Diet-related Improvement of Non-Alcoholic Fatty Liver Based on Iranian Traditional Medicine (Persian Medicine): Case Report

Zahra Gorji1, Rasool Choopani2*, Mohammad Ebrahim Ghamarchehreh3, Sohrab Dehghan2

1 Department of Traditional Medicine, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran
2 Department of Traditional Medicine, School of Traditional Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran
3 Baqiatallah Research Center for Gastroenterology and liver disease, Baqiatallah University of Medical Science, Tehran, Iran

ABSTRACT

Background: NAFLD is the most common cause of chronic liver disease worldwide. The recommended therapy is lifestyle modification, which consists of dietary interventions and physical activity. The first line of treatment in Iranian Traditional Medicine (ITM) regardless of the type of disease is following the six essential principles named Setteh-ye- zarourieh, of which diet is the most important. The long process of treating NAFLD requires a comprehensive lifestyle design, which can be suited for the patients.

Case Presentation: A 57-year-old woman is a known case of NAFLD (grade II-III) accompanied by Insulin resistance, obesity and abnormal liver function tests (LFT). The accompanied sign and symptoms were heartburn, taste of acid, constipation and moderate weakness. The quality of life assessment was performed with SF-36 questionnaire.

Intervention: The patient underwent three months of dietary treatment based on Iranian Traditional Medicine (ITM).

Conclusion: Insulin resistance, obesity and LFT levels improved completely in 3 months and grading of fatty liver decreased to I-II. Afterwards the liver improved entirely and remains healthy after 2 years.

Keywords: Non-alcoholic fatty liver, Persian Medicine, Diet, Iranian Traditional Medicine, Insulin resistance
Introduction

The prevalence of non-alcoholic fatty liver disease (NAFLD) is increasing along with obesity and metabolic syndrome [1]. NAFLD is the hepatic presentation of metabolic syndrome and one of the major health problems worldwide. NAFLD is an umbrella term beginning with accumulation of triglycerides in the liver (simple steatosis) and can progress to steatohepatitis, fibrosis, cirrhosis even hepatocellular carcinoma. The global prevalence of NAFLD is about 30%, which can increase to 40%-90% in obese individuals [2–4]. The prevalence of NAFLD in Iran is 39.9% [5]. Insulin resistance is the major risk factor for this disorder [6]. Insulin resistance is when cells in the muscles, liver and fat don’t respond properly to insulin. There is no approved drug for treatment of NAFLD. To date, lifestyle modification with focus on diet regulation and physical activity is the preferred protocol for NAFLD treatment. There are few clinical trials to show the benefits of the particular diet, for instance Mediterranean diet [4].

Persian medicine as an old and deep-rooted school of medicine has various therapies for liver disease [7].

The first step of the approach to any disorder including NAFLD is lifestyle management, via the six essential principles (Setteh-e-Zarourieh) that include the following:

1. air
2. foods and drinks
3. sleep and wakefulness
4. depletion of harmful matters and retention of necessary matters
5. movement and rest
6. emotions

The rules pertaining to “foods and drinks” are the most important among the mentioned factors.

The patient presented in this case is one of the participants of the clinical trial named “Investigation of Dietary Management Based on Iranian Traditional Medicine Effect on Insulin Resistance in patients with Non-Alcoholic Fatty Liver Disease”.

Case Presentation

The patient was a 57-year-old woman who was incidentally diagnosed with NAFLD one year ago by ultrasonography. During this time, the severity of fatty liver increased from grade II to II-III in spite of receiving Metformin and Vit D. On admission, she mentioned the following habits and symptoms in medical history: fast eating, heartburn, taste of acid, constipation, moderate weakness and day napping. The findings in physical exam included a weight of 76 Kg, height of 154 Cm, BMI: 32, waist circumference (midpoint between the lower margin of the rib cage and the iliac crest): 102 Cm, Blood pressure: 120/80 mm Hg, dental indentations on the tongue, narrow and weak pulse. The first laboratory test revealed the following: FBS: 104, Serum Insulin: 13.5, ALT: 102, AST: 118, Chol: 201, TG: 107, HDL: 51, LDL: 128 and HOMA-IR: 3.46.

Homeostatic model assessment (HOMA) is a method for assessing insulin resistance and β-cell function. HOMA-IR formula is (fasting glucose x fasting insulin)/405.

Ultrasound report showed grade II-III of fatty liver.

Based on temperament criteria in ITM, she possessed hot and wet temperament which had changed to cold and wet distemperament.

The patient completed SF-36 questionnaire to
assess quality of life. This is based on 36 items to represent health concepts consisting of physical functioning, role limitations due to physical health problems, bodily pain, general health, vitality, social functioning, role limitations due to emotional problems and mental health. The primary calculated score was 2635.

**Treatment**

This trial includes teaching the rules of eating and drinking such as chewing food fully and avoiding consumption of more than one type of food at any meal or drinking any liquid during meals. Some recommendations and abstinences are listed in the table-1.

In addition, foodstuffs that are liver tonic, liver cleansers or hepatoprotective were recommended besides restricting anything that could be harmful for the liver based on ITM manuscripts A list of foodstuffs considering their temperaments and recommended recipes for example Chickpea broth, was provided to the patient. A number of these foodstuffs and their effects on liver summarized in table-2. In Addition, the patient was advised to avoid refined flour, Beef and veal, very sweet foods, barbecued meat especially raw or burned, sweet desserts and drinking cold water.

The patient reported all foods during the week by completing food diary (Figure-1).

She was visited monthly for 3 months while in the last visit, following changes occurred: Heartburn, taste of acid, constipation and weakness resolved completely. Quality of life score raised to 3440. She had about 12 kg weight loss without calorie restriction. Waist circumference was reduced by 14 cm. Lab tests revealed the following results: FBS: 90, Serum Insulin: 10.7, ALT: 12, AST: 18, Chol: 130, TG: 148, HDL: 45, LDL: 56, HOMA-IR: 2.37. Report of abdominal ultrasound presented the improvement of fatty liver. After 3 months grading improved to I-II. The first ultrasound was performed about 7 months later at the same center which showed the complete recovery from fatty liver. The patient was followed in regular intervals for two years. The last ultrasonography was performed in October 2018 showing no sign of fatty liver.

**Discussion**

Many efforts have been made in order to find an effective therapy for NAFLD. As yet, lifestyle management is the primary and most efficient treatment [38,39]. Most of studies have confirmed that lifestyle modifications

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Abstinences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating when there is “True appetite”</td>
<td>Long- term thirst</td>
</tr>
<tr>
<td>Fully chewing food</td>
<td>Very sweet foods especially after a meal</td>
</tr>
<tr>
<td>Regular physical activity</td>
<td>Eating with anger, stress or anxiety</td>
</tr>
<tr>
<td>Modification of sleeping time</td>
<td>Daytime napping</td>
</tr>
<tr>
<td>Drinking liquids like water not during but 1-2 hours after meal</td>
<td>Heavy exercises, intercourse and sleeping immediately after a meal</td>
</tr>
</tbody>
</table>
including diet and exercise are the best strategies for this ailment [2,40–42]. Coordination with the culture and taste of patients to choose a diet is also very important. Although NAFLD is not mentioned in ITM references as such, a number of liver diseases such as changes in liver dystemperaments (Soo-e-mezaj), obstructions (Soddeh) or weakness (Za'f) resemble NAFLD based on pathophysiology. On the other hand, the liver is an important organ in ITM and there are many general therapeutic instructions including diet, without considering a particular disorder. Accordingly, the first step in treatment is lifestyle education based on six essential principles. 

Table 2- Beneficial Foodstuffs for Liver

<table>
<thead>
<tr>
<th>Common name</th>
<th>Traditional name</th>
<th>property</th>
<th>Pharmacological effect in ITM</th>
<th>Pharmacological effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Chickpea</td>
<td>Hommas, Nokhod</td>
<td>Hot and dry</td>
<td>Mofatteh(^1), Monaghi(^2) [8]</td>
<td>Antihyperlipidemic [9,10]</td>
</tr>
<tr>
<td>3 Hazelnut</td>
<td>Bondogh, Fandogh</td>
<td>Hot and dry</td>
<td>Moghavi(^3)</td>
<td>Antioxidant, Anti-inflammatory [13]</td>
</tr>
<tr>
<td>4 Squash</td>
<td>Ghar’e</td>
<td>Cold and wet</td>
<td>Liver cooling [14], Mofatteh [15]</td>
<td>Antioxidant [16]</td>
</tr>
<tr>
<td>5 Quince</td>
<td>Safarjal, Beh</td>
<td>Cold and dry</td>
<td>Moghavi</td>
<td>Antioxidant, Antihyperglycemic [17]</td>
</tr>
<tr>
<td>6 Apple</td>
<td>Tofaah</td>
<td>Hot and wet</td>
<td>Moghavi</td>
<td>Antioxidant activity, Antihyperlipidemic [18]</td>
</tr>
<tr>
<td>7 Fig</td>
<td>Teen, Anjir</td>
<td>Hot and dry</td>
<td>Mofatteh [19]</td>
<td>Hepatoprotective [20], Antioxidant activity [21]</td>
</tr>
<tr>
<td>9 Spinach</td>
<td>Esfenaj</td>
<td>Cold and wet</td>
<td>Jaali(^4)</td>
<td>Anti-inflammatory [25], Antioxidant activity [26]</td>
</tr>
<tr>
<td>10 Curcumin</td>
<td>Zardchoobeh, Oroogh-al-sabaghin</td>
<td>Hot and dry</td>
<td>Jaali</td>
<td>Antihyperlipidemic [27]</td>
</tr>
<tr>
<td>11 Carrot</td>
<td>Jazar, Zardak</td>
<td>Hot and dry</td>
<td>Moghavi, Mofatteh</td>
<td>Antioxidative activity [28]</td>
</tr>
<tr>
<td>12 Pomegranate</td>
<td>Romman, Anar</td>
<td>Cold and wet</td>
<td>Moghavi, Jaali, Mofatteh</td>
<td>Radical scavenger, Antioxidant, anti-inflammatory [29,30]</td>
</tr>
<tr>
<td>14 Common Purslane</td>
<td>Khorfeh,</td>
<td>Cold and wet</td>
<td>Moghavi</td>
<td>Immunomodulatory effect [31]</td>
</tr>
<tr>
<td>15 Iranian Damask Rose</td>
<td>Vard, Gol-e-sorkh</td>
<td>Cold and dry</td>
<td>Moghavi</td>
<td>Radical scavenger, Antioxidant [32]</td>
</tr>
<tr>
<td>16 Cinnamon</td>
<td>Darsini, Darchin</td>
<td>Hot and dry</td>
<td>Moghavi, Mofatteh</td>
<td>Insulin sensitizer [33], Antioxidant [34]</td>
</tr>
<tr>
<td>17 Cumin</td>
<td>Zireh, komun</td>
<td>Hot and dry</td>
<td>Moghavi</td>
<td>Anti-inflammatory [35]</td>
</tr>
<tr>
<td>18 Black seed</td>
<td>shooniz</td>
<td>Hot and dry</td>
<td>Moghavi</td>
<td>Insulin sensitizer, Antihyperlipidemic [36]</td>
</tr>
<tr>
<td>19 Almond</td>
<td>Lowzol holw</td>
<td>Hot and wet</td>
<td>Moghavi</td>
<td>Hepatoprotective, Antihyperlipidemic (18, 19)</td>
</tr>
<tr>
<td>20 Ginger</td>
<td>Zanjebil</td>
<td>Hot and dry</td>
<td>Moghavi</td>
<td>Hepatoprotective [37]</td>
</tr>
</tbody>
</table>

1. Mofatteh: liver obstruction reliever by the decrementing blood intensity
2. Monaghi: cleanses the liver by excretion of waste materials
3. Moghavi: protects organ ailments or injuries, tonic, hepatoprotective
is an interconnection between these principles. Although diet is the most important factor, but the rules of sleeping or physical activity should not be forgotten. Depletion of harmful matters is another imperative principle. Thus constipation, urine retention or menstruation disorders should be treated. The second step of treatment in any disorder is nutrition therapy. General nutrition guideline consists of beneficial and harmful foods. Recent studies have confirmed many of them. In addition, Food temperament should be considered as well.

The first process of digestion occurs in stomach. Stomach disorders can lead to liver diseases. Stomach dystemperament causes symptoms such as fluctuation, heartburn and acid reflux. Therefore, diet should suite the particular stomach problems as well.

**Conclusion**

The rising prevalence of NAFLD demands finding a definite therapy. The usual NAFLD management is lifestyle modification. Diet and exercise followed by gradual weight loss, improve liver steatosis. ITM-based diet or lifestyle as a whole improved the patient’s steatohepatitis and increased her quality of life. Long-term follow-up shows that lifestyle education has been effective.
References


[17] Khoubnasabjafari M, Jouyban A. A review of phytochemistry and bioactivity of quince (Cydonia oblonga

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