# Diagnostic Rate and Imaging Study of MR Diagnosis of Female Pelvic Malignant Tumors

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**Keywords:** Female pelvic malignant tumor, MR diagnosis, Diagnostic rate, Imaging

**Abstract: Objective:** To analyze the diagnostic rate and imaging characteristics of MR diagnosis in female patients with pelvic malignant tumors. **Methods:** 105 female patients with pelvic malignant tumors diagnosed from August 2019 to August 2021 were selected. The detection rate, diagnostic accuracy and imaging characteristics of MR were analyzed based on the surgical and pathological results. **Results:** The detection rate of MR diagnosis was close to that of surgery and pathology, and there was no difference (P > 0.05). The accuracy, sensitivity and specificity of MR diagnosis were 98.10%, 99.01% and 75.00%, respectively. The imaging features of MR: irregular density shadow can be seen in the double attachments of ovarian metastatic cancer. On contrast-enhanced scan, the enhancement of bilateral masses was uneven, with vascular shadow inside and ascites shadow at the same time. Cervical cancer is mostly endogenous and the cervix shows increased volume, irregularity and uneven signal. Enhancing scanning, it showed that the tumor of early cervical cancer was significantly strengthened and the signal gradually weakened. The signal of late cervical cancer was strong, but the signal intensity was lower than that of normal cervical tissue. MR examination of endometrial carcinoma showed endometrial thickening involving the lateral wall of the uterus. Primary ovarian cancer had uneven density, unclear boundary, or enlarged lymph nodes. **Conclusion:** MR diagnosis can distinguish the disease types of female pelvic malignant tumors, with high diagnostic accuracy and clear imaging characteristics.

## 1. Introduction

Female pelvic malignant tumor is a frequent gynecological disease with many types, which will seriously damage pelvic function and affect the normal work and life of patients [1]. As the disease develops, pelvic malignant tumor cells will rapidly spread to other organs in the body, even life-threatening. This kind of disease is occult. The time from onset to definite diagnosis is usually half a year to five years. The development of the disease to the late stage will significantly reduce the radical cure rate and increase the mortality of patients. Therefore, it is necessary to reasonably select the diagnostic method, diagnose the disease type as soon as possible and give scientific clinical treatment [2]. Based on this, 105 female patients with pelvic malignant tumors were selected to analyze the effect of MR diagnosis.

## 2. Data and Method

### 2.1 General Data

105 female patients (26-63 years old) with pelvic malignant tumors diagnosed from August 2019 to August 2021 were selected. The mean age was (43.68 ± 1.54) years old. The body mass index ranged from 19kg / m2 to 28kg / m2, with a mean of (23.02 ± 1.42) kg / m2.

Inclusion criteria: pelvic malignant tumor was diagnosed by surgery, pathology and B-ultrasound; can cooperate with this study in the whole process; language communication skills; informed and fully agreed with this study. Exclusion criteria: lactation or pregnancy; combined with reproductive organ diseases or other malignant tumors; complicated with hematological diseases; abnormal liver and kidney function; mental disorders.

## 2.2 Method

Siemens nuclear magnetic resonance scanner (3.0T) was used for MR examination. Cross sectional scanning, coronal scanning and sagittal scanning were taken. The layer spacing was set as 1mm and the layer thickness was set as 5mm. If it was difficult to determine the disease type by fat suppression technology, contrast-enhanced scanning should be taken. The contrast medium was omni scan (GE Healthcare Ireland, J20140162), and the dose was 15ml. High-pressure syringe was used to inject contrast medium through the anterior elbow vein at a rate of 2.5ml/s. T2WI sequence, T1WI sequence and DWI sequence were used for enhanced scanning. The enhanced scanned images were subtracted, reconstructed and transmitted to the workstation for double-blind reading by two imaging doctors. When the results were controversial, they discussed and gave a unified result.

## 2.3 Observation Indicators

The detection rate of MR and pathological diagnosis for disease types, including ovarian metastatic cancer, cervical cancer, endometrial cancer and primary ovarian cancer, was observed. At the same time, the imaging characteristics of MR were analyzed.

## 2.4 Evaluation Criteria

The accuracy rate = (true positive number + true negative number) / total number of cases; Sensitivity = true positive number / (false negative number + true positive number); Specificity = true negative number / (false positive number + true negative number).

## 2.5 Statistical Analysis

The data processing was completed by SPSS21.0 software. The counting data was compared and tested by $x^2$ value. It is assumed that the meaningful standard for verification is that the P value is less than 0.05.

## 3. Results

### 3.1 Analyze the Disease Type Detection Rate of MR

The detection rate of MR diagnosis for disease type was close to that of surgery and pathology, and there was no difference (P > 0.05).

Table 1 Disease Type Detection Rate of MR Analysis [n/%]

| Group | Cases | Ovarian Metastatic Cancer | Cervical Cancer | Endometrial Cancer | Primary Ovarian Cancer |
|---|---|---|---|---|---|
| MR | 105 | 15（14.29） | 52（49.52） | 19（18.10） | 19（18.10） |
| Surgical Pathology | 105 | 17（16.19） | 54（54.43） | 22（20.95） | 12（11.43） |
| $x^2$ | - | 0.148 | 0.076 | 0.273 | 1.854 |
| P | - | 0.701 | 0.783 | 0.602 | 0.173 |

### 3.2 Analyze the Diagnostic Accuracy of MR

The accuracy of MR diagnosis was 98.10% (103 / 105), the sensitivity was 99.01% (100 / 101), and the specificity was 75.00% (3 / 4).

Table 2 Diagnostic Accuracy of MR Analysis

| MR | Surgical Pathology | | |
|---|---|---|---|
| | Positive | Negative | Total |
| Positive | 100 | 1 | 101 |
| Negative | 1 | 3 | 4 |

### 3.3 Analyze the Imaging Characteristics of MR

(1) Ovarian metastatic cancer: Irregular density shadow and uneven density of mass shadow were found in the double appendages of 19 patients. On contrast-enhanced scanning, the enhancement of bilateral masses was uneven, with internal vascular shadow and ascites shadow.(2) Cervical cancer: 52 patients had endophytic cervical cancer. The cervix showed increased volume, irregularity and uneven signal. Enhanced scanning showed that the tumor of early cervical cancer was significantly strengthened and the signal gradually weakened. The signal of late cervical cancer was strong, but the signal intensity was lower than that of normal cervical tissue. (3) Endometrial cancer: MR examination showed that 19 cases of endometrial cancer were accompanied by endometrial thickening, involving the lateral wall of the uterus. (4) Primary ovarian cancer: Among the 19 cases of primary ovarian cancer, 7 cases were accompanied by greater omentum soft tissue mass, of which 6 cases showed flat cake-shape of greater omentum, and 1 case showed massive omentum with uneven density and unclear boundary, which may be greater omentum metastasis. In 9 cases, the pelvic bowel was accompanied by calcification, which may be calcified metastasis. The internal and external iliac lymph nodes of 3 patients increased significantly, and the diameter was more than 1.0 cm, which may be lymph node or distant organ metastasis.

### 4. Conclusion

Under the influence of women's accelerated pace of life and increased work pressure, the number of gynecological diseases is increasing year by year, which seriously affects the physical and mental health of women. Pelvic cavity is a female reproductive organ and a high incidence site of malignant tumors [3]. Due to the special anatomical characteristics of pelvic tissue, the early onset is hidden, and the time from disease onset to diagnosis is long, which will increase the difficulty of treatment. More pelvic malignant tumors are diagnosed in the middle and late stage of the disease. At this time, surgical treatment is more traumatic and the postoperative quality of life is low [4]. Therefore, it is considered that female pelvic malignant tumors should be diagnosed early and targeted treatment should be given to improve the curative effect. CT is a common diagnostic technique for female pelvic malignant tumors. It can detect calcified lesions and has strong repeatability. However, CT is difficult to make qualitative and localized diagnosis of pelvic malignant tumors, which has limitations. MR diagnosis is a relatively new diagnostic technology. It has high diagnostic accuracy for pelvic malignant tumors, can effectively guide the reasonable selection of treatment methods, and can be used for efficacy evaluation [5]. In the process of MR enhancement scanning, subtraction technology can be used to improve the tissue signal intensity and improve the homogeneity between different tissues, so as to obtain a clearer lesion image, identify the lesions with insignificant enhancement and small enhancement, and have a good display effect on the lesions. After enhanced subtraction, the obtained image can eliminate the interference of the surrounding tissue of the lesion, and can clearly show the size, scope and degree of infiltration of the lesion. Some patients have low cooperation with the examination operation, which will affect the image quality. At this time, it is necessary to explain the significance of the examination to the patients, conduct multi-sequence joint scanning such as T1WI and T2WI, and obtain the image from multiple angles and directions, so as to make a clear diagnosis [6].

In this study, the detection rate of MR diagnosis for disease type was close to that of surgical pathology, and there was no difference ($P > 0.05$). The accuracy, sensitivity and specificity of MR diagnosis were 98.10%, 99.01% and 75.00%, respectively. MR diagnosis of female pelvic malignant tumors has clear imaging characteristics. It shows that MR can accurately locate the lesion location of female pelvic malignant tumor, qualitatively diagnose the tumor tissue, facilitate the staging evaluation of malignant tumor, formulate treatment methods, and play a guiding role in clinical diagnosis and treatment.

In conclusion, MR diagnosis for female patients with pelvic malignant tumors has obvious advantages, and it can be used as a common diagnostic technique for this kind of diseases.

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