

Diagnosis of Obesity due to Modification in Lipid Profile

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ABSTRACT

A fastest growing problem, obesity, has reached to an epidemic proportions around the world; have high association with other disease leading to the premature death. Individuals with huge deposition in adipose tissues experienced a certain medical conditions like cardiovascular diseases, heart failure, and myocardial infarction, finally increasing the mortality and morbidity rate. Weight gain during lifetime either during childhood or adulthood tend to have a huge impact on metabolic reactions resulting in body mass index (BMI) changes. Huge impact was also noticed related to dyslipidemia, lipoprotein metabolism alterations and reduction of serum HDL levels in obese individuals. Various theories have been designed which explains the behavior of leptin and adiponectin hormone in obese persons. These hormones changes its pattern; showed huge impact on lipoprotein metabolism. Various deleterious effects have been observed in an excess body weight individuals; proven by studies of different locations. From all such studies, it is observed that females have high risk to get over-weight or obese due to hormonal imbalance while male's risk factors were less on comparison with females. Here, we will discuss and describe convenient risk factors which contributes majorly in obesity-linked lipid profile alterations and elevated risk factors of cardiovascular diseases.

Keywords: Lipid, Obesity, over-weight, cardiovascular diseases, Body-mass index (BMI).

INTRODUCTION

Obesity, a fast growing problem, linked with many social and medical risks that effects the normal living of an individual. It is directly associated with cardiovascular diseases, alteration in lipid profile and hyperglycemic conditions; contributing towards pre-mature death. [1] Its risk is enhances mainly due to the excess amount of calorie intake and initially begins in during adolescent stage. Obesity is one of the sick condition, the higher extensively you allowed it to perceive, the higher difficulty could be there to control it. The impact of obesity on the cardiovascular disease and the lipid profile has been a long debate [2]. In the study conducted by Framingham (1986), with an increase in body weight there will be an increase in atherogenic trait while, simultaneously, with body weight decline a sudden sharp of trait is observed. This study gives a clear indication that heart related diseases tend to increase in person being obese or overweight [3, 4]. Similarly, from the Truswell study, it was concluded that risk of coronary heart disease increase up to 35% in obese individuals than in non-obese [2]. Obesity tends to enhance the metabolic reaction such as lipid disturbances alterations in lipoprotein metabolism, hypertension, and impaired glucose tolerance. Direct relation has been observed in the study, between over-weight and serum triglyceride levels, which tends to elevate in obese individuals[5].

Obesity and Lipoproteins

Obesity is directly linked with the increase in triglycerides levels. A study shows an elevation in serum triglycerides levels in an individuals with an increase in their body weight [6]. Similar study suggested deleterious changes in lipoprotein levels in excess body weight individuals. Subjects of upper age-limit

bearing higher BMI were mainly associated with higher serum triglycerides, LDL-cholesterol levels while lower HDL levels observed [7]. Aim is to evaluate the changes in lipid profile of children aged between 4-18 years. Fasting blood samples were taken on which biochemical tests were performed comprising of parameters of total cholesterol (TC); serum triglycerides, HDL - Cholesterol and LDL - Cholesterol were also carried out. [8] Children's followed the instruction for about four months. After than biochemical tests of similar metabolites were repeated. They were taken 412 children's, in which 245 were girls and 167 were boys. Then they divided children's into four age groups, 6-9, 10-13, and 14-18 year old. Study shows there is significantly no such difference observed in any gender [9]. Level of LDL-C and TC were reduced in boys older than 10 year. In girls which were over 10 year of age they had increase value of HDL-C. The conclusion of that study showed that there is no educational effect on children's anthropometric measurements. [9, 10]

Another study determines the occurrence of overweight, and obesity, along with lipid profile & atherogenic as markers for CVD among population. They take 205 apparently healthy civil servants. Ages of the servants were 21-60 years, mean and standard deviation years. In 205 apparently healthy civil servants there were 106 males and 99 females. In the study, weight along with the height of the study group were measured [11]. According to weight and height they were calculate the BMI [12]. The result of their prevalent rates of overweight and obesity, 34.2% were overweight and 68% were obsessed. Study showed that men were affected more than women. During study, it was observed that most affected individuals belongs to upper-age group with higher BMI. A new conclusion was also made, showing male servants have lower LDL-C and higher HDL-C than the females. So the conclusion based on such study shows females with advanced in age, higher BMI with unfavorable plasma lipids levels tends to have higher risk of CVD [13]; due to social habits and less physical activity,. Suggestions were made to take good nutrition, regular exercising for controlling weight, quitting smoking and alcohol habits, and regularly medical check-up. [14]

A study on 194 students of students of Subharti Medical College, Uttar Pradesh conducted; for finding the changes in normal, overweight and obese individuals. Metabolic indicators like HDL, and TG levels along with their physical measurements were considered for this study. Hence, for all participants, their height, weight and waist circumferences in centimeters (cm) were noted and from the serum samples, HDL, TG and fasting sugar were estimated by using fully automatic victors 250 dry chemistry analyzer. Result of their study shows that female's students tends to be overweighed as 16% females were overweight category while only 8% males. On another hand, 18% female and 9% male were considered to be obese. So the results show that females were overweight and obese than males. The level of BP, weight and waist circumference, HDL and TG levels were higher in overweight and obese individual group [15]. The conclusion of their study had shown an increasing fashion of obesity and derangement of metabolic indicators in young population. The main reason of this over usage of electronic gadgets along with lack of physical activity which causes obesity.

Obesity, Hypertension and Lipid Profile

Obesity, a common condition, develops due to changes in social, cultural, and genetic factors. Various studies suggested that obesity shows negative effect on the health of the worldwide population and associated with deleterious conditions hyperlipidemia, insulin resistance, and hypertension [16]. Major age-group population effected with obesity are the children during their juvenile period which continuous till adulthood. [17]. Many metabolic reactions have been postulated which explains pathogenesis of obesity induced hypertension. In the following mechanism explains the increase leptin and decrease adiponectin levels [18] induces hyperplasia of adipocyte cells. With reduction in serum adiponectin levels, insulin sensitivity of hepatocytes also reduces, followed by the dysfunction endothelial cells [19] and elevated vasoconstriction resulting in hypertension (explained in the following fig-1).

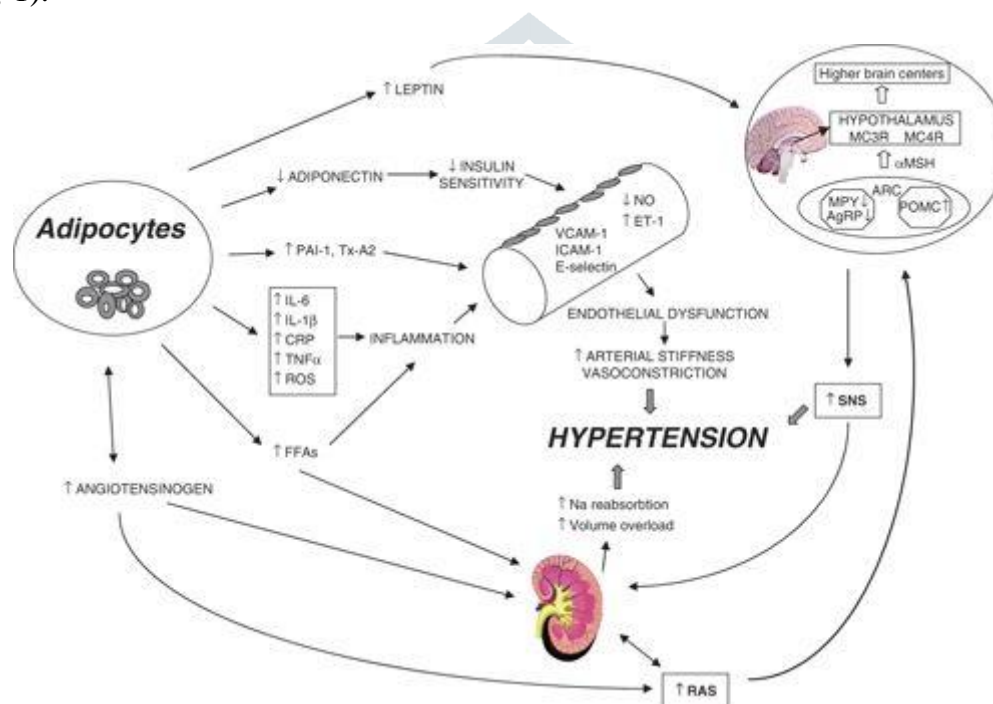


Fig-1- Mechanism of obesity-induced hypertension [17].

M. Mohsen Ibrahim et al., studied on Egyptian patients for evaluating their plasma lipid abnormalities and risk of suffering from CAD, and also level of Hypertension on lipid profile. They collected the data from specialized cardiac clinic records. [15] They took 1000 patients with CAD and 1920 non-coronary individuals as a group of control for the comparison of groups of 19-90 years. By enzymatic methods they were determined the plasma concentration of total cholesterol and triglycerides by phosphotungstate method they determined VLDL and LDL. After the precipitation of VLDL and LDL they measured HDL cholesterol. TG levels of the patients up to 300mg/dl and LDL was estimated; using of Fried Walds' formula. On the basis of age, gender, BMI value and lipid profile, was estimated that 56.7% patients suffers from hypertension. In men, low level of HDL-C and higher serum triglycerides in women were observed. No significant difference values of lipid profile between normotensive and hypertensive were observed in CAD patients, hence, concluded 80% of study population shows abnormalities in lipids. So the lipid abnormalities in Egyptian patients seen. They have to take healthy diet and do physical activity. [20] Similarly, another study of dyslipidemia with

stroke was conducted. The aim focuses on association of lipid profile components & incident ischemic stroke. They took 100 patient record were accessed from the medical records department in father Muller medical patients were between 30 to 90 years. They were collected the history and physical examination details of patient records. They analysed lipid profile according to the ATP 3. According to their study 56% of patients had dyslipidemia, 40% had high total cholesterol, 7 % of the patient had high triglycerides, and only 3% of the patient had high LDL. Whereas 28% of the patients showed low HDL levels and 10% of the patients had both high total cholesterol and low HDL. The conclusion of their study shows a significant association of 56% of between dyslipidemia and stroke. High LDL is responsible for cerebrovascular accidents and significant proportion of patients with low HDL so this study shows primary prevention is the key to overcoming the burden of stroke in our country [21]

In a study, to evaluate the morbidity and mortality rate were assessed; caused by coronary artery disease. They took 100 consecutive cases. In this study they were undertaken to study they were undertaken to study dyslipidemia among the rural patients with coronary artery disease. The age of the patients were 30 to 90 years who were diagnosed as coronary artery disease they were compared to 50 ages and sex matched healthy controls. They were recorded in each subject like age, gender, blood pressure, history of smoking and body mass index [22]. Blood sample used for investigation of lipid profile. The conclusion of the case control study shows that high lipid profile are clinical significant in all age groups above 40 years. This study reveals a distinct association of dyslipidemia with CAD and highlights patients with dyslipidemia, abnormal lipid profile and its proper management by life style modification.

Conclusion

Obesity based outcomes such as cardiovascular diseases, diabetes and hypertension should be considered as chronic medical condition and requires long-term treatment. For its treatment, understanding of this mechanism needs to be understand. For future betterment, obesity based health conditions needs to be understood; which contribute to provide effective and well-tolerated therapies.

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