

Diagnostic Value of Combination of Collagen IV and CEA Test on Patients with Colorectal Cancer Liver Metastases

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Abstract: Objective: To evaluate and analyze the diagnostic value and significance of the combination of collagen IV and CEA test on patients with colorectal cancer liver metastases. Methods Taking 84 cases of patients with colorectal cancer liver metastases admitted by Traditional Chinese Medicine Hospital Dianjiang Chongqing as metastatic group, and other 67 cases of patients with non-metastatic colorectal cancer as non-metastatic group from February 2013 to March 2014. Medical history of hepatitis, cancer site, cancer differentiation status, CEA level, collagen IV level of patients in different groups have been compared and analyzed by multiple logistic regression. At the same time, the 3-year survival rate of patients with different CEA and collagen level in metastatic group as well as serum CA125 and CA19-9 between patients in different groups have been compared. Results Patients with an increase of CEA and collagen IV share respectively 64.29% (54/84) and 72.62% (61/84) in the metastatic group, which are higher than those in the non-metastatic group (32.84% (22/67) and 28.36%(19/67)) ($P<0.05$); according to the analysis of multiple logistic regression, CEA and collagen IV levels are risk factors for the development of colorectal cancer liver metastases; the 3-year survival rate of patients with an increase of CEA and collagen IV is lower than that of patients without CEA and collagen IV changes ($P<0.05$); serum CA125 and CA19-9 are higher of patients in the metastatic group than those in the non-metastatic group ($P<0.05$). Conclusion The combination of collagen IV and CEA test could effectively diagnose colorectal cancer liver metastases, which could be serving as a clinical prognostic indicator. And determination of serum CA125 and CA19-9 could help with the diagnosis of colorectal cancer liver metastases, which should gain much attention.

Key words: Colorectal Cancer; Liver Metastases; Collagen IV; Carcinoembryonic antigen (CEA); Diagnostic Value

Colorectal cancer is one of the most frequent malignant tumors, the morbidity and mortality of which share a certain part among those of all the malignant tumors¹. It is reported that 50% of patients with colorectal cancer will develop metastases, in particular the liver metastases². Once liver metastases occurs, patients would die within one year without timely and effective treatment. Today, surgery and radiochemotherapy are main treatment for colorectal cancer³. Therefore, it is important to find an early and effective treatment for colorectal cancer to help with the clinical treatment plan to improve prognosis. This paper analyzes the diagnostic value and significance of the combination of collagen IV and CEA test on patients with colorectal cancer liver metastases to offer statistic support for the diagnosis and treatment

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for coloorectal cancer liver metastases.

1. Materials and Methods

1.1 Clinical Materials

Retrospectively analyze 84 cases of patients with colorectal cancer liver metastases as metastatic group, who were admitted by Traditional Chinese Medicine Hospital Dianjiang Chongqing from February 2013 to March 2014. All patients were diagnosed as colorectal cancer liver metastases by pre-operative examination and post-operative pathological examination. And there were 54 male patients and 30 female patients in this group, aging from 24 to 84 with an average of 58.4 ± 19.3 . Other 67 cases of patients with non-metastatic colorectal cancer were as non-metastatic group. And there were 43 male patients and 24 female patients in this group, aging from 23 to 82 with an average of 58.2 ± 19.2 . Neither age nor gender was significantly different ($P > 0.05$). Therefore, this analysis is of comparability. All the patients involved in this analysis have signed the informed consent approved by Ethics Committee of the hospital.

1.2 Methods

Collect clinicopathological data of all patients, including medical history of hepatitis, cancer site, cancer differentiation status, CEA level, collagen IV level etc. A 3-year follow-up study of patients in the metastatic group was carried out, and the 3-year survival rate has been recorded. In addition, respectively take 4ml venous blood from all subjects in the early morning, which was centrifuged for 10 minutes (rotating speed is 2000r/min) and saved for testing in the fridge at -20°C . Detect levels of Serum CA125 and CA19-9 by enzyme linked immunosorbent assay (ELISA), strictly following test procedure instructions on the reagent kit.

1.3 Observation Index

Clinicopathological data of patients in two groups have been compared to analyze the factors affecting colorectal cancer liver metastases, the 3-year survival rate of patients with different CEA and collagen level in metastatic group as well as serum CA125 and CA19-9 between patients in different groups.

1.4 Criteria⁴

Normal serum CEA level varies from 0 to $5\mu\text{g/L}$, and normal collagen IV level varies from 0 to 50ng/mL .

1.5 Statistical Methods

All data were analyzed by SPSS21.0. Among, χ^2 was used for enumeration data and t was applied to testing measurement data ($\bar{x} \pm s$). Risk factors were analyzed by multiple logistic regression. And it was statistically significant when $P < 0.05$.

Table 1 Comparison of Clinicopathological Data Between Patients in Two Groups (case, %)

2. Results

2.1 Comparison of Clinicopathological Data Between Patients in Two Groups

Patients with an increase of CEA and collagen IV share respectively 64.29% (54/84) and 72.62% (61/84) in the metastatic group, which are higher than those in the non-metastatic group (32.84% (22/67) and 28.36%(19/67)) ($P < 0.05$). See Table 1:

linical Pathological Index		Metastatic Group (n=84)	Non-metastatic Group (n=67)	χ^2	P
Medical History	Yes	9	7	0.003	0.958
	No	75	60		
Cancer Site	Colon	56	44	0.016	0.898
	Rectum	23	20		
	Colorectum	5	3		
Cancer Differentiation Status	Lower	35	31	0.321	0.571
	Mid-to-higher	49	36		
CEA Level	Increased	54	22	14.747	0.000
	Normal	30	45		
Collagen IV	Increased	61	19	29.310	0.000
	Normal	23	48		

2.2 Multiple Logistic Regression Analysis on Factors affecting Colorectal Cancer Liver Metastases

According to the analysis of multiple logistic regression, CEA and collagen IV levels are risk factors for the development of colorectal cancer liver metastases. See Table 2:

Table 2 Multiple Logistic Regression Analysis on Factors affecting Colorectal Cancer Liver Metastases

Risk Factor	OR	β	95%CI	P
CEA Level	2.074	1.091	0.934~2.253	0.000
Collagen	5.391	1.194	1.024~3.317	0.000

2.3 Comparison of 3-year Survival Rate of Patients with Different CEA and Collagen IV in Metastatic Group

The 3-year survival rate of patients with an increase of CEA and collagen IV is lower than that of patients without CEA and collagen IV changes ($P<0.05$). See Table 3.

2.4 Comparison of Serum CA125 and CA19-9 of Patients in Two Groups

Serum CA125 and CA19-9 are higher of patients in the metastatic group than those in the non-metastatic group ($P<0.05$). See Table 4.

Table 3 Comparison of 3-year Survival Rate of Patients with Different CEA and Collagen IV in Metastatic Group (case, %)

Index		3-year Survival Rate	χ^2	P
CEA Level	Increased (n=54)	24 (44.44)	5.064	0.024
	Normal (n=30)	21 (70.00)		
	Increased (n=61)	27 (44.26)	10.840	0.001
	Normal (n=21)	18 (85.71)		

Table 4 Comparison of Serum CA125 and CA19-9 of Patients in Two Groups (kU/L, $\bar{x} \pm s$)

Group	Case	CA125	CA19-9
Metastatic	84	39.7±4.0	40.6±4.3
Non-metastatic	67	32.4±3.5	33.2±3.8
T	-	11.769	11.056
P	-	0.000	0.000

3.

Discussion

Colorectal cancer is one of the most frequent gastrointestinal malignancies worldwide. In addition, advanced colorectal cancer often develop distant metastases and is with poor prognosis^{5,6}. Liver is the most common site of metastases from colorectal cancer. It is reported that approximately 25% patients of colorectal cancer would be diagnosed with liver metastases, which is also one of the leading causes for the death of the patients^{7,8}. As one of the most important tumor markers for colorectal cancer diagnosis, the increase of CEA has been proved to be highly connected with the poor prognosis in reports both at home and abroad^{9,10,11}. And collagen IV is widely used as a sensitive index for clinical phase division, prognosis evaluation and dynamic observation of disease progression of patients with chronic liver disease^{12,13,14}. Therefore, this paper could provide reference for effective diagnosis of colorectal cancer liver metastases and establish new targets and ideas for clinical therapy and prognosis evaluation through the analysis on diagnostic value and significance of the combination of collage IV and CEA test on patients with colorectal cancer liver metastases.

It has been found in this paper that patients with an increase of CEA and collagen IV share a larger percentage in the metastatic group than that in the non-metastatic group. And according to the analysis of multiple logistic regression, CEA and collagen IV levels are risk factors for the development of colorectal cancer liver metastases, which is in line with the analysis carried by Ceng Yunlong et. Al.^{15,16}. It indicates that levels of serum CEA and collagen IV might play an important role in the metastatic process of colorectal cancer. And colorectal cancer liver metastases could be predicted by detection of serum CEA and collagen IV, further helping with the formulation of individual therapeutic regimen to improve clinical therapeutic effect. In addition, the 3-year survival rate of patients with an increase of CEA and collagen IV is lower than that of patients without CEA and collagen IV changes, indicating that serum CEA and collagen IV are highly related with prognosis of patients of colorectal cancer liver metastases. By detection of serum levels, it is possible to effectively evaluate the prognosis and improvement of patients with colorectal cancer liver metastases. And it shows that serum CEA and collagen IV could serve as the prognosis index of patients with colorectal cancer liver. Furthermore, CA125 expression is not significant among healthy people and benign diseases, but it is higher in a variety of cancers. Studies have shown that CA125 significantly increases in digestive tract cancer with distant metastases¹⁷. The expression of CA19-9 is higher in many digestive tract cancers.

And studies show that the worse patients with colorectal cancer liver metastases are, the higher the expression of CA 19-9 is¹⁸. This analysis also finds that serum CA125 and CA19-9 are higher of patients in metastatic group are significantly higher than those in non-metastatic group, which is in line with the analysis carried out by Wang Meng, et. al. Therefore, liver metastases could be determined by detection of serum CA125 and CA19-9 of patients with colorectal cancer, which could serve as an auxiliary diagnostic index for colorectal cancer liver metastases.

In all, the combination of collagen IV and CEA test could effectively diagnose colorectal cancer liver metastases, which could be serving as a clinical prognostic indicator. And determination of serum CA125 and CA19-9 could help with the diagnosis of colorectal cancer liver metastases, which worth further analysis.

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