Research on the Diagnosis of Tumor Based on CT and MRI

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Abstract: With the accelerating pace of life, the incidence rate of cancer has increased year by year, which has seriously affected the health of patients. Early diagnosis of tumor is difficult, and it is easy to relapse and metastasis after operation, so it is urgent to improve the diagnosis effect. In this paper, CT and MRI, which are commonly used in tumor diagnosis, are selected for analysis and comparison in order to improve the diagnosis effect. Based on this, this paper first introduces the data and methods of tumor diagnosis, then analyses the results of CT and MRI diagnosis, and finally studies and analyses the value of tumor diagnosis based on CT and MRI technology.

Keywords: CT and MRI; Diagnosis of Tumor

1. Introduction

Tumor is a kind of multiple diseases. It is very important for patients' quality of life to detect tumor as early as possible and treat it in time. In general, we can identify benign and malignant tumors by taking living specimens for pathological examination, or by CT and MRI examination. The latter two are the main ways to diagnose tumors, and can diagnose the disease process in a short time and formulate targeted treatment plans. As an efficient staging and postoperative evaluation tool, CT is mainly used for tumor diagnosis; further staging diagnosis and evaluation of treatment effect to determine the nature of space occupying lesions. As a common imaging method for preoperative diagnosis of tumor, MRI is often used to identify tissue contrast with its super-high resolution, and has a high accuracy in the diagnosis of space occupying lesions. CT and MRI are used to locate the tumor area, so as to evaluate the diagnostic value of MRI, CT and their combination, which is helpful to improve the detection status of tumor. Therefore, the study of tumor diagnosis based on CT and MRI technology has important practical value.

2. Data and methods of tumor diagnosis

2.1 General information of diagnosis

Fifty patients with tumor were selected as the study object, aged 25-60 years, with an average age of 42.5 years. All patients were confirmed as tumor patients by operation or pathological examination, and agreed with the study. All patients were examined by operation or laparoscopy, and CT and MRI of lower abdomen were performed.

2.2 Diagnostic method

In this paper, we use Siemens CT equipment and Philips MRI to scan all patients' lower abdomen with MRI and CT. We use techniques such as breath compensation and flow compensation, upper and lower pre saturation to reduce the artifacts caused by breath movement and blood flow. The abdomen of patients was scanned in three phases: plain scan, thin-layer enhanced scan, action pulse phase, vein phase and delay phase. The

scanning range was from the renal portal plane to the lower edge of pubic symphysis. The volume data was transmitted to the image reconstruction workstation. In the image reconstruction workstation, multi MPR, CPR, MIP or VR reconstruction is performed. Among them, MPR reconstruction technology selects the best position for better display of blood vessels, including sagittal, coronal or oblique sagittal reconstruction, mainly including three positions as shown in **Figure 1** below. CPR was used to observe the relationship between the vessels and the lesions in axial images.
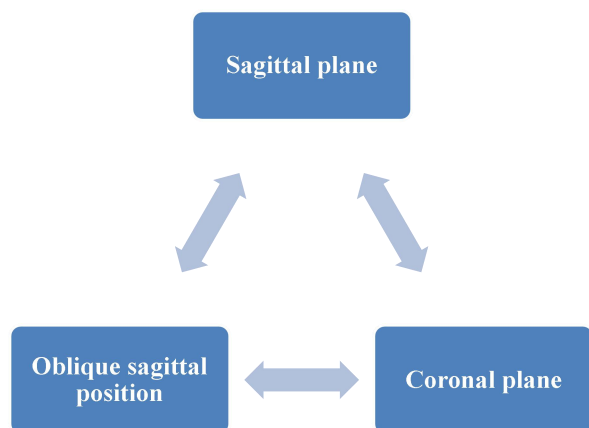

Figure 1. MPR reconstruction technology display positions.

2.3 Observation index of tumor diagnosis

First of all, it needs to compare the accuracy, sensitivity and specificity of two different methods in the diagnosis of ovarian tumors, and study the performance, localization and qualitative of the two methods in the imaging of ovarian tumors. Secondly, it is necessary to compare the accuracy, sensitivity and specificity, as well as the influence on performance, location and qualitative.

Through the statistical analysis and calculation of several situations as shown in **Figure 2** below, the accuracy, sensitivity and specificity of the statistical analysis can be achieved. SPSS software was used to analyze the data. The data were expressed in % and χ_2 test was used. P<0.05 means the difference is statistically significant.
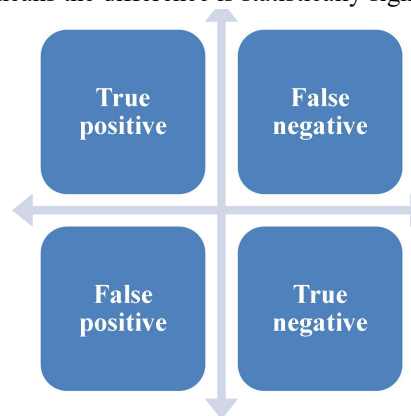

Figure 2. Several situations of statistical analysis and calculation.

3. Diagnostic results

3.1 Accuracy of CT and MRI in clinical diagnosis of tumor

Among the 50 cases confirmed by pathology, 43 cases were confirmed by CT, 3 cases were missed, 4 cases were unclear, and the accuracy rate was 86%. MRI showed 50 cases of definite diagnosis, 2 cases of missed diagnosis, 1 case of unclear display, and the accuracy rate was 94%. There was a significant difference in the accuracy of CT and MRI (χ_2=3.97153, P<0.05). The accuracy, sensitivity and specificity of CT and MRI in the diagnosis of ovarian tumors are shown in **Table 1**.

	Number of cases	True positive	False negative	False positive	True negative	Accuracy	Susceptibility	Specificity
CT	50	42	2	2	1	86%	90.5%	87.2%
MRI	50	46	2	1	1	94%	93.5%	91.4%
P	/					<0.05	>0.05	>0.05

Table 1. The accuracy, sensitivity and specificity of CT and MRI

3.2 The clinical value of CT and MRI in the diagnosis of tumor

All of the subjects were confirmed by pathology in 50 cases. 13 cases were misdiagnosed by CT, the accuracy of qualitative diagnosis was 82.5%; and 5 cases were misdiagnosed by MRI, the accuracy of qualitative diagnosis was 91.3%. The accuracy of the two methods

is statistically different. It can be seen that MRI is superior to CT in the qualitative diagnosis of tumors. The sensitivity and specificity of MRI were slightly higher than that of SCT, similar to that of SCT. In addition, MRI can accurately display the specific location and qualitative of the tumor. The two methods complement and confirm each other, which can improve the detection

rate and diagnosis accuracy.

3.3. CT and MRI findings

Through the CT study of benign tumor, we can find that the cystic wall of benign tumor is obviously different from the adjacent tissue, and it is more complete. In addition, after the onset of benign tumors, there is no enhancement of the cystic wall, or the enhancement is not obvious. Through the study of MRI manifestations of benign tumors, we can find that benign tumors will appear calcification or signal phenomenon, and can accurately diagnose the abnormal changes in the capsule. For benign tumor mass, the cyst wall or relatively smooth patients can be noted benign after diagnosis.

Through the study of CT image of malignant tumor, we can find that the mass is thick, and its interior is solid. Some patients with serious malignant tumor will have necrosis, and others will show up in the form of cauliflower, and separate the thickness of the tumor. Through the study of MRI manifestations of malignant tumors, it can be found that there are differences in the internal enhancement degree of malignant tumors, which will have a great impact on nearby organs, and lead to ascites in the abdominal cavity, as well as the abnormal increase of lymph nodes, as well as the spread of tumor tissue.

4. Analysis of tumor diagnosis results based on CT and MRI

In recent years, the incidence rate of cancer has increased year by year, and the mortality rate is higher, which seriously affects the life and health of patients. The main reason of high mortality of tumor is that its early diagnosis is difficult, and it is easy to relapse and metastasis after operation. In the process of treatment, tumor not only depends on pathological biopsy, but also needs to be diagnosed by CT and MRI. With the development of imaging and laboratory diagnostics, as an important means of tumor diagnosis, the accuracy of CT and MRI diagnosis is gradually improving.

As a method of tumor diagnosis with quick results and simple operation, CT examination can make a more accurate judgment of tumor conditions. However, there are some problems in the process of CT examination, such as cross-sectional images, and X-ray scanning

cannot accurately distinguish the tumor. MRI diagnosis method relies on its high spatial resolution, clear display image and other characteristics, not only can accurately locate the tumor location and its internal structure, but also can generate clear images, accurately diagnose the patient's condition, and show the distribution of soft tissue. For example, MRI can diagnose whether there is cystic change, whether there is a change in thickness, and the size of the tumor's impact on nearby organs. Therefore, MRI diagnosis method has better diagnostic accuracy with its more sensitive diagnostic effect, and its location and qualitative has more obvious advantages.

In addition, clinical research found that MRI not only has a good resolution of soft tissue, but also can accurately distinguish the ultrastructure. It can effectively diagnose the small tumor focus, which is conducive to the early and comprehensive diagnosis of the tumor, which shows that MRI has a good effect on the nature and staging of the tumor. CT cannot detect small lesions, but it is easy to miss small lesions, and it is difficult to show the complex internal structure, so it is easy to misdiagnose the tumor. However, the high resolution of CT plays an important role in the diagnosis of metastasis, invasion and stage of advanced cancer. Therefore, CT plays an important role in the diagnosis of tumor.

In summary, both CT and MRI have clear diagnostic value in tumor diagnosis, and both of them have their own advantages and disadvantages. Therefore, when necessary, we can carry out the joint diagnosis of CT and MRI to make up for each other's diagnostic defects, so as to further improve the diagnostic accuracy.

5. Conclusions

With the accelerating pace of life, the incidence rate of cancer has increased year by year, which has seriously affected the health of patients. The early diagnosis of tumor is difficult, and it is easy to relapse and metastasis after operation, which leads to a high mortality. CT and MRI are often used to diagnose the tumor as a highly effective staging and postoperative evaluation tool. Through the analysis of the accuracy of CT and MRI in the clinical diagnosis of tumor and the clinical value of both, it is found that both CT and MRI have a clear diagnostic value in the diagnosis of tumor, but MRI

is better than CT, and its sensitivity and specificity are higher, and also has a great advantage in the process of positioning and qualitative. In addition, the two methods have their own advantages and disadvantages, so it is necessary to carry out the joint diagnosis of CT and MRI to further improve the diagnosis effect.

References

1. Cheng J. Value of CT and MRI in the diagnosis of communicating meningioma of skull base. Jilin University 2015.
2. Lu Z. Comparative study on the diagnostic value of conventional ultrasound, CT and ultrasound / CT fusion imaging in renal tumors. Shandong University 2014.
3. Xie P, Bai Y, Tang S. Retrospective analysis of 100 cases of gynecological tumor diagnosed by CT and MRI. China Higher Medical Education 2015; 11 (6): 124-125.
4. Chen D. Analysis of clinical value of MRI in the diagnosis of adrenal cancer. Medical theory and practice 2017; 30 (4): 575-576.
5. Liu H, Shi J, Wang Y, *et al*. CT, MRI manifestations and pathological basis of ovarian yolk sac tumor. Journal of Clinical Radiology 2014; 33 (9): 1395-1396.
6. Wang H, Chen X, Lin Q, *et al*. Clinical value of multi-slice spiral CT and ultrasound in the diagnosis of female pelvic cystic masses. Journal of medIcal Imaging 2017; 27 (2): 379-382.