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Correlation analysis of the treatment and prognosis of atherosclerosis patients with acquired pneumonia

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Abstract: It is to analyze and compare the risk factors influencing the infection of atherosclerosis patients with acquired pneumonia and the influencing factors of treatment and prognosis after infection with acquired pneumonia. A total of 100 atherosclerosis patients admitted to our hospital from May 2021 to April 2023 were selected, of which 50 were infected with acquired pneumonia during hospitalization as the observation group and 50 were not infected as the control group. There was no significant difference in the general data between the two groups. Patients with atherosclerosis who have diabetes, smoking and drinking habits, and worsening lipids are more likely to contract acquired pneumonia. Patients with atherosclerosis with diabetes mellitus and smoking habits who are infected with acquired pneumonia have a significant increase in recovery time and a significant decrease in prognosis. Conclusion: Patients with atherosclerosis who have diabetes mellitus, smoking and drinking habits, and deteriorating blood lipid levels have a significantly increased risk of acquired pneumonia compared with those who do not, and patients with atherosclerosis who have diabetes and smoking habits have a worse treatment and prognosis after infection with acquired pneumonia.

1. Introduction

Atherosclerosis is a common sipid caused by lipid metabolism disorders is one of the main bases for its pathogenesis, and patients with atherosclerosis are often accompanied by a variety of cardiovascular, cerebrovascular and underlying metabolic diseases such as coronary heart disease and diabetes. However, due to the existing level of inflammation in the body and the accompanying diseases, atherosclerosis patients have greatly reduced immune activity against viruses and bacteria, and are more likely to be infected with acquired pneumonia than normal patients[i,ii,iii].Therefore, it is of great value to analyze the risk factors of atherosclerotic patients complicated by infection with acquired pneumonia, and to find out the relevant factors affecting the post-infection treatment

and prognosis of atherosclerotic patients[1].

2. Data and Methods

2.1 General Data

A total of 100 atherosclerosis patients who were admitted to the hospital from May 2021 to April 2023 were selected as the study subjects, of which 50 patients who were not infected with acquired pneumonia during admission were the control group, and the other 50 patients who were infected with acquired pneumonia during admission were selected as the observation group[2].

Methods

Inclusion Criteria: (1) The clinical diagnosis of the patient must conform to the relevant diagnosis of atherosclerosis in the Guidelines for Vascular Ultrasonography (2019 Edition) in China;2. The patient is self-aware and in a reasonable mental state, and can answer questions accurately.

Exclusion Criteria: (1) Patient has a neoplastic disease; (2) Patient has severe autoimmune disease; (3) Patient has underlying psychiatric disorders; (4) Patient has other significant serious illness in major organs of the body.

Diagnostic criteria for acquired pneumonia: (1) Chest imaging results showed signs of pneumonia; (2) Significant respiratory inflammatory symptoms are present.

2.2 Observation indicators

The patient's adverse life history and complications were recorded in the hospital.

After fasting for half a day, blood was collected through veins, and cholesterol, low-density lipoprotein and high-density lipoprotein were collected from the samples of each patient using a fully automatic multi-functional biochemical analyzer. The blood of the patients in the observation group was collected on the seventh day of infection for the determination of white blood cell count and hypersensitivity protein C.

According to the symptoms of respiratory diseases in the observation group, the recovery time of acquired pneumonia was recorded, and the follow-up visit was made on the 15th day after recovery[3].

2.3 Statistical methods

SPSS17.0 software was used for statistical analysis of all data, the mean ± standard deviation was used to express the data, the t-test was used for comparison between continuous data, and the chi-square test was used for comparison between counting data, and the difference of $P < 0.05$ was regarded as statistically significant.[4]

3. Result

3.1 General data

As shown in the table below, there were 23 males and 27 females in the control group, accounting for 46% of males, and 26 males and 24 females in the observation group, accounting for 52% males, and the sex composition ratio between the two groups was not statistically significant ($P > 0.05$). The minimum age of the control group was 40 years, the maximum was 65 years, the mean age was 52.2 years, the standard deviation was 7.85, the minimum age was 42 years, the

maximum was 66 years, the mean age was 53.2 years, the standard deviation was 8.42, and the age between the two groups was not statistically significant (P > 0.05), shown in Table 1.

Table 1: General clinical data

	Control Group(n = 50)	Observation Group(n = 50)	t/χ^2	P
Number of males	23	26	0.360	0.689
Age	52.2±7.85	53.2±8.42	-0.602	0.549

3.2 Analysis of risk factors for acquired pneumonia in atherosclerosis patients

As can be seen from the following table, the number of patients with hypertension in the control group and the observation group was 11 and 16, respectively, and the number of patients with coronary heart disease was 7 and 14. Respectively, the statistical test showed that the composition ratio of patients with hypertension or coronary heart disease in the control group and the observation group was not statistically significant (P > 0.05). It is indicating that patients with atherosclerosis complicated by hypertension or coronary heart disease were not risk factors for acquiring pneumonia[5].

The number of patients with diabetes mellitus in the control group and the observation group was 16 and 29, which was statistically significant (P < 0.05), and the number of patients with smoking habit and drinking habit in the two groups was 12 and 27. Respectively, the number of patients with drinking habit was 16 and 28, respectively, and the results between the two groups were significantly different (P < 0.05), indicating that patients with atherosclerosis complicated by diabetes mellitus, or patients with atherosclerosis with smoking and drinking habits increased the risk of acquired pneumonia[6].

Further comparison of the levels of blood lipids between the control group and the observation group showed that the cholesterol and low-density lipoprotein levels of the control group were significantly lower than those of the observation group (P < 0.05), and the levels of high-density lipoprotein in the control group were significantly higher than those in the observation group (P < 0.05), suggesting that the deterioration of hyperlipidemia may increase the risk of acquired pneumonia, shown in table 2.

Table 2: Analysis of risk factors for acquired pneumonia in patients with atherosclerosis

	Control Group(n = 50)	Observation Group (n = 50)	t/χ^2	P
Number of high blood pressures	11	16	1.268	0.368
Number of diabetes mellitus	16	29	6.828	0.015
Number of coronary heart diseases	7	14	3.124	0.091
habitual smokers	12	27	8.167	0.008
Alcoholics	16	28	5.844	0.026
cholesterol	5.98±0.59	6.89±0.62	-7.595	< 0.001
Low-density lipoprotein	4.48±0.24	5.03±0.32	-9.599	< 0.001
high-density lipoprotein	0.85±0.09	0.69±0.06	10.094	< 0.001

3.3 Analysis of factors affecting the prognosis of patients with atherosclerosis and acquired pneumonia

Therefore, on the seventh day after the patient was infected with acquired pneumonia, the blood of the patient was collected by a biochemical analyzer to measure the white blood cell count and hypersensitive C-reactive protein level, and the duration of cough, fever and sputum was combined to evaluate whether diabetes mellitus would affect the prognosis of patients infected with acquired pneumonia[7].

It can be seen from Table 3 that the duration of fever in the observation group was 6.20 days in patients with diabetes mellitus and 5.34 days in patients without diabetes mellitus, which was statistically significant ($P < 0.05$), indicating that the fever resolution time after infection with acquired pneumonia in patients without atherosclerosis was significantly lower than that in patients with diabetes. The duration of cough and sputum production were 7.76 days and 9.42 days in the observation group and 7.88 days and 9.78 days in the observation group and 9.78 days in the observation group ($P >$). 0.05), speculating that the similarity between the duration of cough and sputum prug may be due to the influence of unhealthy lifestyle habits such as smoking or drinking, so further comparisons are needed[8].

On the seventh day of treatment, blood was collected and white blood cell count and hypersensitive C-reactive protein level were detected in the observation group, and the white blood cell count and hypersensitive C-reactive protein level were 7.11×109/L, which was significantly lower than that of the observation group (×$P < 0.05$), and the ultra-sensitive C-reactive protein (2.91 mg/L) of the non-diabetic patients in the observation group was significantly lower than that of the 5.08 mg/L ($P < 0.05$)[9].

The plasma inflammatory factor level combined with the duration of fever showed that the recovery time and recovery effect of patients without diabetes in the observation group were significantly better than those in the observation group compared with those in the observation group[10].

Table 3: Analysis of the prognosis of pneumonia in the observation group

	Observation group with diabetes (n = 29)	Observation group without diabetes (n = 21)	t	P
Duration of cough(d)	7.88±1.20	7.76±0.71	0.492	0.626
Duration of fever(d)	6.20±1.12	5.34±0.71	3.321	0.002
Duration of sputum pruptive(d)	9.78±0.95	9.42±0.78	1.410	0.165
White blood cell count(×10^9/L)	9.89±1.35	7.11±1.20	7.510	< 0.001
Hypersensitive C-reactive protein (mg/L)	5.08±0.56	2.91±0.60	13.162	< 0.001

From the above, it can be seen that there is no significant difference between the duration of cough and the duration of sputum production in patients with or without diabetes mellitus in the observation group, and it is speculated that the bad lifestyle habits of drinking or smoking may affect them, so the duration of cough and the duration of sputum production are compared in Table 4 and Table 5 according to whether the patients in the observation group have smoking habits and drinking habits[11].

The results showed that the duration of cough and sputum in the observation group were 6.00

days and 8.47 days, which were significantly smaller than those in the observation group (7.79 days and 10.06 days) (P < 0.05). Table 5 showed that the duration of cough and sputum in the observation group were 7.04 days and 9.32 days, respectively, which were slightly smaller than those of those with drinking habits (7.23 days and 9.84 days), but were not statistically significant (P >). 0.05). The results indicated that smoking habits did have a significant effect on the treatment and prognosis of patients with atherosclerosis and diabetes mellitus after infection with acquired pneumonia, but not on drinking habits, and that smoking habits may have an effect on the cough and sputum duration of patients in the observation group with and without diabetes[12].

Table 4: The effect of smoking habits on the prognosis of acquired pneumonia was observed in the observation group

	Observation group with smoking habits(*n* = 27)	Observation group without smoking habits(*n* = 23)	*t*	*P*
Duration of cough(d)	7.79 ±0.56	6.00 ±0.68	10.288	< 0.001
Duration of sputum pruptive(d)	10.06 ±1.19	8.47 ±0.84	5.516	< 0.001

Table 5: The effect of drinking habits on the prognosis of acquired pneumonia was observed in the observation group

	Observation group with alcoholic (*n* = 28)	Observation group without alcoholic (*n* = 22)	*t*	*P*
Duration of cough(d)	7.23 ±0.80	7.04 ±0.59	0.977	0.334
Duration of sputum pruptive(d)	9.84 ±1.21	9.32 ±0.82	1.784	0.081

4. Discussion

Patients with atherosclerosis are more susceptible to infection due to their disease specificity when exposed to pathogenic microorganisms. Another study showed that the detection rate of carotid atherosclerosis in the hypertensive group of patients infected with chlamydia pneumoniae was significantly higher than that in the group of hypertensive patients without pneumonia, which also revealed the susceptibility of patients with atherosclerosis to acquired pneumonia; Similarly, there were similar studies on Mycoplasma pneumoniae, and it was found that compared with patients without atherosclerotic disease, the serum IgG and inflammatory factors such as interleukin-1β and interleukin-6 were significantly increased in patients infected with Mycoplasma pneumoniae pneumonia in patients with atherosclerosis. Therefore, it is of great significance to analyze the risk factors for acquired pneumonia in patients with atherosclerosis.

In addition to the concomitant underlying diseases, this study found that the level of lipid index is also one of the significant risk factors for acquired pneumonia infection. It has also been found that the number of patients with coronary heart disease with significant disorders of lipid metabolism and significantly elevated blood lipid levels infected with chlamydia pneumonia pneumonia is significantly higher than that of patients with coronary heart disease whose blood lipid levels are well controlled[13]. In addition, meta-analyses have found that the blood lipid level of patients with cerebrovascular diseases including atherosclerosis is significantly correlated with Chlamydia pneumoniae pneumonia, and the blood lipid level is also significantly correlated with inflammatory factors after pneumonia. Combined with the content of this study, it was shown that

the blood lipid level of atherosclerosis patients significantly affected the risk of infection and the prognosis effect of treatment of acquired pneumonia.

At present, there is a lack of research on the susceptibility and prognosis effect of smoking habits and drinking habits on the infection of acquired pneumonia in patients with atherosclerosis, but there are also relevant studies that show that the smoking history of patients with acute stroke is significantly correlated with severe pneumonia. In addition, there are also studies on risk factors for stroke-related pneumonia in patients with cerebral infarction, and it has been found that smoking history is also one of the relevant factors affecting the pneumonia in stroke patients.

In conclusion, this study found that diabetes mellitus, unhealthy lifestyle habits such as smoking and drinking, and deterioration of blood lipid indexes can significantly affect the risk of acquired pneumonia in patients with atherosclerosis, and it was found that diabetes mellitus and smoking habits can significantly affect the treatment and prognosis of patients with atherosclerotic infection.

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