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Effect of grand multiparity on HDL-C level in normal pregnant Sudanese ladies.

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Abstract

The objective of this study is to determine maternal serum high density lipoprotein (HDL-C) levels at 26-32 weeks of gestation and the effect of multiparity on it. Study population is normal term pregnant women age 18-42 years who delivered normally with no previous obstetric complication and all previous deliveries were spontaneous, normal term and uneventful. Maternal serum HDL-C levels were determined from 325 normal women. Their mean age was 30 ± 12 years. The nulliparity (P0) was about 30.8 per cent, the first parity –primiparity- (P1) was about 30.8 per cent, whereas, the multiparity -grand and great grand- (PG) were 38.5 per cent. Mean serum high density lipoprotein-cholesterol (HDL-C) levels in P0, P1 and PG were 53 ± 10, 35.8 ± 5.3, 67.2 ± 11 mg/dl, respectively. There was a significant variance between maternal lipid and nulliparity ($p \leq 0.01$) as well as between primiparity and multiparity ($p \leq 0.01$).

Introduction

The role of plasma lipids and lipoproteins in the development of coronary heart disease (CHD) has been extensively studied. There is now a large body of data based on epidemiological studies, experimental research, genetics, and clinical trials that relates elevated total serum cholesterol and particularly LDL cholesterol (LDL-C) as well as low serum HDL cholesterol (HDL-C) to increased risk of CHD. [1, 2] Although the role of TG in the development of CHD has been controversial, it has been shown that high TG in combination with low HDL-C accounts for twice as many cases of CHD as low HDL-C alone. [1, 2]

Pregnancy is associated with profound alterations in the cardiovascular system, the long-term effects of which are unknown. Human epidemiological studies suggest that multiparity (*multiple pregnancies*) increases the risk of cardiovascular disease. The mechanisms underlying these findings remain to be elucidated. The objective of this study was to determine the long-term effects of grand-multiparity on HDL-C level. [3, 4]

High Density Lipoprotein: [HDL]

High density lipoproteins (HDL) form a class of lipoproteins, varying somewhat in their size (8-11 nm in diameter) and contents HDL will usually be

performed as part of an overall lipid profile, wherein LDL and triglycerides will also be measured. The combined information gathered from all of these tests may help determine cardiovascular event risk (risk of heart attack, stroke, and peripheral vascular disease) [5].

HDL particles are the smallest of the lipoproteins. They are the densest because they contain the highest proportion of protein. The main function of HDL appears to be carrying excess cholesterol (and probably other phospholipids and proteins) from the walls of the arteries to the liver for "re-packaging" or excretion in the bile. For that HDL can remove cholesterol from atheroma within arteries, and transport it back to the liver for excretion, HDL is called good cholesterol. [6].

In a review of nine different prospective studies in women, HDL cholesterol emerged as the single most important lipid risk factor in women. Recently, the National Cholesterol Education designates high HDL-C as a negative CHD risk factor, and recommends consideration of HDL-C in choice of drug therapy. [7]

Low HDL-C (*<35 mg/dL*) -as an independent indicator of risk- is equivalent to non-lipid risk factors such as smoking or hypertension. The increased clinical importance attributed to HDL-C concentrations now places additional burden on the clinical laboratory to provide accurate and precise measures of HDL-C. [8]

Normal level:

Normal value ranges may vary slightly among different laboratories.

- Male: 29-62 mg/dl
- Female: 34-82 mg/dl

An HDL 60mg/dL or above helps protect against heart disease. [9]

Multiple pregnancies:Multipara, grand: The term "multipara" applies to any woman who has given birth 2 or more times. A woman who has given birth 5 or more times is called a grand multipara.

For a pregnancy to count as a "birth," it must go to at least 20 weeks' gestation (the mid-point of a full-term pregnancy) or yield an infant that weighs at least 500 grams, irrespective of whether the infant is liveborn or not. [14]

The term "multipara" is composed of two Latin words: "multi-" from "multus", much + "-para" from "pario", to bring forth = to bring forth much (in the way of children).

Uniparous [primiparous]: 1) Having produced only one offspring. 2) Producing only one offspring at a time. [15]

Materials and methods:

The cohort consisted of 600 unrelated normal Sudanese pregnant women recruited from the most hospitals in Khartoum state, Nahr Elnil state and Gadarif state between October 2005 and September 2007. Informed consent, approved by University of Tamyal and Obstetricians committees – Bahry

Teaching Hospital, was obtained from all study participants.

200 of the volunteers are not pregnant, 200 of them were pregnant for the first time, and 200 were pregnant for more than 5 times.

Statistical analyses

Between-group comparison was performed using an ANOVA followed by the parametric *t*-test. Statistical analyses were performed using Microsoft Excel Data and Statistical Package for the Social Sciences (SPSS) computer program.

Sampling

Total serum cholesterol and HDL cholesterol (HDL-C) are the preferred screening tests for most inmates. Blood samples can be obtained at any time in the non-fasting state, since total cholesterol does not change significantly after a fat-containing meal, and HDL-C levels drop minimally. But, because all lipid profile needed to be determined, the 10 – 14 hours fasting samples were collected from all study groups.

Venipuncture should be performed after 5 minutes in the sitting position, using the tourniquet as briefly as possible, to minimize the effect of plasma volume and Federal Bureau of Prisons Management of Lipid Disorders posture on cholesterol levels. Recent surgery or trauma, or changes in diet can all affect lipid metabolism and cholesterol levels.

Method of estimation of HDL-C:

Specimen type, collection and storage

HDL-cholesterol measurement is still problematic, especially in samples that have been frozen and in lipemic plasma samples. [11]

Phosphotungstate/ Mg^{2+} method: [12]

Principle:

Phosphotungstate/ Mg^{2+} compound precipitates other lipoproteins than HDL by precipitating apolipoprotein (apo) B-containing lipoproteins. Then estimation of the isolated supernatant for cholesterol is carried.

Hazardous materials This procedure uses phosphotungstate, which is caustic and toxic. Do not swallow, and avoid contact with skin and eyes.

Advantages: sensitive and specific

Disadvantages:

- TG level more than 400mg/dL has a high probability of error when the cholesterol in the supernatant is analysed.
- In some laboratories, a major source of error is the failure to achieve clear supernatant
- more expensive
- **How to prepare patients for the test**
- Fast for 8 to 12 hours before the test.
- Anyone whose HDL level is below 40 mg/DL should consider taking steps to increase their HDL. This is the case even if total cholesterol and LDL cholesterol levels are within the normal range. [13]

Serum or plasma can be used. A fasting blood sample is preferred for lipid profile test. However if HDL-cholesterol alone has to be analyzed, a random sample can also be used. The specimen is stable for a week at 2 - 8ºC and at least for 3 months at -20ºC.

Results

Table1: Describes the results of HDL of all study groups

Type of parity	HDL
Multiparity	67.2
Primiparity	35.8
Nulliparity	53

Table 2: Compares the results of HDL of different number of pregnancy

No of parity	HDL
Nulliparity	53
primiparity	35.8
Multiparity5	65.3
Multiparity6	67
Multiparity7	67.9
Multiparity8	71.1
Multiparity9	71
Multiparity10	72.5

Table 3: Compares the results of lipid profile of HDL basing on the obesity

	Obesity	**HDL**
Multi parity	Non-obese	67.6
	Obese	66.9
Prim parity	Non-obese	36.2
	Obese	35
Null parity	Non-obese	53.2
	Obese	**51.8**

Discussion

Effect of multiparity and grand multiparity on many analytical factors during pregnancy has been reported in several papers as well as the affect of hyperlipidemia on the heard. Serum for high density lipoprotein-cholesterol (HDL-C) levels in nulliparity, primiparity and grand-multiparity were 53 ± 10.5, 35.8 ± 5.3, and 67.2 ± 11 mg/dl, respectively. These results of (HDL-C) levels showed significant decreasing ($p = 0.03$) from nulliparity to primiparity (in as much as 87.7%) and showed significant increasing ($p < 0.02$) from primiparity and grand multiparity (as much as 48%). These findings are in agreement with many researchers such as Johnson JA et al [16], Feskanich D et al [17], Manson JE et al [18] and others who have described the affect of normal pregnancy on lipid metabolism.The hyperlipidaemia during pregnancy is proved in many researches. Cramer DW [19], Cappuccio FP et al [20], Emanuel R [21] and others have described the reference range of lipid profile during the pregnancy, but each one of them has his own parameters. Although there are significant variations between them, they all have the same contentment that the peak level of hyperlipidaemia during pregnancy occurs during 26-32 weeks gestation. Other findings express the results of the grande multiparas according to the number of the pregnancy. All the results of the lipid profile –in the three tables- showed irregular ranging. This means it is undependable results. All the results showed insignificant changes when the lipid results are compared between each two respective numbers. In cholesterol the results showed as irregular results, but showed significant changes when compared the

results between each two respective results. Thus these findings proved that the lipid profile - except for total cholesterol- is not affected by the number of the grande multiparity.

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