

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

قال الله تعالى

فَتَعَالَى اللَّهُ الْمَلِكُ الْحَقُّ وَلَا تَعْجَلْ بِالْقُرْآنِ مِنْ قَبْلِ أَنْ يُقْضَىٰ إِلَيْكَ وَحْيُهُ وَقُلْ رَبِّ زِدْنِي عِلْمًا

صدق الله العظيم

سورة طه الآية 114

Dedication

Dedication

To my dear family

and

To all Sudanese diabetic patients

I dedicate this work

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Thanks are first and last to (ALLAH) who enabled me to conduct this study by the grace of him and give me strength and patience.

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ABSTRACT

A cross-sectional study conducted during the period from December 2007 to July 2010 to determine and to assess the serum levels of LMW apo(a) isoforms in Sudanese diabetic patients with coronary heart disease in comparison with a healthy control group and a diabetic group without coronary heart disease. One hundred-fifty Sudanese diabetic patients with Coronary Heart Disease (CHD) were selected from different hospitals and diabetic medical centers in Khartoum states, Sudan, the test group, compared with two control groups, control group A included 150 diabetic patients without CHD, whereas control group B included 150 apparently healthy volunteers. Blood specimens were collected from all groups and serum Apolipoproteins (LMW apo(a) isoforms, lp(a) apo A1 and apo B) and lipid profiles (Total cholesterol, Triglyceride, LDL cholesterol and HDL cholesterol) were determined. Age and gender of the test group were matched with the control groups. The serum levels of apolipoprotein and lipid profiles were measured using Roche/Hitachi 902 full-automated analyzer and commercial kits from Biosystems, BioRad and Sigma Aldrich companies. Statistical analysis was done, using SPSS computer analysis programme for analysis of results.

The serum levels of apo(a) LMW isoforms and lipoprotein(a), of the test group showed significantly raised when compared with control group A and control group B.

The serum levels of apolipoprotein B, total cholesterol, LDL-cholesterol triglyceride and VLDL of the test group were not significantly different when compared with control group A, whereas they were significantly raised when compared with control group B.

The serum levels of apolipoprotein A1 and HDL-cholesterol of the test group showed insignificant difference when compared with control group A, while they showed significant decrease when compared with control group B.

The study indicated a strong positive correlations between the duration of diabetes mellitus and the serum levels of LMW apo(a) isoforms, and lipoprotein(a), and indicated moderate correlations between the duration of diabetes and apolipoprotein B, and showed a weak correlations between the duration of diabetes and Total cholesterol and LDL, and indicated a weak negative correlation between apolipoprotein A1 HDL cholesterol, and showed insignificant correlations between the duration of diabetes and Triglyceride and VLDL. The study indicated strong positive correlations between the age of patients and the serum levels of LMW apo(a) isoforms and lipoprotein(a). The study demonstrated a moderate correlation between apolipoprotein A1 and HDL. and a weak correlation between apolipoprotein B and LDL.

In conclusion the study indicates that LMW apo(a) isoforms and lipoprotein(a) are important diagnostic markers because they are strongly correlated with the duration of the diabetes and the age of patients, so they can be used for early detection of atherosclerotic cardiovascular disease (CVD) and in follow up of diabetic patients.

مستخلص الدراسة

أجريت هذه الدراسة المقطعية في الفترة من ديسمبر ٢٠٠٧ والى يوليو ٢٠١٠ ، وقد تم في هذه الدراسة اختيار مجموعة مكونة من ١٥٠ مريض سوداني (بمرضى السكر وأمراض القلب التاجية عشوائيا ، وذلك تبعا لتشخيص الأطباء) من كلا الجنسين ومختلف الفئات الاجتماعية والاقتصادية يعالجون في مختلف المستشفيات ومراكز علاج مرض السكر في ولاية الخرطوم-السودان وقد أطلق على هذه المجموعة اسم مجموعة الاختبار ، قورنت هذه المجموعة بمجموعتين ، الأولى ١٥٠ مريض بمرض السكر فقط من غير أمراض القلب ، يعالجون أيضا في مختلف المستشفيات ومراكز علاج مرض السكر في ولاية الخرطوم ، أطلق على هذه المجموعة (المجموعة الضابطة أ) ، والمجموعة الثانية تضم ١٥٠ متطوعا أصحاء كعينات مرجعية لمقارنة النتائج ، أطلق عليها (المجموعة الضابطة ب) ، وقد تمت مطابقة العمر والجنس مع المجموعتين الضابطتين. وقد تم اخذ عينات دم من كل المجموعات قيست فيها نسب الدهون ومشتقاتها والابوليوبروتين باستخدام جهاز قياس الاطياف الضوئية الاوتوماتيك روش-هيتاشي ، واستخدام محاليل من شركة بيوسيستم الاسبانية وبيوراد الايطالية وسيقما الامريكية ، وباستخدام التحليل الاحصائي (SPSS) قورنت النتائج بين المجموعات.

على ضوء النتائج فقد وجد هناك ارتفاع عند المرضى مهم إحصائيا فى متوسط نسبة المشتقات منخفضة الوزن الجزيئي للابوليوبروتين أ والليوبروتين أ بين مجموعة الاختبار والمجموعة الضابطة أ والمجموعة الضابطة ب.

ووجدت الدراسة فرق غير مهم احصائيا بين متوسط نسبة كل من ابوليوبروتين ب ، الدهون ذات الكثافة القليلة ، الدهون الثلاثية والدهون ذات الكثافة القليلة جدا ، في متوسط النسبة بين مجموعة الاختبار والمجموعة الضابطة أ ، لكن عند مقارنة متوسط النسبة مع المجموعة الضابطة ب وجد ان هناك ارتفاع مهم احصائيا عند المرضى.

وجد هناك فرق غير مهم إحصائيا بين متوسط نسبة ابوليوبروتين أ والدهون ذات الكثافة العالية في متوسط النسبة بين مجموعة الاختبار

والمجموعة الضابطة أ ، لكن عند مقارنة متوسط النسبة مع المجموعة الضابطة ب وجد ان هناك انخفاض مهم احصائيا عند المرضى.

ايضا اشارت الدراسة لوجود ارتباط قوى بين مدة مرض السكر والمشتقات منخفضة الوزن الجزيئى للابوليپروتين أ والليپروتين أ ،

واشارت لوجود ارتباط متوسط بين مدة المرض وابوليپروتين ب ، واشارت لارتباط ضعيف عكسى بين مدة المرض مع ابوليپروتين أ والدهون ذات الكثافة العالية ، واشارت لارتباط ضعيف بين مدة المرض مع كل من الكلسترول والدهون ذات الكثافة القليلة ، كما اشارت لارتباط غير مهم بين مدة المرض والدهون الثلاثية والدهون ذات الكثافة القليلة جدا. ووضحت الدراسة وجود ارتباط قوى بين عمر المرضى مع كل من المشتقات منخفضة الوزن الجزيئى للابوليپروتين أ والليپروتين أ ، ووجدت الدراسة ارتباط متوسط بين نسبة ابوليپروتين أ والدهون ذات الكثافة العالية ، ووجدت ارتباط ضعيف بين ابوليپروتين ب والدهون ذات الكثافة القليلة.

وفى الختام خلصت الدراسة إلى إن قياس المشتقات منخفضة الوزن الجزيئى للابوليپروتين أ والليپروتين أ مؤشر مهم فى تشخيص مرضى السكر بتصلب الشرايين وأمراض القلب فى المراحل الأولية لأنهما يرتبطان ارتباط قوى مع كل من مدة المرض وعمر المرضى ، لذلك قياسهما مهم فى التشخيص ومتابعة المرضى.

ABBREVIATIONS

Apo A1	Apolipoprotein A1
Apo B	Apolipoprotein B
CHD	Coronary Heart Disease
CVD	Cardio Vascular Disease
DKA	Diabetic ketoacidosis
DM	Diabetes Mellitus
DM1	Diabetes Mellitus type one
DM2	Diabetes Mellitus type two
F	Female
GOD	Glucose Oxidase
HDL	High Density Lipoprotein
HMW	High Molecular Weight
IDDM	Insulin Dependant Diabetes Mellitus
IDL	Intermediate Density Lipoprotein
Kd	kilo dalton
LCAT	Lecithin - Cholesterol - Acyl Transferase
LDL	Low Density Lipoprotein
LMW	Low Molecular Weight
Lp(a)	Lipoprotein(a)
M	Male
µl	Micro liter
n	number
NIDDM	Non Insulin Dependant Diabetes Mellitus
PAD	Peripheral Arterial Disease
PAP	Phenol 4-Amino Phenazone

PLG	Plasminogen
POD	Peroxides
PVD	Peripheral Vascular Disease
SDS-PAGE	Sodium dodecyl Sulphate-Poly Acrylamide Gel Electrophoresis
TC	Total Cholesterol
TG	Triglyceride
VLDL	Very Low Density Lipoprotein

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