Study on the Changes in the Blood Lipid Profile Levels of Patients with Metabolic Syndrome while Receiving Oriental Medicine Treatments for Various Diseases

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Among patients who visited each clinical department for oriental medical treatments, anthropometric measurement, blood pressure, fasting blood glucose and blood lipid profile level were measured at their first initial visit. 55 subject patients who were diagnosed as having metabolic syndrome and 150 mg/dL or more of triglyceride were selected as subjects whose fasting blood glucose, triglyceride, total cholesterol, HDL cholesterol and LDL cholesterol were measured after fasting. According to each patient's disease, the subject received treatments such as herb medicine, acupuncture, moxibustion, cupping therapy, physical therapy and rehabilitation therapy from each clinical department, and after an average of 4.10±0.31 weeks, another test was performed yielding the following results. Serum triglyceride was 243.72±13.05 mg/dL before the oriental medical treatment and 188.11±12.17 mg/dL after the treatment where although it continued to show an abnormal value even after the treatment, there was statistically significant decrease compared to pre treatment($P<0.05$). Serum total cholesterol was 207.50±5.89 mg/dL before the oriental medical treatment and 192.37±5.53 mg/dL after the treatment which was statistically insignificant compared to pre treatment($P>0.05$). Serum HDL cholesterol was 51.19±3.95 mg/dL before the oriental medical treatment and increased to 52.53±1.49 mg/dL after the treatment although it was statistically insignificant compared to pre treatment($P>0.05$). Serum LDL cholesterol was 110.66±5.86 mg/dL before the oriental medical treatment and decreased to 106.12±4.82 mg/dL after the treatment although it was statistically insignificant compared to pre treatment($P>0.05$). In regards to the change of triglyceride for each sex, it was 221.84±14.01 mg/dL before the treatment and 187.00±15.47 mg/dL after the treatment for men, and it was 271.50±22.78 mg/dL and 189.53±19.76 mg/dL respectively for women where even though men and women showed the decrease of 34.84±12.79 mg/dL and 81.96±20.01 mg/dL respectively, both men and women continue to show abnormal values after the treatments. However, there was statistically significant decrease compared to pre treatment($P<0.05$). In regards to the change of total cholesterol for each sex, with 198.24±7.60 mg/dL for men before the treatment and 188.93±7.45 mg/dL after the treatment, values for both before and after the treatment were within the normal range where the change value was 9.30±5.86 mg/dL and statistically insignificant($P>0.05$). For women, it was 219.26±8.87 mg/dL and 196.73±8.43 mg/dL respectively for women where with 22.53±7.60 mg/dL, it decreased to the normal level after the treatment, and there was a statistically significant decrease compared to pre treatment($P<0.05$). With such results, serum triglyceride and cholesterol levels of patients who have been diagnosed as having metabolic syndrome were observed to decrease after the oriental medical treatment. Especially, for both men and women, abnormally high triglyceride level decreased while the effect of lipid profile improvement for women was more significant compared to men.

Key words : metabolic syndrome, lipid profile, oriental medicine treatment

Introduction

The diseases which had relatively little medical interest in the past have recently become diseases requiring national statistical researches and appropriate measures because of the rapid industrialization, demographically aging society and cityward tendency in Korea. Among such diseases, the metabolic syndrome not only has close interactions as the cause and aggravation factor for diseases such as cardiovascular disease, cerebrovascular disease and endocrine disease, but also is a disease that needs a lot of research and

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· Received : 2008/10/27 · Revised : 2009/01/23 · Accepted : 2009/02/10

continuous attention for the betterment of people's health[1-4].

The criteria for the metabolic syndrome has been announced by WHO in 1998 and calls for an instance of having two or more of diabetes mellitus or insulin resistance together with hypertension, hypertriglyceridemia, low serum HDL cholesterol, micro albumunuria and obesity[3].

Reven[4] first mentioned the syndrome called "Syndrome X" where hypertension, glucose intolerance, insulin resistance, hyperinsulinemia and low serum HDL cholesterol appear at the same time with high serum VLDL. National Education Cholesterol Program Adult Treatment Pannel III(NCEP ATP III)[5] announced the criteria which puts the emphasis on abdominal obesity and has an easy diagnostic application in 2001, and American Association of Clinical Endocrinologists(AACE)[6] presented a new guideline for clinically deciding the risk factors by combining WHO diagnostic criteria and ATP criteria.

The importance of metabolic syndrome which is recently gaining attention is due to increased risk of cardiovascular disease by causing gradual progression of atherosclerosis over a long period of time. The reason that there are large scale researches being presented or performed has a purpose in the prevention of high risk cardiovascular disease through early diagnosis, maintenance and patient education of metabolic syndrome by clinical doctors.

According to the national health and nutrition examination survey in 1998, the prevalence of metabolic syndrome showed 19.9% for adult male and 23.7% for adult female while for each category, abdominal obesity had 19.2% and 38.5% for male and female, high blood pressure had 44.6% and 29.5%, fasting blood glucose had 20.1% and 21.0%, and low HDL cholesterol had 24.3% and 46.1%, which report that the metabolic syndrome is already a disease calling forth serious concerns for people's health[7].

Therefore, considering the fact that the mortality rates of cerebrovascular disease and cardiovascular disease, which are the major diseases to look out for in patients with hypertension, diabetes mellitus, hyperlipidemia and obesity, for both men and women, placed the second and the third positions, active measures for metabolic syndrome is being emphasized even more[8].

Recently among patients receiving oriental medical treatments for different diseases at an oriental medical hospital, it is common to encounter a patient who is suspected of having not only the main disease requiring treatments but also metabolic syndrome during the diagnostic process. Also, even though the treatments for such patients were not aimed at correcting metabolic syndrome or dyslipidemia, if the blood lipid profile levels are compared before, during and after treatments, there are many patients with a significant difference in the change.

This study targeted patients with higher serum triglyceride than the diagnostic criteria out of patients with metabolic syndrome according to NCEP ATP III[5] diagnostic criteria reinforced by WHO Asia-Pacific region criteria[9] at their first clinical visit among patients who are receiving oriental medical treatments for various diseases. The levels of serum triglyceride(TG), total cholesterol(TC), HDL cholesterol, and LDL cholesterol before and after their oriental medical treatments were measured. And then, by observing the trend of their changes, this study aimed to examine any effects which oriental medical process has on blood lipid levels of the patients even though it is not the direct treatment intended to normalize abnormal lipid profile.

Subjects and Methods

1. Subjects

Among patients who visited each clinical department for oriental medical treatments, anthropometric measurement, blood pressure, fasting blood glucose and blood lipid profile level were measured at their first initial visit. 55 subject patients who were diagnosed as having metabolic syndrome and 150 mg/dL or more of triglyceride were selected as subjects.

1) Diagnosis Criteria

Although the clinical diagnostic criteria from American NCEP ATP III[5] were applied, WHO Asia-Pacific region criteria[9] which were reported as appropriate for Asians were applied for the waist circumference. From following 5 risk factors, the patient was diagnoses as having metabolic syndrome when 3 or more factors apply(Table 1).

Table 1. Clinical Diagnostic Criteria of NCEP ATP III and WHO Asia-Pacific Region

Risk Factors	Defining level by NCEP ATP III	Defining level by WHO Asia-Pacific Region
Blood Pressure		
SBP	≥130 mmHg	
DBP	≥85 mmHg	
Fasting Glucose	≥110 mg/dL	
Triglyceride	≥150 mg/dL	
Waist circumference		
Men	>102 cm	>90 cm(35 inch)
Women	>88 cm	>80 cm(31 inch)
HDL-Cholesterol	<40 mg/dL	
Men	<40 mg/dL	
Women	<50 mg/dL	

2. Methods

1) Measurement Methods

The blood pressure was measured twice at the adequate level of rest and calculated to obtain the average value, and the blood sample was collected after fasting 12 hours after dinner for the measurements of fasting blood glucose, triglyceride, total cholesterol, HDL cholesterol and LDL cholesterol using the auto biochemistry analyser(Hitachi 7060, Hitachi, Tokyo, Japan). The circumference of waist was measured at the midpoint between lower ribs and iliac crest.

2) Progress Observation of Blood Lipid Profile Levels

For the base value of blood lipid profile, triglyceride, total cholesterol, HDL cholesterol and LDL cholesterol were measured before the oriental medical treatments, and after the treatments, blood samples were collected and measured using the same methods.

3) Statistical analysis

All results were expressed as mean± standard deviation(SD) and mean± standard error(SE). In the comparison of men and women, student's t-test was used, and for the comparison of before and after treatment in the same group, the paired t-test was used. P values <0.05 were considered to be statistically significant.

Results

1. The Distributions of Characteristics and Diagnoses for the Subject Patients

There were total of 55 subject patients (average age: 58.61±10.91 years) with 30 males (average age: 57.12±13.25) and 25 females (average age: 60.50±6.67). The diagnoses at the time of hospital visit were 17 cases with stroke sequelae, 14 cases with low back pain, 9 cases with chronic osteoarthritis, 8 cases with cervicalgia and 3 cases each with chronic gastritis and essential tremor. The average period of observation was 31.35±3.33 days(Table 2).

Table 2. Characteristics and Diagnostic Distribution of Subjects

		Total 55(100%)	Age(years±SD)
Sex	male	30(54)	57.12±13.25
	female	25(46)	60.50±6.67
Diagnosis	stroke sequelae	17(30)	
	low back pain	14(25)	
	chronic osteoarthritis	9(16)	
	cervicalgia	8(14)	
	chronic gastritis	4(7)	
	essential tremor	3(5)	

2. The Prevalence rates for each Anthropometry and Risk Factor in Subject Patients

This study selected subjects among metabolic syndrome patients with high serum triglyceride. Other than high serum triglyceride, the order of prevalence rates was high blood pressure, high fasting blood glucose, obesity and low HDL cholesterol for each risk factor while all patients had 3 or more risk factors with 47(85%) cases with 4 or more and 43(78%) cases with 5 or more. In relation to each sex, women had higher number of obesity(21/25 cases) and high fasting blood glucose(20/25 cases) than men, and men had higher frequencies of high blood pressure(28/30 cases) and low HDL cholesterol(21/30 cases) than women(Table 3).

Table 3. Prevalence Rate according to Anthropometry and Risk Factors in Subjects

Risk Factor	Total Number(%)	Male(n=30)	Female(n=25)
Blood Pressure	50(90)	28	22
Waist Circumference	43(78)	22	21
Fasting Glucose	45(81)	25	20
Triglyceride	55(100)	30	25
Low HDL-Cholesterol	31(56)	21	10
Risk Factor Number			
3	55(100)	30	25
4	47(85)	23	24
5	43(78)	21	22

3. Comparison of Risk Factors and Lipid Profile Levels according to Sex

From the initial examination of all subject patients before oriental medical treatments, the values for each risk factor were 136.92±7.3 mmHg for systolic blood pressure, 87.45±6.05 mmHg for diastolic blood pressure, 88.96±4.08 cm for waist circumference, 115.09±26.69 mg/dL for fasting blood glucose, 243.72±13.05 mg/dL for triglyceride and 207.50±5.89 mg/dL for total cholesterol, and 51.19±3.95 mg/dL for HDL cholesterol, 110.66±5.86 mg/dL for LDL cholesterol. The special quality in risk factors for each sex is that triglyceride levels of women with 271.50±22.78 mg/dL were higher than men with 221.84±14.01 mg/dL which was statistically significant($P<0.05$). For HDL cholesterol, men displayed lower value in comparison with women which was statistically significant($P<0.05$)(Table 4).

Table 4. Comparison of Risk Factors and Lipid Profile Levels according to Sex

Risk Factors	Total(Mean±SE)	Male(Mean±SE)	Female(Mean±SE)
Blood Pressure(mmHg)			
SBP	136.92±7.3	137.90±1.49	135.76±1.13
DBP	87.45±6.05	88.54±1.01	86.15±1.24
Waist circumference(Cm)	88.96±4.08	90.06±0.65	87.65±0.80
Fasting Glucose(mg/dL)	115.09±26.69	111.90±4.03	121.36±6.75
Triglyceride(mg/dL)	243.72±13.05	221.84±14.01	271.50±22.78*
Total Cholesterol(mg/dL)	207.50±5.89	198.24±7.60	219.26±8.87
HDL-Cholesterol(mg/dL)	51.19±3.95	44.58±1.08*	53.40±5.38*
LDL-Cholesterol(mg/dL)	110.66±5.86	106.09±6.96	116.52±10.01

* P<0.05

4. The Details of Oriental Medical Treatments for Patients with Metabolic Syndrome

According to each patient's disease, the subject received treatments such as herb medicine, acupuncture, moxibustion, cupping therapy, physical therapy and rehabilitation therapy from each clinical department. All patients received the acupuncture treatment, and 41 patients were treated with herb medicine while 29 patients with cupping therapy and 21 patients with physical therapy or rehabilitation therapy. For their oriental medical treatments, the acupuncture treatment was performed simultaneously with herb medicine, physical therapy, moxibustion therapy or cupping therapy. The acupuncture therapy and moxibustion therapy were performed once or more per day while physical therapy, rehabilitation therapy and cupping therapy were performed once per day, and the herb medicine was administered 3 times per day between 1 to 2 hours after the meal.

5. Meals and Food Intake of Patients with Metabolic Syndrome

During the observation period, in-patients had meals which were prepared according to hospital diet to include 1800-2000 kcal, and out-patients were directed to maintain their normal diet habit at home.

6. Method of Administration and Period for the Treatments to the Subjects

The periods of oriental medical treatments were 28.99±3.27 days on average. Ingredients which were included in the prescription of herbal treatment were an average of 14.65±3.82 different kinds. One dose of decoction had about 120-140 ml and it was administered one hour after each meal 3 times a day. The herb medicines which were administered during the observation period were common prescriptions by each clinical department and had some exceptions and additions to patient's medicines according to oriental medical diagnoses.

7. Changes in Lipid Profile before and after Oriental Medical Treatment

For observing the progress in changes of blood lipid profile level for the subjects, after an average of 4.10±0.31 weeks, another test was performed using the same methods as the first hospital visit. Serum triglyceride was 243.72±13.05 mg/dL before the oriental medical treatment and 188.11±12.17 mg/dL after the treatment where although it continued to show an abnormal value even after the treatment, there was a statistically significant decrease compared to pre treatment (P<0.05). Serum total cholesterol was 207.50±5.89 mg/dL before the oriental medical treatment and 192.37±5.53 mg/dL after the treatment which was statistically insignificant compared to pre treatment(P>0.05). Serum HDL cholesterol was 51.19±3.95 mg/dL before the oriental medical treatment and increased to 52.53±1.49 mg/dL after the treatment although it was statistically insignificant compared to pre treatment(P>0.05). Serum LDL cholesterol was 110.66±5.86 mg/dL before the oriental medical treatment and decreased to 106.12±4.82 mg/dL after the treatment although it was statistically insignificant compared to pre treatment(P>0.05)(Table 5)(Fig. 1).

Table 5. Changes in Lipid Profile before and after Oriental Medical Treatment

Risk Factors	Before(Mean±SE)	After(Mean±SE)
Triglyceride(mg/dL)	243.72±13.05	221.84±14.01*
Total Cholesterol(mg/dL)	207.50±5.89	198.24±7.60
HDL-Cholesterol(mg/dL)	51.19±3.95	54.58±1.08
LDL-Cholesterol(mg/dL)	110.66±5.86	106.09±6.96

* P<0.05

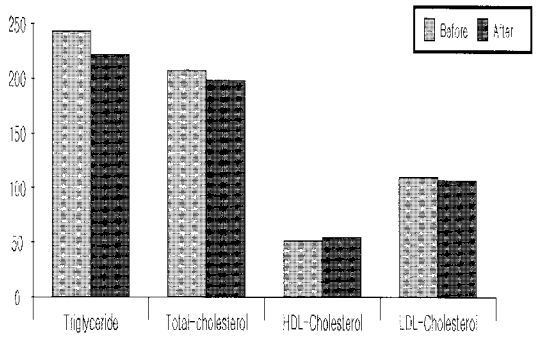

Fig. 1. Changes in Lipid Profile before and after Oriental Medical Treatment.

8. The Change rate of lipid profile level after the treatment for each sex

The change rate of blood lipid profile level in subject patients compared the pure decreased value by subtracting the post treatment value from the pre treatment value. In regards to the change of triglyceride for each sex, it was 221.84±14.01 mg/dL before the treatment and 187.00±15.47 mg/dL after the treatment for men, and it was 271.50±22.78 mg/dL and 189.53±19.76 mg/dL respectively for women where even though men and women showed the decrease of 34.84±12.79 mg/dL and 81.96±20.01 mg/dL respectively, both men and women continue to show abnormal values after the treatments. However, there was statistically significant decrease compared to pre treatment(P<0.05). In regards to the change of total cholesterol, with 198.24±7.60 mg/dL for men before the treatment and 188.93±7.45 mg/dL after the treatment, values for both before and after the treatment were within the normal range where the change was 9.30±5.86 mg/dL and statistically insignificant(P>0.05). For women, it was 219.26±8.87 mg/dL and 196.73±8.43 mg/dL respectively for women where with

22.53±7.60 mg/dL, it decreased to the normal level after the treatment, and there was a statistically significant decrease compared to pre treatment($P<0.05$). In regards to the change of HDL cholesterol, it was 44.58±1.08 mg/dL before the treatment and 47.90±2.10 mg/dL after the treatment for men, and it was 49.30±2.12 mg/dL and 53.40±5.38 mg/dL respectively for women where men and women showed the increase of 3.36±1.9 mg/dL and 4.10±0.88 mg/dL respectively. However, it was statistically insignificant compared to pre treatment ($P>0.05$). In regards to the change of serum LDL cholesterol, it was 106.09±6.96 mg/dL before the treatment and 105.71±6.65 mg/dL after the treatment for men, and it was 116.52±10.01 mg/dL and 106.64±7.12 mg/dL respectively for women where although men and women showed the decrease of 1.41±6.51 mg/dL and 14.33±9.16 mg/dL respectively, it was statistically insignificant compared to pre treatment($P>0.05$)(Fig. 2).

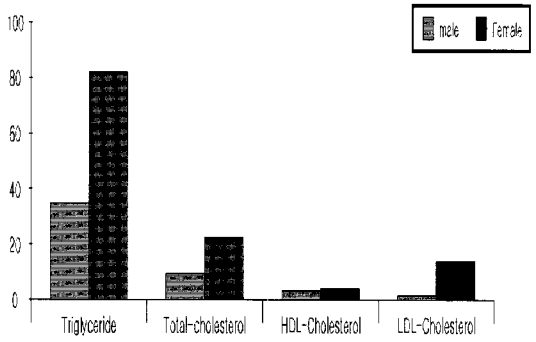

Fig. 2. The Change rate of lipid profile level after the treatment for each sex.

9. Patients whose lipid profile level was normalized after the oriental medical treatment

For patients whose lipid profile level, which was abnormal before the oriental medical treatment, became normal after the treatment, triglyceride had the most changes with 7 men and 5 women. Total cholesterol did not show overall changes while HDL cholesterol was normalized in 1 man and 1 woman each, and 1 man and 2 women displayed normal levels for LDL cholesterol(Table 6).

Table 6. Patients whose lipid profile level was normalized after the oriental medical treatment

Lipid profile	Male30(before/after)	Female25(before/after)
Triglyceride	0/7	0/5
Total Cholesterol	12/11	17/18
HDL-Cholesterol	9/10	15/16
LDL-Cholesterol	24/25	19/21

Discussion

Metabolic syndrome is a syndrome which shows risk factors for cardiovascular diseases such as hypertension, abdominal obesity, hyperlipidemia, diabetes mellitus and coagulation disturbance simultaneously[1-3]. In the past, hypertension, diabetes mellitus and hyperlipidemia were treated as different diseases, but since such diseases sometimes appeared simultaneously in one person and were found to have insulin resistance in common, they were named as one syndrome for their management[2-5]. The clinical importance of metabolic syndrome is in the increased risks for stroke and ischemic coronary heart diseases such as myocardial infarction and angina pectoris, and therefore, the mortality due to such diseases also increases[1-4,10].

Although the pathophysiologic mechanism of metabolic syndrome is not yet defined clearly, various metabolic disturbances seem to happen simultaneously and frequently due to genetic factors or habits, and the causes are largely categorized into groups of independent factors which mediates specific factors of metabolic syndrome such as the abnormality of body fat distribution, insulin resistance, environment and genetic factors[11,12]. Until now, the diagnostic criteria for the metabolic syndrome has been suggested by various institutes, but in NCEP III, with the emphasis on the importance of abdominal obesity instead of the body mass index, the measuring of waist circumference can easily be clinically implemented while offering the criteria with enhanced utility for large scale researches[5].

Because hypertension, diabetes mellitus, obesity and hyperlipidemia as a single disease also are the risk factor for promoting atherosclerosis, the purpose is to evaluate the presence of metabolic syndrome by studying risk elements from healthy cases who do not have cardiovascular diseases yet, to focus on the primary prevention which suppresses the progression to diabetes mellitus or cardiovascular diseases, and also in the secondary prevention through focused treatments for high risk patient who has cardiovascular diseases[13-15].

According to Korean death statistics of 2001, the deaths due to cerebrovascular diseases and cardiovascular diseases increased from 10.4 people for every 100 thousand people of the population in 1990 to 21.9 people in 2001, which shows the trend of rapid increase with 110.6% increase in about 10 years. According to national research performed recently, the prevalence rate of metabolic syndrome with the Asia Pacific waist circumference criteria was announced as 19.4% with 20.2% for men and 18.4% form women[16]. Especially, approximately 20% of Korean adults with the age of 30 years or older were reported to have metabolic syndrome while the prevalence rate for men were higher than women whose prevalence rate drastically increased after the age of 50 years[17,18].

In this study, with the average age of 59.14 years, the subjects were relatively old age which was the age group with high prevalence rate of metabolic syndrome. There was also the difference in ages for men and women where women were more than 3 years older than men with men being 57.12 years and women being 60.50 years. With this result, blood lipid profile and fasting blood glucose were observed as high in older people from the first test results before the treatment where women had higher triglyceride, cholesterol and fasting blood glucose.

However, because the observation of various ages in the same sex was not performed, more advanced research is required in the future. Also, because most patients lived in a city, obesity and hypertension showed high frequency similar to the result of previous research[19] carried out in a city. But because this study selected only patients with high triglyceride levels among the diagnostic criteria, it showed some different aspects compared to previous studies. The frequencies according to the diagnostic criteria were ordered as abdominal obesity, high blood pressure, high fasting blood glucose and low HDL cholesterol in order for overall sexes. For each sex, the order for men was high blood pressure, high fasting blood glucose, abdominal obesity and low HDL cholesterol, and the order for women was abdominal obesity, high blood pressure, low HDL cholesterol and high fasting blood glucose.

Although the typical main indicators in lipid profile which predicts the cardiovascular diseases are LDL cholesterol, triglyceride and HDL cholesterol, the predictability of such indicators differ between sexes where it is already know that LDL cholesterol is the most important indicator for men while HDL cholesterol and triglyceride rather than LDL cholesterol have higher predictability for women[20]. According to the result of this research, the serum triglyceride of old women was significantly higher than men, and in addition, with higher frequency of low serum HDL cholesterol for women, the risk for cardiovascular diseases is found to be even higher. In relation to this, there is a research where it claims that as triglyceride increases, the mortality rate of coronary heart diseases increases, and the rate of such increase is more drastic in men than women[21]. HDL cholesterol, the ratio between triglyceride and HDL cholesterol, and triglyceride are all said to act as independent indicators of lipid profile in contracting metabolic syndrome for a portion of Korean women using IDF(International Diabetes Federation) criteria, NCEP ATP III criteria and IDF criteria where the significance of triglyceride as a risk factor was emphasized[22]. Also, there was a research showing that HDL cholesterol was stronger indicator for the mortality rate of coronary heart diseases than LDL cholesterol in women, and such tendency was much clearer in old age[23].

Various lipid profile values in the blood after the oriental medical treatment was performed on subject patients decreased compared to pre treatment. Especially, with the value of triglyceride reduced significantly, 12(21.8%) patients out of 55 subject patients displayed normal values. However, continuous progress monitoring seems to be needed to determine if high triglyceride level before the treatment maintained the normal level after the treatment was stopped. The reasons for such reduction in triglyceride level are thought to be the environment after the admission to the hospital, diet changes and oriental medical treatment which affected the most of level changes in triglyceride. Especially, because most subject patients with their old age ate average Korean diet plan which is comprised mainly of grains rather than meat, there were dietary habits of eating food with high carbohydrate content.

However, by either being served with or received instructions for well balanced meals during the study period, it was thought to be caused by changes in dietary habits from high carbohydrate meals to balanced meals with carbohydrate, fat and protein. According to a national study, the carbohydrate intake of large quantity increases serum triglyceride, and specially, hypertriglyceridemia is reported as possibly being caused by high carbohydrate meals[24]. The intake of high carbohydrate not only increases the serum triglyceride level but also the decrease of serum HDL cholesterol, the increase of fasting blood glucose, and undesirable effects on carbohydrate metabolism and lipid profile such as hyperinsulinemia, and as a result increases the risk of coronary heart diseases[25].

Another cause for the changes in serum triglyceride level is possibly the difference in the total calorie intake per day where although the diet of subjects, which served 3 meals a day between 1800 to 2000 kcal per day for the duration of hospital stay, was the same as the average calorie[26] intake at subject's home with 1985 kcal, the snacks were limited. The carbohydrate, fat and protein in the oriental medical decoction which was administered in this study were a small amount where although there might be a little bit of increase in the calorie intake, the effect over the total calorie intake is small, and therefore, it was thought to have no effect on the serum triglyceride level.

Therefore, more researches to find out the cause for the decrease in triglyceride level seem to be necessary. Although there was a change where total cholesterol decreased from initial measurement of 207.50±5.89 mg/dL to 198.24±7.60 mg/dL after 4 weeks, it was not as clear as triglyceride. The reasons for such result seem to be because cholesterol, unlike

triglyceride, in serum is less affected by changes in outside variables such as diet change or oriental medical treatment within the short period of time, and because Koreans usually eat less food with cholesterol than western people.

With the research on the lipid metabolism regulating the enzyme of lipid metabolism in regards to the decoction or herb medicine for hyperlipidemia, hawthorn leaf(山査葉)[27], mulberry leaf(桑葉) and red ginseng(紅蔘)[28] reduce triglyceride through peroxisome proliferator activated receptor ɣ. Also, Xuezhikang(血脂康) and Zhibituo(脂必妥) containing HMG CoA reductase inhibitor in the fermented red rice(赤米) have been reported as effectively reducing total cholesterol and triglyceride[29].

As the regulators of lipid metabolism related receptors, turmeric rhizome(薑黃) and curcumin(鬱金) are known to lower total cholesterol by activating sterol regulatory element binding proteins(SREBP), promoting low density lipoprotein receptor (LDLR) on the cell surface, or reinforcing the intracellular absorption and utilization of cholesterol[30]. The genistein in soybean(大豆) is known to act as ligand, increase the intracellular absorption of total cholesterol and suppress synthesis[31].

For the study on herb decoction, there is a report where hawthorn(山査), chinese yam(山藥,) and cassia(草決明) seed as ingredients improved blood lipid profile levels[32]. In addition, for the integration therapy of western and chinese medicine, after the administrating the combination of Xiaotan Qingzhi Fang(消痰清脂方: 茵蔯, 酒大黃, 澤瀉, 法半夏, 陳皮, 茯笭, 生山査, 草決明, 生首烏) and flavastatin as an integration therapy, the serum triglyceride and LDL cholesterol of combined administration group were observed to decrease sharply in comparison to single flavastatin administration group[33]. Such studies have demonstrated that effective substances can be extracted from the herb medicine or oriental medical treatment using modern techniques, or the traditional decoction can be adapted in the clinical treatment of hyperlipidemia.

In conclusion, This study did not intend to study the effect on the lipid metabolism by administering oriental medicine to metabolic syndrome patients, but it observed the changes in lipid profile levels during the oriental medical treatment process for metabolic syndrome patients showing high level of triglyceride among patients who visited the hospital for the treatment of various diseases. As a result, serum triglyceride and total cholesterol level before the oriental medical treatment were confirmed to have been reduced with the effect of improving the blood lipid profile. Especially, for both men and women, abnormally high triglyceride and total cholesterol level decreased while the effect of lipid profile improvement for women was more significant compared to men.

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