Early diagnosis of cervical cancer in women with Computer Technology based on HPV, LBC and CPS screening and its comparative study

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Abstract. For a comparative study of the practical application of screening methods for the early diagnosis of cervical cancer in women, this paper conducted HPV, LBC and CPS screening tests for 1462 women with cervical abnormalities who came to hospital within 2 years with computer technology, and investigated the results of screening statistics, comparison and analysis. To further explore the value of the above three methods in cervical cancer screening, the results of HPV, LBC and CPS tests in 1462 patients with cervical cancer screening were further discussed in this study, and the results were obtained.

Keywords: screening method, cervical cancer, early diagnosis, computer technology

1. Introduction

Uterine lesions are frequent diseases in the female reproductive system, including common inflammation, cervical precancerous lesions and cervical cancer, which seriously affect the quality of life of women and even threaten life and health, while cervical carcinogenesis is second only to breast cancer, and the incidence and mortality of cervical cancer is high. The early effective prevention and treatment of early cervical lesions can greatly reduce the incidence of cervical cancer. With the continuous improvement of medical diagnostic equipment and the increase of technology, women's health awareness and clinical diagnostic accuracy are obviously improved. The results show that the application of liquid-based cytology in cervical cancer and precancerous lesions is helpful to improve the clinical value of screening. In this study, cervical fluid-based cytology was performed in the
screening of cervical lesions in our county to analyze the screening value of cervical fluid-based cytology. Cervical cancer is one of the most common malignant tumors in gynecology, with extremely high mortality and second only to breast cancer. Due to the influence of many factors, the onset of cervical cancer in recent years is becoming younger. With early detection, early treatment, the cure rate can reach more than 90%. In recent years, with the extensive work of cervical cancer screening in China, the detection rate of cervical precancerous lesions and early cervical cancer has increased obviously, and the mortality of cervical cancer has decreased. At present, there are many methods for cervical cancer screening, and thin-layer liquid-based cytology (LBC) and HPV virus detection have become more mature in the screening of cervical cancer and cervical precancerous lesions. Traditional Pap smear (CPS) has long been used as a traditional screening method for cervical cancer, but its sensitivity is low, so it has a high rate of missed diagnosis.

2. Data collection

Among the 1462 patients with abnormal cervix who came to our hospital from August 2017 to August 2019, the minimum age was 21, the maximum age was 60, and the average age was 36.7. All the subjects had sexual experience, normal family life, and no history of cervical lesions and total hysterectomy. They all had no more than three maternal experiences, averaging 1.7. There are no other serious organ diseases, clear awareness of the normal communication, are aware of the purpose and methods of the study, voluntary participation. The inclusion criteria were:(1) no various forms of cervical cancer screening were performed within 12 months prior to the screening;(2) non-pregnant women;(3) complete cervix and no history of hysterectomy;(4) married;(5) no sexual life was performed within 24 hours prior to the screening and no vaginal medication and irrigation was performed within 3 days; and (6) I have been informed and agreed to the purpose of the study.

3. Application of three inspection methods

3.1. HPV testing

We used a hybrid capture (hc2) experiment to collect epithelial cells in the transitional zone of the cervix during this assay, which was first derived from Digene in USA. Then 13 high-risk HPV DNA hybrid probe kits were used to detect the samples stored in 4°C solution.

3.2. LBC detection

All patients are forbidden to use vaginal drugs within 3 days before the examination, and are not allowed to carry out vaginal irrigation. The patient's own condition was investigated and recorded, such as the patient's menstrual cycle, marriage history, childbearing history, sex life history, contraception condition, whether or not to have suffered from gynecological diseases and so on. All the subjects were
subjected to routine gynecological examination, and the samples of vaginal secretion and cervical exfoliated cells were taken for relevant examination. The patients were subjected to a fluid-based cytology examination, the cervical exfoliated cell specimens were thinly sliced and fixed stained under a microscope, the results were classified and recorded, and the patients with suspicious conditions were further examined by colposcopy, and the surface of the cervix and excessive vaginal discharge were removed. Observe the transformation area of scale-column junction and the condition of blood vessels, apply acetic acid solution on the surface of cervix, observe the white epithelium of cervix, typical mosaic, abnormal blood vessel, lesion position, and diagnose according to the observed characteristics. Cervical biopsy and histopathological examination should be performed for colposcopy positive patients.

3.3. CPS detection

Insert the scraper into the cervix and rotate around the cervix, then smear the cells collected on the scraper on the smear, and repeat the smear if necessary, fixed with 95% ethanol. The fixed smears were pasteurized, placed in a fixed solution, and then screened.

4. Result

4.1. Detection of different screening methods

The biopsy results of cervical tissue were 35 cases of CIN1, 20 cases of CIN2 and 19 cases of CIN3. The number of positive cases of human papillomavirus was 388. The number of positive cases was 61, including 18 cases of ASCUS, 15 cases of ASC-H, 14 cases of LSIL and 13 cases of HSIL. The traditional Pap smear was positive in 27 cases, including ASCUS12, HSIL6 and HSIL9. The results distributions of different screening methods are shown in table 1.

| Method | Inspection result | Quantity | Results of pathology |
|--------|-------------------|----------|----------------------|
|        |                   |          | GIN 1 | GIN 2 | GIN 3 |
| HPV    | Positive          | 388      | 35    | 20   | 19   |
|        | Negative          | 1074     | 0     | 5    | 6    |
| LBC    | ≥ASCUS            | 61       | 18    | 8    | 13   |
|        | Negative          | 1401     | 20    | 15   | 1    |
| CPS    | ≥ASCUS            | 27       | 10    | 10   | 11   |
|        | Negative          | 1435     | 23    | 10   | 10   |

4.2. ROC curves based on three screening methods
The area of the roc curve plotted according to the data obtained from human papillomavirus screening, liquid-based cytology screening and traditional pasteurization smear screening is shown in figure 1.

![Figure 1. ROC map based on three screening methods](image)

5. Discussion

Cervical cancer is a high incidence of malignant tumors in women, which will pose a serious threat to the quality of life and safety of patients. There are no obvious symptoms in the early stage of cervical cancer, with the development of the disease patients may have vaginal bleeding, drainage and other manifestations, the disease is prone to lymphatic metastasis risk, the prognosis is relatively poor. Therefore, it is important to take effective measures to improve the early diagnosis of the disease. Chronic inflammation is especially common in cervical diseases, but it is also necessary to pay attention to cervical intraepithelial neoplasia, which is a disease with high correlation with cervical cancer. In the past, most of the clinical gynecological examinations were performed by Pap smear, but it is important to note that the method is more susceptible to human factors and affects the quality of the examination. Liquid-based cytology has been widely used in recent years and has gradually replaced the traditional method of Pap smear. This method can make full use of all the exfoliated cells, and it can also greatly reduce the influence of mucus and blood on the test results, and effectively improve the accuracy of the test results. The results show that we should pay attention to the gynecological screening in the early stage of cervical cancer screening. Table 2 shows the diagnostic value of the three screening methods.

Table 2. Diagnostic value of three screening methods
6. Conclusions

Among the three cervical cancers screening methods of papillomavirus, liquid-based cytology and pasteurization, the liquid-based cytology screening method has the highest accuracy, but it is more difficult to carry out. In contrast, the human papillomavirus screening method is more feasible and more suitable for development in rural remote areas.

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