

Analysis on the effect of serum CA211 and IGF-1 expression in postoperative clinical efficacy of non-small cell lung cancer.

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Abstract

Objective: To evaluate the postoperative value of serum carbohydrate antigen 21-1 (CA211) and Insulin Growth Factor-1 (IGF-1) in the treatment of patients with non-small cell lung cancer.

Methods: From May 2015 to May 2017, 52 patients with Non-Small Cell Lung Cancer (NSCLC) were collected in our hospital as the study objects. They were regarded as study group (n=52) and another 52 healthy patients were selected as control group. The level of CA211 and IGF-1 was measured before and after treatment in the two groups. The measurements were compared both in and between different groups.

Results: The results showed that both the serum level of CA211 and IGF-1 in patients from the study group were significantly higher than those in the patients from the control group ($P<0.05$); and after treatment, the serum CA211 and IGF-1 level of patients in the study group decreased significantly comparing with the pre-treatment value ($P<0.05$).

Conclusion: There is a correlation between the level of serum CA211 and IGF-1 and the progression of non-small cell lung cancer, thus they can serve as indicators to evaluate the recovery of patients after treatment.

Keywords: Non-small cell lung cancer, Serum detection, CA211; IGF-1, Clinical efficacy.

Accepted on June 20, 2017

Introduction

In past decade, vigorous development of domestic industry and economy has made great influences on ecological environment with the increasingly high incidence of haze. What's worse, the aggravation of population aging issue in China greatly increases the incidence of lung cancer [1-3]. Lung cancer is less likely to be completely cured and its mortality is high. In all patients with lung cancer, those with non-small cell lung cancer accounts for about 80%, which poses a serious threat to both physical and mental health of the patients. Therefore, it is of great significance to explore effective treatment method of lung cancer [4-6]. At present, lung cancer is mainly treated by means of radiotherapy, chemotherapy and surgery and it thus can be seen that reliable evaluation of curative effect is of great significance for implementation and adjustment of the treatment plan. Some studies have shown that IGF-1 is associated with the occurrence and progression of tumor, because the tumor can produce IGF-1 to promote the survival and inhibit the apoptosis of cancerous cells [7-10]. Because the IGF-1 can be secreted to the circulation, we hypothesize that the IGF-1 level will increase during tumorigenesis. Reversely,

the cure of cancer will induce the decrease of IGF-1 in serum. CA211 is one of the biomarkers used to diagnose different cancers, but the value of using it to indicate NSCLC is unknown. The combination of different biomarkers is helpful in diagnose and detection of NSCLC. In our study, we evaluate the using of CA211 and IGF-1 to indicate the effect of surgery in treating NSCLC.

Materials and Methods

General information

From May 2015 to May 2017, 52 patients suffering non-small cell lung cancer were collected in Shanxi Provincial Cancer Hospital. They were regarded as the study group including 28 males and 24 females. The age of the patients range from 49 to 70 with the average of 60.23 ± 4.5 . The patients were diagnosed as non-small cell lung cancer by means of radiological and pathological diagnosis. They didn't receive any treatment before the surgery. Exclusion criteria: patients with metabolic disorders and mental disorders. Another 52 people who came to our hospital for health examination at the

same period were selected as control group including 30 males and 22 females, age range from 50 to 71 with the average of 61.31 ± 4.4 . There was no significant difference in gender and age between these two groups, $P > 0.05$.

Methods

In this study, Radioimmunoassay (RIA) and ELISA were used to detect the serum level of the two groups. All study objects were subject to venous blood collection on the condition of fasting in the early morning with 3 ml blood drawn from each patient placed in the test tube followed by a settling time of 4 h. At the end of the settling, blood samples were centrifuged at the speed of 3000 r/min followed by the separation of blood serum which was placed in a tube of 1.5 ml propylene glycol at the temperature of -80°C for preservation.

Serum CA211 level was detected by ELISA method and serum IGF-1 level by RIA method with the manual as the standard for specific operation.

Clinical observation index

The level of CA211 and IGF-1 were measured and recorded before and after treatment in two groups.

Table 1. Comparison of serum CA211 and IGF-1 level in the two groups before and after treatment.

Group	CA211 ($\mu\text{g}\cdot\text{L}^{-1}$)		IGF-1 ($\mu\text{g}\cdot\text{L}^{-1}$)	
	Before treatment	After treatment	Before treatment	After treatment
Study group	6.88 ± 1.21	$1.77 \pm 0.20^*$	287.31 ± 50.62	155.46 ± 19.43
Control group	1.76 ± 0.19	1.75 ± 0.18	154.33 ± 18.82	155.31 ± 18.36
t	30.144	0.536	17.756	0.040
P	0.000	0.593	0.000	0.968

The relationship between age as well as gender and serum CA2-1 as well as IGF-1 level in the study group

Based on the research and calculation, there was no significant difference in age as well as gender and serum CA2-1 as well as IGF-1 level in patients with non-small cell lung cancer ($P > 0.05$) (Table 2).

Table 2. Relationship between age as well as gender and serum CA2-1 as well as IGF-1 level in the study group.

	>60 (n=29)	≤ 60 (n=23)	t	P
CA211	7.53 ± 2.11	7.22 ± 2.14	0.523	0.603
IGF-1	255.12 ± 36.12	258.31 ± 34.17	0.420	0.676
	Male (n=28)	Female (n=24)	t	P
CA211	7.54 ± 1.13	7.62 ± 1.15	0.252	0.802
IGF-1	256.14 ± 36.42	257.15 ± 35.23	0.101	0.919

Statistical approach

Quantity data were described as percentage (n, %) and measurement data as Mean \pm SD. T test and chi square test were applied to determine the significant difference and Spearman method was used for correlation analysis, $p < 0.05$. Statistical software: SPSS 19.0 and Microsoft office excel.

Results

Comparison of serum CA211 and IGF-1 level before and after treatment in the two groups

The results showed that before treatment the serum level of patients in the study group was significantly higher than that in the control group of statistical difference, $P < 0.05$; and after treatment, the serum CA211 and IGF-1 level of the patients in the study group decreased significantly compared with the pre-treatment value of statistical difference ($P < 0.05$), but with no significant difference in the serum level between the two groups of no statistical difference, $P > 0.05$ (Table 1).

Discussion

Non-small cell lung cancer, with moderately higher incidence accounts for about 82% in the total incidence of lung cancer and most patients with the onset of the disease suffer such clinical symptoms as chest tightness, shortness of breath, cough and sputum. In the early stage, the patients are treated by surgical resection of the lesion. Therefore, it is of great significance to determine the effect of surgery treatment correctly and effectively [11-13]. If the curative effect is poor, the treatment plan can be adjusted in time to improve the efficiency of the treatment for lung cancer. Existent results have showed that CA211 and IGF-1 in serum are closely related to the occurrence and progression of most malignant tumors [14-18]. In this study, the results showed that before treatment the serum level of patients in the study group was significantly higher than that in the control group of statistical difference, $P < 0.05$; and after treatment, the serum CA211 and IGF-1 level of the patients in the study group decreased

significantly compared with the pre-treatment value of statistical difference ($P < 0.05$), but with no significant difference in the serum level between the two groups of no statistical difference, $P > 0.05$. In addition, there was no statistical significance in age and gender of the patients in the case of serum CA211 and IGF-1 development of non-small cell lung cancer patients, $P > 0.05$. CA211 is one of polypeptide fragments of cytokeratin 19, seen more commonly in pulmonary alveoli and its concentration will increase with the rising number of cancer cells [19-22]. Therefore, when the level of CA211 decreases significantly or is similar with that of normal subjects, it proves that lung cancer surgery has moderately good effects thus making it significant to detect the serum CA211 level in patients with lung cancer surgery. IGF-1, a kind of single polypeptide, can be seen in the human chromosome 12q22, mainly composed of amino-acid residue and it enables to generate low molecular peptides through the transformation of sintracrine, autocrine and paracrine. Besides, IGF-1 is also very common on the cell surface and its over expression will facilitate the transformation into malignant cells. And its combination with the IGF-1R of the target cells will activate acid residues, produce cascade reaction, accelerate anti-apoptosis and synthesis of protein, promote the proliferation of cells and help with the invasion of cancer cells [23-25].

Conclusion

The detection of serum CA211 and IGF-1 level in patients with non-small cell lung cancer has good evaluation and predictive significance for surgical treatment in this regard, thus making it worthy of promotion of moderately high application value.

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