

## Original Article

# Changes of tumor markers and C reactive protein in different status of lung cancer

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**Abstract:** Aims: Our research aims at finding the change regularity of the tumor markers and C reactive protein in different status of lung cancer patients. Methods: 111 lung cancer patients were divided into different groups by age, gender, Metastasis, TNM, and histology. The tumor markers which include alpha fetal protein (AFP), carcino-embryonic antigen (CEA), carbohydrate antigen 125 (CA125), carbohydrate antigen 199 (CA199), ferritin, and C reactive protein (CRP) in serum were analyzed and compared between 111 lung cancer patients with normal personals. Results: The five kinds of tumor markers and CRP of lung cancer patients were significantly higher than the normal personals. And the tumor markers of CA125, CA199 and CRP in the young group and the middle age group were significantly lower than the old age group of lung cancer patients; the CRP in TNM(I) group of lung cancer patients was significantly lower than the TNM(II) TNM(III~IV) groups; the CA125, CA199 and Ferritin in the squamous cell carcinoma group and the adenocarcinoma group were significantly lower than the small cell cancer group, but there was no obvious difference between the squamous cell carcinoma group and the adenocarcinoma group. Conclusions: Above all, our research found that the five tumor markers and CRP had changed significantly in different status of the lung cancer patients, which may provide references for the diagnosis and treatments for the clinic.

**Keywords:** Lung cancer, tumor marker, C reactive protein, change

## Introduction

Lung cancer is the most important causes of the cancer related mortality, which has a high incidence in many countries, with the characteristics of quick malignant development and high death risk [1, 2]. Patients with lung cancer are usually diagnosed at advanced or locally advanced stage, which is not conducive to the clinical treatment. In recent years, researchers pay more and more attention to the study of tumor molecular biology, so as to find many tumor markers may indicate the source of the tumor and histology [3]. Our research aims at finding the change regularity of the tumor markers and C reactive protein in different status of lung cancer patients, to provide reference to the clinic.

## Methods

### General clinical data

111 lung cancer patients were recruited from between January 2013 and April 2015 who were hospitalized in dermatological department aged 33-81 years, mean (58.86±9.48) years. Diagnosis and staging according to the clinical manifestation and laboratory examination, and the pathology diagnosed, with reference to the international union of cancer clinical stage (UICC) of lung cancer TNM staging (7th edition) standard. All the patients were divided into three groups by age (age <50, 20 cases; age ≥50 and age <70, 79 cases; age ≥70, 12 cases); divided into three groups by TNM(I: 61 cases, II: 24 cases, III~IV: 26 cases); divided into three groups by histology (Group 1:

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**Table 1.** Differences of Tumor markers and C reactive protein (CRP) between lung cancer patients and normal personals

Group	AFP	CEA	CA125	CA199	Ferritin	CRP
Lung cancer Group	3.58±0.22**	36.60±17.06**	144.78±51.87**	1197.45±191.96**	701.6±117.38**	10.27±2.12**
Normal group	2.04±0.10	1.50±0.08	12.89±1.00	4.05±0.42	125.33±15.34	1.81±0.69

\*\*compared with the normal group, P<0.01.

**Table 2.** Differences of Tumor markers and C reactive protein in lung cancer patients of different metastasis groups

Metastasis	AFP	CEA	CA125	CA199	Ferritin	CRP
No	3.63±0.30	40.37±24.52	43.09±9.26	144.06±97.29	275.19±29.82	7.27±1.14
Yes	3.49±0.29	28.51±11.16	362.69±319.50	3454.71±3427.80	1615.35±1309.62	16.71±5.80
t	0.293	0.323	-1.000	-0.965	-1.203	-1.596
p	0.770	0.748	0.324	0.341	0.313	0.119

**Table 3.** Differences of Tumor markers and C reactive protein in lung cancer patients of different gender groups

Gender	AFP	CEA	CA125	CA199	Ferritin	CRP
Female	3.43±0.42	51.59±38.9	44.67±14.22	33.58±15.82	243.79±52.08	10.71±4.72
Male	3.68±0.25	27.34±13.79	206.61±164.57	1916.31±1765.70	984.37±674.03	10±1.56
t	-0.549	0.689	-0.771	-0.837	-0.861	0.168
p	0.584	0.482	0.442	0.405	0.391	0.867

the squamous cell carcinoma group, 26 cases; Group 2: the adenocarcinoma group, 71 cases; Group 3: the small cell cancer group, 14 cases; divided into two groups by Metastasis (Yes: 75 cases, No: 36 cases); divided into two groups by genders (female: 42 cases, male: 69 cases). Normal group included 35 cases for our hospital physical examination personals, whose age and gender matched with the patients. All cases were out of autoimmune diseases.

### Materials and methods

5 ml fasting blood was extracted from all the patients and normal personals on the second early morning in hospital. And the serum was separated by centrifuge 10 min at 3000 r/min after clotted. And the tumor markers which included alpha fetal protein (AFP), carcino-embryonic antigen (CEA), carbohydrate antigen 125 (CA125), carbohydrate antigen 199 (CA199), ferritin, and C reactive protein (CRP) were detected in the clinical laboratory in hospital.

### Statistical analysis

Data were analyzed by SPSS 13.0 software. All data are presented as mean ± standard deviation

and a difference in mean value was considered significant at P<0.05. Comparison between the two groups using independent sample t test, Comparison between groups were determined by one-way analysis of variance (ANOVA).

### Results

#### *Differences of tumor markers and C reactive protein between lung cancer patients and normal personals*

The five kinds of tumor markers and C reactive protein of lung cancer patients were significantly higher than the normal personals: (**Table 1**).

#### *Tumor markers and C reactive protein of lung cancer patients in different metastasis groups*

The Tumor markers and C reactive protein of lung cancer patients had no obvious difference in different metastasis groups (**Table 2**).

#### *Tumor markers and C reactive protein of lung cancer patients in different gender groups*

The tumor markers and C reactive protein of lung cancer patients had no obvious difference in different gender groups (**Table 3**).

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**Table 4.** Tumor markers and C reactive protein of lung cancer patients in different age groups

Age	AFP	CEA	CA125	CA199	Ferritin	CRP
Group 1	3.16±0.39	28.46±18.18	32.49±9.41**	15.77±4.36**	180.40±48.00	5.36±1.00**
Group 2	3.86±0.29	40.26±23.57	38.20±7.93**	27.07±9.22**	285.91±29.77	7.56±1.35**
Group 3	2.52±0.35	26.38±12.62	1024.68±927.61	10774.38±9947.13	4272.30±3804.56	36.08±14.83

Group 1: the young group; Group 2: the middle age group; Group 3: the old age group. \*: compare with Group 3 P<0.05; \*\*: compare with Group 3 P<0.01.

**Table 5.** Tumor markers and C reactive protein of lung cancer patients in different TNM groups

TNM	AFP	CEA	CA125	CA199	Ferritin	CRP
Group 1	3.79±1.80	19.49±11.46	30.83±16.63	9.69±3.74	264.85±148.29	7.68±3.31*
Group 2	3.11±0.98	80.30±33.56	65.11±13.07	139.10±46.80	193.04±51.98	8.47±3.21
Group 3	3.52±1.92	38.06±14.65	482.59±21.91	4920.35±235.11	2176.17±696.76	17.94±5.60

Group 1: the TNM(I) group; Group 2: the TNM(II) group; Group 3: the TNM(III-IV) group. \*: compared with t Group 3 P<0.05; \*\*: compared with Group 3 P<0.01.

**Table 6.** Tumor markers and C reactive protein of lung cancer patients in different histology groups

Style	AFP	CEA	CA125	CA199	Ferritin	CRP
Group 1	3.37±2.37	3.18±1.91	28.75±42.01*	274.73±13.68*	213.99±155.77*	8.93±9.16
Group 2	3.77±2.49	53.97±22.27	47.34±24.87**	60.36±27.01*	292.73±30.67**	10.86±5.39
Group 3	3.06±1.16	11.79±23.31	847.46±29.86▲**	8596.51±320.64▲*▲	3651.59±122.22▲**	9.80±4.51

Group 1: the squamous cell carcinoma group; Group 2: the adenocarcinoma group; Group 3: the small cell cancer group. \*Compared with Group 3 P<0.05; \*\*Compared with Group 3 P<0.01. ▲Compared with Group 1 P<0.05; ▲▲Compared with Group 1 P<0.01; \*Compared with Group 2 P<0.05; \*\*Compared with Group 2 P<0.01.

### *Tumor markers and C reactive protein of lung cancer patients in different age groups*

The tumor markers of CA125 and CA 199 and CRP in the young group and the middle age group were significantly lower than the old age group of lung cancer patients (Table 4).

### *Tumor markers and CRP of lung cancer patients in different TNM groups*

The CRP in TNM(I) group of lung cancer patients was significantly lower than the TNM(II) TNM(III-IV) groups (Table 5).

### *Tumor markers and CRP of lung cancer patients in different histology groups*

Tumor markers and CRP of lung cancer patients in different histology groups had obvious differences, the CA125, CA199 and ferritin in the squamous cell carcinoma group and the adenocarcinoma group were significantly lower than the small cell cancer group, but there was no obvious difference between the squamous cell carcinoma group and the adenocarcinoma group (Table 6).

### **Discussion**

Lung cancer is a leading cause of cancer-related deaths worldwide, and is considered one of the most aggressive human cancers, with a 5-year overall survival of 10-15% [4]. At present many kinds of tumor markers have been widely used in the lung cancer diagnosis [3]. The presence of biomarkers in the serum of patients with lung cancer has aroused great clinical interest, since, with a simple blood test, a valid biomarker could be used for screening, diagnosis, prognosis, progression assessment, and monitoring of therapeutic response [5]. Despite efforts for early detection, most patients with lung cancer continue to present with an advanced of the disease [6]. Finding the change features of the biomarkers in different status of lung cancer may be important to improve survival in these patients.

Several tumor markers are produced by the limited organ and have the advantage for the determination of the origin [7]. Some markers were classified as oncofetal antigens, such as carcinoembryonic antigen (CEA), alpha-fetopro-

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tein (AFP) [8, 9]. Some markers classified as tumor associated antigens are produced by various organs and are not specific to cancer but associated with cancer, such as, cancer antigen (CA) 125, CA199. Now, levels of CEA, AFP, CA125, and CA199 have been assayed in many studies focusing on differentiating benign and malignant tumors [10-13]. Recent studies have also demonstrated that elevated serum ferritin levels are indicative of pathological processes in immunosuppression, angiogenesis, and proliferation. This evidence suggests that elevated serum ferritin could be a potential biomarker of malignant disease [14]. Therefore, our research selected the five tumor markers (CEA, AFP, CA125, CA199, and Ferritin) as the representative of tumor markers in lung cancer.

Serum CRP levels, measurement of which is relatively inexpensive and easy to quantify in daily clinical practice and it is used in various studies to diagnose, evaluate the prognosis or response to treatment [15-17]. Several possible mechanisms have been proposed for the relationship between CRP and cancer. First, tumor growth can cause tissue inflammation and hence increase CRP levels [16-18]. Second, CRP could be an indicator of an immune response to tumor antigens [19]. Third, there is evidence that cancer cells can increase the production of inflammatory proteins, which could explain the high CRP concentrations in patients with cancer. Some cancerous cells have been shown to express CRP [20, 21].

Our research detected the five kinds of tumor markers AFP, CEA, CA125, CA199, Ferritin, and CRP in lung cancer patients, to find the features of the changes in different status of the disease, to provide references for the clinic. In our research, we find that the five kinds of tumor markers and CRP of lung cancer patients were significantly higher than the normal personals, which indicated that the five kinds of tumor markers and CRP can be the biomarker to distinguish the lung cancer and normal personals. And we studied the different status of lung cancer patient, found that different gender and different metastasis had no difference. Otherwise different age groups and different histology groups and different TNM groups had significant differences. The tumor markers of CA125 and CA199 and CRP in the young group

and the middle age group were significantly lower than the old age group of lung cancer patients. The CRP in TNM(I) group of lung cancer patients was significantly lower than the TNM(II) TNM(III~IV) groups. Tumor markers and CRP of lung cancer patients in different histology groups had obvious differences, the CA125, CA199 and Ferritin in the squamous cell carcinoma group and the adenocarcinoma group were significantly lower than the small cell cancer group, but there was no obvious difference between the squamous cell carcinoma group and the adenocarcinoma group.

Above all, our research found that the five tumor markers and CRP had changed significantly in different status of the lung cancer patients. And the changes had obvious features, for that the change of biomarkers in different ages and TNM and different histology showed some regularity, which may provide references for the diagnosis and treatments for the clinic.

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### Disclosure of conflict of interest

None.

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