroad*, No. 23, 182-183.
12. Chao, H.D. (2019) Clinical Analysis of 1060 Cases of Cytological Negative/High-Risk HPV Positive Cervical Cancer and Precancerous Lesions. Zhejiang University, Hangzhou.
13. Munav, K. (2018) Clinical Value of Liquid Based Cytology in Cervical Screening for Cervical Lesions. *Women's Health Research at Home and Abroad*, No. 20, 61+90.
14. Feng, S.L., Zhang, X.L. and Tao, F. (2018) The Value of Colposcopy and Cervical Cytology in High-Risk Groups of Cervical Cancer. *China Continuing Medical Education*, **10**, 87-88.
15. Roz, N. (2018) Clinical Value of Cervical Cell DNA Ploidy Analysis Combined with Liquid-Based Cytology in Screening Cervical Lesion. Xinjiang Medical University, Ürümqi.
16. Su, P. (2018) The Clinical Significance of Cervical Cytology Combined with Colposcopy Targeted Biopsy for Early Cervical Cancer Screening. *Electronic Journal of Clinical Medicine Literature*, **5**, 4+6.
17. Huang, Y. (2018) The Clinical Value of Cervical Cytology Combined with Colposcopy in Cervical Cancer Screening. *Chinese and Foreign Medical Treatment*, **37**, 34-35+171.
18. Lin, M.H. (2017) Application Value of Liquid Based Cytology Combined with DNA Quantitative Analysis in Female Cervical Lesions. *Journal of Clinical Rational Medicine*, **10**, 143-144.
19. Ren, M.L. (2017) Comparative Analysis of Cervical Liquid Based Cytology and High-Risk HPV Detection for Early Screening of Cervical Precancerous Lesions. *Electronic Journal of Clinical Medicine Literature*, **4**, 17106.
20. Liang, L.X. (2017) Clinical Application of Cervical Cytology Combined with Colposcopy in Cervical Cancer Screening. *Journal of Mathematical Medicine*, **30**, 1442-1444.
21. Jin, C.Y. (2017) Analysis of the Differential Value of Cervical Cytology and Colposcopy in Cervical Cancer Screening. *Journal of Practical Gynecology Endocrinology* (*Electronic Edition*), **4**, 117+120.
22. Wu, L.L. and Yang, W.F. (2017) The Clinical Value of Colposcopy and Cervical Cytology for Cervical Cancer Screening in High-Risk Groups of Gynecological Outpatients. *Guangzhou Medicine*, **48**, 78-80.
23. Li, X.F., Wang, Y.Y., Liu, X. and Hou, H.L. (2017) Application of Cervical Liquid Based Cytology Combined with HPV Examination in Cervical Precancerous Lesions. *China Maternal and Child Health Research*, **28**, 21-22.
24. Chen, Q. and Zhao, X.Y. (2017) Observation on the Diagnostic Effect of Cervical Cytology Combined with Colposcopy in Cervical Cancer and Precancerous Lesions Screening. *China Modern Drug Application*, **11**, 16-18.

25. Weng, M.J., Li, W. and Tan, H.X. (2017) Application of Cervical Liquid Based Cytology in Physical Examination of Women of Childbearing Age. *Journal of Clinical Rational Drug Use*, **10**, 150-151.

26. Li, Z.J. and Zhao, R. (2017) Evaluation of the Value of Colposcopy Combined with Cervical Cytology in Cervical Cancer Screening. *Chinese and Foreign Women's Health Research*, No. 10, 167-168.