Measurement of serum lipids and lipoproteins in children as a risk index for cardio vascular diseases in adulthood

Akeel. A. AL-Kafagi*

الخلاصة

أمراض كثيرة واعتلالات ايضية مهمة تحدث نتيجة زيادة نسبة الدهون وبروتيناتها في الدم.أمراض القلب والشرايين تعتبر من أكثر الأمراض شيوعا في هذا المجال.

الهدف من هذه الدراسة هو تحديد مستويات الدهون المصلية وبروتيناتها لدى الأطفال كعامل خطورة لأمراض القلب والشرايين عند الكبار.حيث تمت دراسة تأثيرات(الوزن،الحالة الصحية للطفل والتاريخ العائلي) في مستويات معايير هذه الدهون وبروتيناتها.

أظهرت النتائج وجود زيادة معنوية في مستويات(الكولسترول والكلسيريدات الثلاثية) لدى الأطفال الذين لديهم زيادة في الوزن مقارنة بالأطفال ذوي الوزن الطبيعي. في حين لم تكن هناك تأثيرات واضحة في هذه المعايير لعاملي الحالة الصحية والتاريخ العائلي للأطفال.

تشير هذه النتائج إلى أن الكولسترول والكلسيريدات الثلاثية عند الأطفال الذين لديهم زيادة في الوزن من المؤشرات المهمة لحدوث أمراض القلب والشرايين عند الكبار فضلا عن ذلك فان المتابعة والفحص الدوري لمستويات هذه الدهون وعلاجها بصورة مبكرة يقلل من نسبة خطر الإصابة بأمراض القلب والشرايين المستقبلية .

Abstract

Many diseases and metabolic abnormalities are take place as result of increase lipids and lipoprotein in the blood. Cardiovascular events are the most common disease in this regard.

The aim of this study is to determine the level of cholesterol, triglycerides, high density lipoprotein cholesterol and low density lipoprotein cholesterol in children as a risk index for cardiovascular diseases in adulthood. To achieve this aim , the study was evaluate the effect of weight, family history and health status for children on the level of the lipids and lipoproteins.

The result revealed significant increase in the level of lipids and lipoproteins (cholesterol and triglycerides) in the over weight children when compared with normal kids.

*University of Al-Qadisaya College of medicine

While no clear effects were observed in the scale of lipids and lipoprotein values with regard to the family history and the health status issues.

The outcome indicate that increase in the concentration of cholesterol and triglycerides in the over weight children are the main directing consideration for the cardio vascular diseases in the adult. Further more the follow up ,the screening for the intensity of lipids and lipoproteins and the early therapy for hyperlipidemia will certainly decrease the incidence of future cardiovascular disease.

Introduction

Cardio vascular diseases is the leading cause of death and morbidity in the most developing countries. Most of the clinical burden of cardio vascular diseases occur in adulthood but the process of atherosclerosis changes begins in early life and progress throughout the life span. Many predisposing factors may contribute in the process of atherosclerosis changes and or in establishing the cardio vascular diseases(1).

Genetic component consider the important factor in determined the susceptibility of individual for subsequent Cardiovascular events. Family history in this regard will provide supplementary information about the genetic predisposition for the cardio vascular risk. Hence positive family history of dyslipidemia or premature Cardio vascular diseases(cardio vascular disease diagnosed before age 55 for men and 65 for women) or other risk factor for heart diseases like diabetes mellitus and hypertension are involved in this category(2).

Environmental factors like diet and physical activity are equal important in determining the course of disease progress. Diet rich in saturated fatty acids and cholesterol as well as with high carbohydrate intake together with decrease physical activity will influence the fitness risk for adult onset subsequent heart problems. Therefore obese or over weight children will reflect this parameter(3).

Other parameter may exert itself on the outcome of the adult onset Cardiovascular diseases is the health status of the child, in fact

chronic diseases like diabetes mellitus, nephrotic syndrome and liver diseases are consider the main causes for impairment of lipids and lipoprotein metabolism with higher rate of hyperlipidemia that may bring to bear great impact upon the heart and the blood vessels(4).

The objective of this study is to determine the level of lipids and lipoprotein in children with regard to weight, family history and child own health status as a risk index for future cardiovascular diseases.

Results and discussion

A random blood samples were taken from fifty two child who were admitted to the hospital with different diseases and from those who attended to out patient clinic for checking, another samples were taken also from normal volunteers for comparison. Serum level of cholesterol, triglycerides, high density lipoprotein cholesterol and low density lipoprotein cholesterol were measured for all children.

Astastical estimate was made using student t test to verify the comparison in serum cholesterol, triglycerides, high density lipoprotein cholesterol and low density lipoprotein cholesterol with regard to different parameters (family history, health status and weight) among all children. Significant variation was considered when ($p=<0.05$)

1-Role of the family history on the level of serum lipids and lipoprotein

The data from all children were evaluated for the discrepancy in the serum cholesterol, triglycerides, high density lipoprotein cholesterol and low density lipoprotein cholesterol with regard to family history. children are classified into two groups. Those with positive family history of dyslipidemia or premature cardio vascular diseases like hypertension, ischemic heart disease an myocardial infarction and other group with negative family history i.e. are absent from these diseases. Student t test was used to demonstrate the difference between two groups (table -1).

Table (1) Lipids and lipoprotein levels according to family history

	Family history	Mean	Std. Deviation
Cholesterol(mg/dl)	-ve +ve	173.35 195.81	77.663 90.178
Triglycerides (mg/dl)	-ve +ve	145.45 146.52	55.928 55.025
HDL-cho (mg/dl)	-ve +ve	48.95 37.61	27.894 14.364
LDL-cho (mg/dl)	-ve +ve	75.60 87.87	32.250 46.336

The result revealed no significant changes between two groups, but still there is high normal of serum level of cholesterol, triglycerides and low serum HDL cholesterol in the positive family history rather than that in negative family history .

In fact American heart association recommended three stages to asses the degree of severity according to the level of serum cholesterol. In stage 1 the level of serum cholesterol is less than 150 mg/dl (mild risk), while in stage 2 the rang between 150-179mg/dl (moderate risk) and stage 3 the rang is between 179-199mg/dl (high risk). In our study the serum cholesterol level in family positive group are in the stage 3 (high risk). Furthermore the American association for heart revealed that the severity of danger is increased if other risk factor is added to the high level of serum cholesterol like diabetes mellitus.(2).

On the other hand the American academy of pediatrics consider the patient at higher risk if the level of serum LDL cholesterol in more than eight years old age. more than 190 mg/dl, or more than160mg/dl with positive family history of early heart disease or if other two additional risk factors are present or more than 130mg/dl if diabetes mellitus is involve.(3).

A number of studies have identified potential risk for adult cardio vascular diseases, the strongest risk factor include familial diseases like familial hyperlipoproteinemia, high concentration of LDL cholesterol , a low concentration of HDL and elevated blood pressure and type 1 and type 2 diabetes mellitus(5).Research in

children and adolescent has demonstrated that some of these risk factors are present at a young age (6).

2-The consequence of health status on the level of lipids and lipoprotein.

The children are categorized into two groups according to health status, Group-1- consisted of (30) children with different diseases while group- 2- included (21) which were healthy children(table 1-2). The data were examined by student t test to determine the discrepancy between two groups.

Table (2) Lipids and lipoprotein levels according to health status

	Diagnosis	Mean	Std deviation
Cholesterol(mg/dl)	Normal Disesed	171.76 197.67	63.040 97.719
Triglycerides (mg/dl)	Normal Diseased	133.57 154.87	41.159 61.810
HDL-cho (mg/dl)	Normal Diseaed	40.33 43.27	12.811 25.694
LDL-cho (mg/dl)	Normal Diseased	75.81 88.13	21.238 50.890

Unfortunately there is no statistically difference in the compared groups, but still there is disparity in the scale of cholesterol and triglycerides in diseased children somewhat than in healthy subjects.

The reason beyond this result perhaps related to the diversity in the clinical stages i.e. the lipids changes in acute active stage differ when the patient became in the chronic state. Other reason might be related to the period and continuity of the therapy which will certainly influence the outcome of the lipids and lipoprotein levels. So timing of the samples taken may play a part in the lipids and lipoprotein reading .

Many diseases are associated with hyperlipideima that come to be an essential component during the course of the some disease or may develop as a later squeal in the other. Diabetes mellitus,

nephrotic syndrome and chronic liver disease are consider the main diseases that may associated with hyperlipidemia(7).

Similar results were mentioned that in long standing diseases there is a great possibilities of hyperlipidemia which could contribute to the risk of atherosclerosis(8) Furthermore the hazard of ischemic cardiovascular events due to hyperlipidemia is well documented in a case report of myocardial infarction in seven years old boy with unresponsive nephrotic syndrome for more than four years(9).

3-Impact of weight on the concentration of lipids and lipoprotein

The serum lipids and lipoprotein for children were studied according to the weight percentile per age per gender. The children were arranged in two groups, group 1 involved overweight children i.e.(those with their weight above percentile for corresponding age), and group 2 consist of children with normal weight for their stander range. Both groups were subdivided into to male and female progeny. The result were investigated by using t test to show any variances between two groups (table -3).

Table (3) Lipids and lipoprotein levels according to the weight

		Mean-+SD	
	weight percentile	Male	Female
Cholesterol(mg/dl)	Overweight Normal	274 ±213.54 192.13±83.43	178.94±83.80 138.61±35.40
Triglycerides (mg/dl)	Overweight Normal	320± 135.76 144.95±44.017	141.57±59.43 135.21±55.56
HDL-cho (mg/dl)	Overweight Normal	39.13±13.55 57±7.07	33.5±47.39 38.68±13.44
LDL-cho (mg/dl)	Overweight Normal	136.15±88.38 79.17±23.69	83.94±54.80 64.42±21.54

The result exhibit significant increase ($p=<0.05$) in the level of cholesterol and triglycerides concentration in over weight children from those with normal weight marker, while no significant change

was observed in the concentration of HDL cholesterol and LDL cholesterol altitude. In the same way no significant was noticed in the weight of female kids.

Most of the over weight children in our study were mainly due to disease processes rather than to actual dietary regime, this may provide an explanation to the differences in the enrolled lipids parameter with corresponding weight in male from female subjects.

Some reporter believes that over weight children regardless of sex or diseases or and other risk factors are in need for follow up for their lipids and lipoprotein disorder(10).Other suggested that for pediatrics patients who were over weight or obese and have high triglycerides concentration and low HDL cholesterol level, weight management is the primary goal, which include improvement of diet with nutritional counseling and increase physical activity to produce improved energy balance(11).

In the mean time and based to the data obtained from the study rational approach for follow up children with high risk group(over weight or obese, positive family history and diseased children) should be ahead. On the other hand genetic counseling for familiar diseases , nutritional advice for diet habit together with increase physical activity are good protocol strategy to maintain healthy life for children and to diminish subsequent future threat for cardiovascular disease in adulthood.

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