Study on Risk Factors and TCM Syndrome Distribution of T2DM Accompanied by MAFLD

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Abstract: This paper mainly studies the risk factors of type 2 diabetes combined with metabolic fatty liver disease and the distribution of TCM syndrome types by incorporating case comparison diagnosis and observation, in order to identify the main inducements of type 2 diabetes combined with metabolic fatty liver disease, and to provide guidance for clinical diagnosis and treatment.

Keywords: T2DM Accompanied by MAFLD; TCM Syndrome; Risk Factors

1. Introduction

Relevant clinical studies have shown that diabetes mellitus type 2 (T2DM) are interrelated with and can be transformed to metabolic associated fatty liver disease (MAFLD). They can together promote the occurrence and development of cardiovascular diseases, hepatocellular carcinoma, extrahepatic malignancies, cirrhosis and other diseases, and seriously affect the health of patients. T2DM accompanied by MAFLD can be included in the categories of liver accumulation, influenza and thirst, hunger, frequent urination, weight loss in traditional Chinese medicine. Traditional Chinese medicine (TCM) treatment based on syndrome differentiation can delay the development of the disease [1]. This study conducted a study on the risk factors and distribution of TCM syndrome types in patients. The detailed content of the study is as follows.

2. Information and Methods

2.1 General Information

The study was conducted from June 2022 to July 2023. 100 patients with T2DM accompanied by MAFLD were selected from the hospital as the research group, and 100 patients with T2DM that were accompanied by MAFLD were regarded as the control group. There were patients with 55 male and 45 female in the research group, with an age range of 55-75 years and an average age range of (65.68 ± 1.39) years. There are patients with 53 male and 47 female in the control group, with an age range of 57-76 years and an average age of (66.17 ± 1.45) years. And the general information of patients in the two groups were compared, p>0.05.

2.2 Methods

The study first diagnosed whether the patient had diabetes. The diagnostic criteria of diabetes were that the patient had clinical symptoms such as significant weight loss, excessive thirst, polyuria, etc. The plasma glucose of the patient was ≥ 11.1 mmol/L at any time, the fasting plasma glucose of the patient was ≥ 7.0 mmol/L, and the blood glucose of the patient in the 2-hour glucose tolerance test was ≥ 11.1 mmol/L.

The study collects detailed information and medical history of patients, and conducts color Doppler neck vascular ultrasound examination on patients. The research group of patients underwent TCM syndrome differentiation and classification. According to the standard, patients can be divided into four types, namely liver and kidney deficiency syndrome, phlegm stasis syndrome, dampness heat accumulation syndrome, and liver depression and spleen deficiency syndrome.

2.3 Observation Indicators

Objective indicators of patients in the research group and the control group were observed, namely, the levels of serum uric acid (SUA), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), total cholesterol (TG), triglycerides (TC), and glycated hemoglobin (HbA1C).

2.4 Statistical Methods

The research data were analyzed by SPSS 26.0 software, with count data expressed as percentages, chi square value as the study test value, measurement data expressed as mean ± standard deviation, and t-value as the study test value. If p<0.05, it can fully demonstrate that

there has significant statistical significance of the research data.

3. Results

3.1 Objective Indicators of Patients in the Research Group and the Control Group

The LDL-C levels of patients in the research group were higher than those in the control group (p<0.05). But there was no significant difference in the levels of SUA, HDL-C, TG, TC, and HbA1C between the research group and the control group (p>0.05). The specific data of the study is shown in Table 1 and Table 2.

Table 1. Objective Indicators of Patients in the Research Group and the Control Group ($\bar{x} \pm s$)

Group	Case	LDL-C(mmol/L)	SUA(μmol/L)	HDL-C(mmol/L)
research group	100	3.09±1.25	352.47±109.65	1.22±0.57
control group	100	2.62±1.12	349.45±117.496	1.18±0.62
t	-	9.786	1.458	1.975
P	-	0.001	0.081	0.064

Table 2. Objective Indicators of Patients in the Research Group and the Control Group ($\bar{x} \pm s$)

Group	Case	TG(mmol/L)	TC(mmol/L)	HbA1C
research group	100	5.28±1.53	1.70±0.42	10.05±2.87
control group	100	4.88±1.65	1.90±0.52	9.98±2.73
t	-	1.092	1.118	1.217
P	-	0.071	0.068	0.079

3.2 Distribution of TCM Syndrome Types of Patients in the Research Group

The TCM syndrome types of patients in the research group can be divided into four types, namely liver and kidney deficiency syndrome, phlegm stasis syndrome, dampness heat accumulation syndrome, and liver depression and spleen deficiency syndrome.The age of patients with liver and kidney deficiency syndrome is older than the other three types. And patients with liver depression and spleen deficiency syndrome have the shortest course of disease, while patients with liver and kidney deficiency syndrome have the longest course of disease. The specific research data is shown in Table 3.

Table 3. Distribution Characteristics of TCM Syndrome Types of Patients in the Research Group [n, (%)]

TCM syndrome	Case	Percentage of classification(%)	middle age	median course of disease (months)
liver and kidney deficiency syndrome	10	10.00	70.00	11.205
phlegm stasis syndrome	22	22.00	66.00	10.020
dampness heat accumulation syndrome	18	18.00	61.65	4.665
liver depression and spleen deficiency syndrome	50	50.00	56.38	0.985

4. Discussion

T2DM is due to the combined effect of poor lifestyle and certain genetic risks, which makes insulin secretion relatively insufficient and can not meet the physiological needs of the body, thus resulting in increased blood sugar [2]. Fatty liver refers to the pathological changes caused by excessive accumulation of fat in liver cells, and there are many reasons that can cause fatty liver. For example, the patient is too fat, has chronic hepatitis, likes drinking, and has diabetes [3]. Relevant clinical studies have shown that glycated hemoglobin, triglycerides, and total cholesterol are risk factors for patients with T2DM accompanied by MAFLD in clinical practice. The incidence of patients with T2DM accompanied by MAFLD increases with their age, and the incidence rate of female patients is significantly higher than that of male patients. It may be because that with the increase of female patients' age, their estrogen level decreases significantly, leading to more serious symptoms of lipid metabolism disorders in the body. And patients are more likely to have T2DM accompanied by MAFLD [4]. There is a certain correlation between the incidence of T2DM accompanied by MAFLD and the disorder of glucose and lipid metabolism. Glycated hemoglobin can effectively reflect the average blood sugar level of diabetes patients within 2-3 months, and long-term hyperglycemia is more likely to induce T2DM accompanied by MAFLD. In the clinical research on lipid metabolism, it is found that low-density lipoprotein can be an independent risk factor for patients with T2DM accompanied by MAFLD.

Patients can use low-density lipoprotein as an important target in clinical treatment. Clinicians need to pay close attention to the changes of patients' low-density lipoprotein indicators, effectively control controllable factors, and timely carry out relevant intervention indicators for patients, so as to prevent the patient's disease from evolving into cirrhosis and liver fibrosis, and to prevent the patient's disease from developing into liver cancer [5].

T2DM accompanied by MAFLD is considered in traditional Chinese medicine to be a diabetes with disease marked by frequent drinking and urinating, which can damage stomach, consume spleen and stomach, and lead to the dysfunction of spleen and stomach transport. Due to improper diet, phlegm and dampness are generated internally, and gather under the threat to become a disease of phlegm and drink. Phlegm retention obstructs the liver meridian, causing liver loss and laxity, leading to stagnation of liver. And long term illness can also damage the liver and kidneys [6]. T2DM accompanied by MAFLD can be treated with traditional Chinese medicine. Through the dialectical treatment of traditional Chinese medicine and the overall concept, the clinical symptoms and glycolipid metabolism indicators of patients can be significantly improved, so that the disease development of patients can be effectively delayed. The research results show that the most common syndrome of patients with T2DM accompanied by MAFLD is liver depression and spleen deficiency syndrome, and the patients are relatively young and the course of disease is relatively short [7]. In addition, the incidence rate of female patients increases with age, especially women in perimenopause or menopause, whose hormone levels are significantly reduced, are prone to major changes in personality, and sudden changes in personality may lead to stagnation of liver. Phlegm stasis syndrome, dampness heat accumulation syndrome are commonly seen traditional Chinese medicine syndromes in clinical practice. With the continuous extension of the patient's disease course, the patient's disease may develop from liver depression and spleen deficiency syndrome to dampness and heat accumulation syndrome, and then from phlegm stasis syndrome to liver and kidney deficiency syndrome. When the patient's disease course does not exceed 5 years, the main traditional Chinese medicine symptoms of the patient are dampness heat accumulation syndrome and liver depression spleen deficiency syndrome. When the patient's disease course is prolonged to a certain extent, the patient will experience internal phlegm turbidity, blood stasis blockage, and then develop into phlegm stasis syndrome. Patients with T2DM accompanied by MAFLD can be treated with diet, exercise and western medicine to reduce blood sugar and lipid. At the same time, if taken orally with traditional Chinese medicine and combined with a dual approach, accurate therapeutic effects are often achieved.Liver depression and spleen deficiency syndrome include dull pain and discomfort in the liver region, dizziness and fatigue, pale complexion, bloating and loose stools, worsening symptoms when emotions are not smooth with red tongue, thin and greasy coating, and thin or stringy pulse. The treatment for patients with liver depression and spleen deficiency syndrome is to soothe the liver and strengthen the spleen. The formula is modified with Xiaoyao Powder, which is used for medicinal purposes such as atractylodes macrocephala, angelica sinensis, chaihu, white peony, poria cocos, alisma orientalis, astragalus membranaceus, hawthorn, and neijin. For those with spleen deficiency and diarrhea, they can be added with lentils, atractylodes macrocephala, etc. Other syndromes should reasonably use the overall concept of traditional Chinese medicine and combine the characteristics of the disease to clarify the basic treatment principles of patients, and also pay attention to the development laws of the patient's disease. More importantly, effective dynamic treatment should be carried out to protect the patient's liver and effectively delay the onset of the disease.

5. Conclusion

Low density lipoprotein can be used clinically to diagnose type 2 diabetes combined with metabolic fatty liver disease. In combination with the TCM syndrome type of the patient's disease, appropriate TCM treatment can be selected to promote the patient to recover as soon as possible.

References

[1] Zhang Lili, Weng Xiaogang, Yao Shufan (2023). Correlation between Blood Glucose Fluctuation and Type 2 Diabetes Combined with Metabolic Fatty Liver Disease. Journal

of Xinxiang Medical University, 40 (05): 427-431.

[2] Kong Dexian, Xing Yuling, Sun Wenwen, et al (2023). Study on the Correlation between Estimated Glucose Treatment Rate and Type 2 Diabetes with Metabolic Fatty Liver Disease. China General Practice, 26 (26): 3252-3258.

[3] Qian Fangfang, Li Haoxiang, Shen Yirong, et al (2023). Correlation between Monocyte/High-density Lipoprotein Cholesterol Ratio and Insulin Resistance in Male Type 2 Diabetes Patients with Metabolic Fatty Liver Disease. China Tropical Medicine, 23 (04): 333-337. DOI: 10.13604/j.cnki.46-1064/r.2023.04.02.

[4] Yin Meiqi, Jin Lijuan, Liu Yuanjun, et al (2023). Observation on the Efficacy of Wumen Tiaozhi Granule in Treating Obese Type 2 Diabetes with Metabolic Fatty Liver

Disease. Western Journal of Traditional Chinese Medicine, 36 (04): 97-100.

[5] Zheng Panpan, Zhao Weili, Hu Qingshan, etc. Study on the Influencing Factors of Type 2 Diabetes Combined with Metabolic Fatty Liver Disease. Chinese Journal of Diabetes, 2023,31 (02): 99-103.

[6] Xu Ting, Li Yuanyuan, Chen Yue, et al (2022). Correlation between Serum S100A8/A9 and sRAGE levels and Type 2 Diabetes with Metabolic Fatty Liver Disease. Journal of Tropical Medicine, 22 (11): 1502-1506+1550.

[7] Xing Lixuan, Chen Man, Lin Lili, etc (2021). Study on the Risk Factors and Distribution of TCM Syndrome of Type 2 Diabetes Combined with Metabolic Fatty Liver Disease. Shanxi Traditional Chinese Medicine, 37 (08): 48-51.