Value of CA19–9, CA125 and CEA combined magnetic resonance imaging in the diagnosis of pancreatic cancer

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ABSTRACT

Objective: To study the value of CA19-9, CA125 and CEA combined magnetic resonance imaging (MRI) in the diagnosis of pancreatic cancer, and to provide a reference for clinical diagnosis and treatment. Methods: A total of 110 cases of pancreatic cancer admitted to our hospital from November 2015 to November 2017 were selected as the observation group, and another 80 normal pancreas organizers who participated in the physical examination in the same period were selected as the control group. The change of magnetic resonance scanning parameters and serum CA19-9, CA125 and CEA detection were compared between the two groups of subjects at the same time, contrast scan and serum magnetic resonance detection of CA19-9, CA125 and CEA positive rate, and to evaluate the four alone and in combination with the diagnosis of pancreatic cancer specificity, sensitivity, negative predictive value and positive predictive value. Results: The T1WI of the observation group was low or slightly low signal, T2WI was slightly high signal, and the tumor of fat suppression sequence was low signal, which was in line with the typical characteristics of pancreatic cancer. The serum levels of CA19-9, CA125 and CEA in the observation group were significantly higher than those in the control group, and the difference was statistically significant. Compared with the two groups, the positive rates of MRI and serum CA19-9, CA125 and CEA in the observation group were significantly higher than those in the control group, and the difference was statistically significant. The sensitivity and accuracy of MRI scan combined with three serological markers were higher than those of single detection. The specificity was between four. Conclusion: CA19-9, CA125 and CEA combined magnetic resonance imaging (MRI) have good sensitivity and accuracy in diagnosis of pancreatic cancer, but their specificity is common, which should be used for reference.

1. Introduction

As one of a common clinical digestive system malignant tumor, pancreatic cancer (pancreatic, cancer, PC) the incidence of tumors from 1% to 2%, but the median survival time of only 6 months, the survival rate of 5A was 5%, the mortality rate of malignant tumor fourth[1]. In recent years, due to the increasing trend of aging in China, coupled with unhealthy diet structure, smoking, drinking, high fat and high protein diet and other crowds are increasing. The incidence of pancreatic cancer has been increasing gradually in recent years in China[2]. It is worth noting that early pancreatic cancer is difficult to be found, and has the characteristics of high degree of malignancy, rapid development and poor prognosis. Once the diagnosis is often in the middle and late stage, the curative effect of operation is poor[3]. Therefore, early detection, early diagnosis and early treatment of pancreatic cancer can better improve the prognosis of patients. It has become the focus and difficulty of pancreatic cancer research at present[4]. At present, the commonly used pancreatic cancer auxiliary examinations include imaging and serum tumor markers. If combined diagnosis can help pancreatic cancer early diagnosis, it will help[5]. Therefore, we specially study the value of CA19-9, CA125 and CEA combined magnetic resonance imaging in the diagnosis of pancreatic cancer, and provide reference for clinical diagnosis and treatment.

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2. Data and methods

2.1 Clinical data

A total of 110 cases of pancreatic cancer admitted to our hospital from November 2015 to November 2017 were selected as the observation group, and another 80 normal pancreas organizers who participated in the physical examination at the same period were taken as the control group. All the patients were examined by serum CEA, CA125, CA199 and MRI. There were 61 men in the observation group, 49 women, 36-86 years old, and the average age was (63 ± 2) years. There were 61 men in the observation group, 49 women, 36-86 years old, and the average age was (63 ± 2) years. Tumor site: 63 cases of pancreatic head carcinoma, 47 cases of body tail carcinoma and 35 cases with regional lymph node metastasis. All the diagnostic criteria of pancreatic cancer were confirmed by histopathology, and there were abdominal distension, abdominal pain, jaundice, wasting and other discomfort symptoms. The KPS score was above 60 points. The exclusion criteria included rapid progress of the disease, intestinal obstruction and other diseases that had not been controlled. Those who had received local or systemic treatment before the disease were combined with other malignant tumors. In the control group, there were 46 men and 34 women, aged 34-82 years, with an average age of (61 ± 4) years. The two groups were compared in the general data of sex and age, and the difference was not statistically significant (P>0.05), which was comparable. The patients or their families have signed the informed consent, and the study has been approved by the hospital ethics committee.

2.2 Research methods

The change of magnetic resonance scanning parameters and serum CA19-9, CA125 and CEA detection were compared between the two groups of subjects at the same time, contrast scan and serum magnetic resonance detection of CA19-9, CA125 and CEA positive rate, and to evaluate the four alone and in combination with the diagnosis of pancreatic cancer specificity, sensitivity, negative predictive value and positive predictive value.

MRI scan: magnetic resonance scanner uses Holland PHILIPS Achieva 3.0 T, selects the special abdominal phased array surface coils, and uses gadolinium gluconate (Gd-DTPA) as contrast agent, dosage 0.1 mmol/kg. All MRI diagnosis results were evaluated by two MRI technicians with double blind method. Before the examination, pay attention to the patient before 6-8 h fasting, training the subjects to control the breathing exercise, breath in the middle of breath. All subjects underwent DWI scan and MR plain scan, dynamic enhanced scan, T1WI dynamic enhanced scan and plain scan all used 3D-LAVA sequence. T2WI used fast recovery spin echo sequence, DWI used respiratory trigger SE-EPI sequence. Serum detection: the detection results of various tumor markers were more than the upper limit value: CEA: 0 to 5.2 ng/mL; CA199: 0 to 27 U/mL; CA125: 0 to 35 U/mL. All subjects were examined in the morning fasting venous blood 3-5 mL, 3 500 r/min centrifugal 10 min, plasma separation, stored in the 2-8 °C, the instrument adopts Rochecobase-602 automatic immune analyzer, the quality control of BIORAD company, calibrators, reagents by Roche facilities.

2.3 Statistical methods

Research on data analysis by SPSS 19 software, using t test measurement data using (Mean ± SD) said that the paired t test group measurement data, the sample t test measurement data between groups using x2 test; Count data rate (%) said, with P<0.05 as the difference was statistically significant.

3. Results

3.1 Two groups of patients with magnetic resonance imaging and serum CA19–9, CA125 and CEA changes

The T1WI of the observation group was low or slightly low signal, T2WI was slightly high signal, and the tumor of fat suppression sequence was low signal, which was in line with the typical characteristics of pancreatic cancer. The serum levels of CA19-9, CA125 and CEA in the observation group were significantly higher than those in the control group, and the difference was statistically significant (P<0.05). It is specific as shown in Table 1.

Table 1.

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>CA125 (U/mL)</th>
<th>CA19-9 (U/mL)</th>
<th>CEA (mg/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation</td>
<td>110</td>
<td>29.8±10.4</td>
<td>125.4±26.2</td>
<td>8.9±3.5</td>
</tr>
<tr>
<td>Control</td>
<td>80</td>
<td>2.7±1.0</td>
<td>7.9±3.6</td>
<td>2.5±2.3</td>
</tr>
<tr>
<td>t</td>
<td></td>
<td>49.483</td>
<td>71.108</td>
<td>31.528</td>
</tr>
<tr>
<td>P</td>
<td></td>
<td>0.002</td>
<td>0.001</td>
<td>0.012</td>
</tr>
</tbody>
</table>

3.2 Two groups of patients with magnetic resonance imaging and serum CA19–9, CA125, and CEA positive rates

Compared with the two groups, the positive rates of MRI and serum CA19-9, CA125 and CEA in the observation group were higher than those in the control group, and the difference was statistically significant (P<0.05). It is specific as shown in Table 2.

Table 2.

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>CA125</th>
<th>CA19-9</th>
<th>CEA</th>
<th>MRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation</td>
<td>110</td>
<td>72(66.5%)</td>
<td>86(78.2%)</td>
<td>56(51.9%)</td>
<td>98(89.1%)</td>
</tr>
<tr>
<td>Control</td>
<td>80</td>
<td>56(6.8%)</td>
<td>45(5.0%)</td>
<td>6(7.5%)</td>
<td>3(3.8%)</td>
</tr>
</tbody>
</table>
CA242, CEA and other serum tumor markers[10] technology, and the main diagnostic indicators include CA19-9, developed with the continuous development of diagnostic technology, and the main diagnostic indicators include CT, MRI and ultrasound examination, and the first choice in clinical diagnosis is CT imaging.

At present, the diagnosis of pancreatic cancer has been gradually increased, the sensitivity of diagnosis of pancreatic cancer is as high as 80%. However, it is worth noting that the specificity of CA19-9 is only about 60%, that is, it cannot differentiate pancreatic cancer and benign pancreatic disease, so that the application[12] is limited. Some studies also suggest that[13] and CA125 often help diagnose ovarian related tumors, and can also be significantly increased in pancreatic cancer patients. It can be used as an independent index for predicting the prognosis of pancreatic ductal adenocarcinoma. There are also reports[14], and CA125 is better than CA19-9 for the diagnosis of pancreatic cancer. As a complex structure of soluble glycoprotein, CEA is a classic index for diagnosis of breast cancer, gastrointestinal cancer and other malignant tumors. Its serum concentration change has been widely recognized[15]. In the two groups of patients in this study, the positive rates of MRI and serum CA19-9, CA125 and CEA in the observation group were higher than those in the control group, and the difference was statistically significant (P<0.05).

The sensitivity and accuracy of magnetic resonance imaging combined with three serum markers were all higher than those of individual tests. The specificity was between four. It is specific as shown in Table 3.

### 3.3 Two groups of patients with magnetic resonance imaging and serum CA19-9, CA125 and CEA diagnostic efficiency comparison

Table 3.

Comparison of the diagnostic efficacy of magnetic resonance imaging and serum CA19-9, CA125, and CEA in the two groups.

<table>
<thead>
<tr>
<th>Index</th>
<th>Accuracy</th>
<th>sensitivity</th>
<th>Specificity</th>
<th>Forecast value of Yangxin</th>
<th>Negative predictive value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA19-9</td>
<td>72.2</td>
<td>58.0</td>
<td>97.1</td>
<td>94.3</td>
<td>56.9</td>
</tr>
<tr>
<td>CA125</td>
<td>78.4</td>
<td>82.9</td>
<td>70.7</td>
<td>92.7</td>
<td>75.6</td>
</tr>
<tr>
<td>CEA</td>
<td>76.2</td>
<td>65.8</td>
<td>82.3</td>
<td>93.1</td>
<td>66.4</td>
</tr>
<tr>
<td>MRI</td>
<td>89.6</td>
<td>90.2</td>
<td>88.6</td>
<td>93.3</td>
<td>83.8</td>
</tr>
<tr>
<td>Joint diagnosis</td>
<td>95.8</td>
<td>92.6</td>
<td>84.5</td>
<td>91.8</td>
<td>89.2</td>
</tr>
</tbody>
</table>

4. Discussion

In recent years, although the incidence of pancreatic cancer is only ninth of all malignant tumors, its mortality rate is fourth. Therefore, the early diagnosis of pancreatic cancer has attracted enough attention[6]. At present, the main imaging methods for pancreatic cancer include CT, MRI and ultrasound examination, and the first choice in clinical diagnosis is CT imaging[7]. But it is worth noting that the accuracy of CT imaging is not accurate to 100% because of the fibrosis and early clinical symptoms of pancreatic cancer. Therefore, MRI scan combined[8] is needed. At any time, the continuous improvement of MRI diagnostic technology can enhance functional imaging and enhance the function of scanning and other post-processing functions. It can effectively diagnose and analyze pancreatic tumors and surrounding lesions, which is helpful for clinical diagnosis and treatment[9].

At present, the diagnosis of pancreatic cancer has been gradually developed with the continuous development of diagnostic technology, and the main diagnostic indicators include CA19-9, CA242, CEA and other serum tumor markers[10]. In this study, the T1WI of the observation group was low or slightly low signal, the T2WI was slightly high signal and the fat suppression sequence was low signal, which was in line with the typical characteristics of pancreatic cancer. The serum levels of CA19-9, CA125 and CEA in the observation group were significantly higher than those in the control group, and the difference was statistically significant (P<0.05). This paper has research and results similar[11], it is a kind of oligosaccharide tumor associated carbohydrate antigen, CA19-9 content in normal human serum is low (usually less than 35 kU/L), but once the lesions occur in the body of pancreas was significantly increased, the sensitivity of diagnosis of pancreatic cancer is as high as 80%. However, it is worth noting that the specificity of CA19-9 is only about 60%, that is, it cannot differentiate pancreatic cancer and benign pancreatic disease, so that the application[12] is limited. Some studies also suggest that[13] and CA125 often help diagnose ovarian related tumors, and can also be significantly increased in pancreatic cancer patients. It can be used as an independent index for predicting the prognosis of pancreatic ductal adenocarcinoma. There are also reports[14], and CA125 is better than CA19-9 for the diagnosis of pancreatic cancer. As a complex structure of soluble glycoprotein, CEA is a classic index for diagnosis of breast cancer, gastrointestinal cancer and other malignant tumors. Its serum concentration change has been widely recognized[15]. In the two groups of patients in this study, the positive rates of MRI and serum CA19-9, CA125 and CEA in the observation group were higher than those in the control group, and the difference was statistically significant (P<0.05). The sensitivity and accuracy of MRI scan combined with three serological markers were higher than those of single detection. The specificity was between four. Some studies also think that[12,14] can be used for MRI examination of pancreatic cancer patients, especially in DWI images, which is helpful for finding small lesions and early diagnosis. However, the diagnostic value of DWI for pancreatic cancer needs further clarifying.

In conclusion, CA19-9, CA125 and CEA combined with MRI have good sensitivity and accuracy in the diagnosis of pancreatic cancer, but the specificity is general, which is worthy of clinical reference.

### References


