The Professional Medical Journal
www.theprofesional.com

DOI: 10.17957/TPMJ/17.3753

ORIGINAL PROF-3753

HbA1c AND LIPID PROFILE;
CORRELATION WITH THE COMPLEXITY OF CORONARY ARTERY DISEASE

1. PG Student
Department of Cardiology
Isra University Hospital, Hyderabad.
2. Associate Professor,
Department of Cardiology
Isra University Hospital, Hyderabad.
3. Associate Professor
Department of Cardiology
Peoples Medical University
Shaheed Benazirabad.
4. Medical Officer
Indus Medical College
Tando Muhammad Khan.
5. Medical Officer
Indus Medical College
Tando Muhammad Khan.
6. Professor,
Department of Cardiology
Isra University Hospital, Hyderabad.

Correspondence Address:
Dr. Faraz Farooq Memon
PG Student
Department of Cardiology
Isra University Hospital, Hyderabad.
farazkashif@yahoo.com

Article received on:
02/12/2016
Accepted for publication:
25/03/2017
Received after proof reading:
06/05/2017

Dr. Faraz Farooq Memon[1], Dr. Nandlal Rathi[2], Dr. Qurban Ali Rahoo[3], Dr. Bhunesh Maheshwari[4], Dr. Mariya Maheshwari[5], Dr. Feroz Memon[6]

ABSTRACT… Objectives: The aim behind this study was to scientifically correlate the glycosylated hemoglobin and lipid profile with the complexity of coronary artery disease. **Study Design:** Comparative hospital based study. **Setting:** Cardiology Department of Isra University Hospital Hyderabad. **Period:** Six months. **Patients and Methods:** 112 participants between the ages of 25 to 80 years both male and female and undergoing their first coronary angiography was included. Data were entered and analyzed by using Statistical Package for the Social Sciences version 20.0. **Results:** The mean age of patients was 54.16 years (9.74 ± SD) and the study subjects consisted of 76 males (67.86%) and 36 (32.14%) females. a total of 65 patients (58.0%) were presented between the ages of 41 – 60 years (middle aged group). The mean SYNTAX Score was 15.22. Patients with increased HbA1C (≥6.5%) and triglyceride levels (≥150 mg/dl) and decreased HDL-C levels (≤40 mg/dl) were tend to have high Sx score. However, we did not find any significant relationship of SX score with total cholesterol and LDL-C levels. **Conclusion:** It was found that the trend of complexity of CAD increased with increasing age, high HbA1C, high LDL-C, high serum triglyceride, and low HDL-C levels.

Key words: SYNTAX Score, coronary artery disease complexity, HbA1C.

Article Citation: Memon FF, Rathi N, Rahoo QA, Maheshwari B, Maheshwari M, Memon F. HbA1c and lipid profile; correlation with the complexity of coronary artery disease. Professional Med J 2017;24(5):650-655.
DOI: 10.17957/TPMJ/17.3753

INTRODUCTION

Diabetes mellitus is a chronic long standing disease which has a significant role in the development and worsening of coronary artery disease other than the most common systemic involvements. Abnormally raised in the blood sugar levels persistently may increase the incidence of coronary artery disease (CAD) in otherwise healthy population. Previously published data suggest that atherosclerosis, formation and deposition of lipids in vessels, is enhanced after the patients diagnosed with diabetes mellitus and if not properly controlled may lead to its chronic disabilitating complications such as myocardial infarction and stroke.[1]

Mortality due to CAD in North America and Western Europe in the last decades has effectively reduced by a good health care system.[2,3] But, it has expanded in the Asia mainly due to lack of awareness, unhealthy life style and poor health care system.[4] Diabetes and Dyslipidemia has been major risk factors for the development of CAD around the world as well as in Pakistan.

Most of the cardiovascular diseases are caused by the underlying presence of atherosclerotic changes which starts since adulthood and increase in the burden of atherosclerosis can be caused by some already known modified and non-modifiable risk factors in which diabetes mellitus has a major role. Proper recognition of these underlying risk factors is very useful in prevention and cardiovascular disease in both man and women.

An angiographic based grading tool is designed with a name of SYNTAX score system to determine the complexity of coronary artery disease and to decide which patient gets benefit from CABG or PCI. One of a very famous SYNTAX trial which has been conducted recently has observed the outcome of patients with multivessel coronary artery disease along with involvement of left main

narrowing with coronary artery bypass grafting. In their study, they have found that patients with SYNTAX score greater than 34 were benefitted from CABG rather than PCI and in those patients whose SYNTAX score lower than 34 with a significant coronary artery disease was just as good for major adverse cardiac events, with lower stroke rates.

Previously, only one study has been conducted in Japan to determine the relationship between the complexities of coronary artery disease (CAD) with HbA1c. But there is no international or national scientific data available that has shown relationship between the complexities of CAD with Lipid profile. So, this study has been conducted to fill the present scientific gap and to determine the causative underlying factor associated with complexity of CAD which will ultimately help us in further management of patients.

PATIENTS AND METHODS

This is a descriptive case series study conducted at Isra University Hospital Hyderabad in the department of Cardiology for duration of six months through consecutive patient selection sampling technique.

We have evaluated a total of 112 patients having age ≥25 and ≤80 years and undergoing for coronary angiography for the first time of either gender given consent to participate. Patients with renal impairment (Creatinine clearance <60 ml/min) and having history of Coronary Artery Bypass Grafting (CABG) or prior Percutaneous Coronary Intervention (PCI) were excluded from the study.

DATA ANALYSIS

After careful review of inclusion and exclusion criteria a detailed history was taken from the patient before undergoing coronary angiography and then Syntax score was calculated using the available online calculator http://www.syntaxscore.com/calc/start.htm.

A 10cc blood samples were obtained from an overnight fast (12 hours) for determining the levels of blood glucose, HbA1C, and lipid profile including total cholesterol, High density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C), and serum triglycerides.

All patients were screened for Diabetes mellitus and were labeled as Diabetic when the fasting blood glucose levels were ≥126 mg/dl or random blood glucose levels were ≥200 mg/dl or patient were already taking anti-diabetic drugs.

Before coronary angiography informed written consent was taken by patient and family members after explaining about all the risks and complications. Typically all the cases of coronary angiography were performed on General Electrical (GE) Innova 2000 U.S.A through the femoral artery in angiography department at Isra University Hospital, Hyderabad.

Statistical Package for the Social Sciences version 19 (SPSS V.19) was used for data entry and analysis. Categorical data like gender is presented as frequencies and percentages, whereas age, HbA1C levels, and lipid profile measurements are presented as mean ± standard deviation. Age groups were equally divided into three categories, Younger (30-45 years), middle (46-60 years), and old (61-75 years). Based on the WHO criteria the HbA1C levels were labeled normal when levels were <6.5% and impaired when ≥6.5%. Total cholesterol, HDL-C, LDL-C, and serum triglycerides were also divided into two categories, normal and impaired, based on the ATP III lipid profile guidelines. Association of syntax score with HbA1C, total cholesterol, HDL-C, LDL-C, and serum triglycerides were analyzed by using Independent sample t-test and ANOVA tests where needed and presented as comparing bar charts and a p value of < 0.05 was taken as statistically significant. The data is presented in the form of tables, pie chart, and bar diagrams.

RESULTS

A total of 112 patients were selected for this study. The study subjects consisted of 76 males (67.86%) and 36 (32.14%) females. The mean age of patients was 54.16 years (9.74 ± SD). Table-I.

Show descriptive analysis of continuous variables including their means and standard deviations, SYNTAX Score (15.22 ± 10.16), Total Cholesterol (138.35 ± 35.85), HDL-C (27.6 ± 6.76), LDL-C (92.39 ±34.68), Triglycerides (164.71 ± 94.07), and HbA1C (6.66 ± 2.29).

Variables	Mean	Standard Deviation
SYNTAX Score	15.22	10.16
Total Cholesterol - mg/dl	138.35	35.85
HDL-C - mg/dl	27.6	6.76
LDL-C - mg/dl	92.39	24.68
Triglycerides - mg/dl	164.71	94.07
HbA1C - %	6.66	2.29

Table-I. Descriptive statistics of continuous variables

When comparing the SYNTAX score observed in our study with respect to three different age groups, analysis from this study showed significantly high mean of SX score (20.5 ± 12.1, p value 0.01) among older age group population than younger (13.8 ± 10.1) and middle (13.9 ± 9) age groups [Presented via Figure-1].

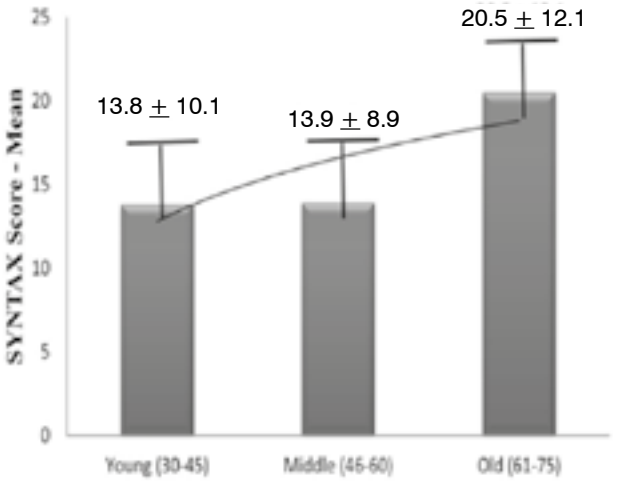

Figure-1. Comparison of Gender with SYNTAX Score

The main objective of this study was to find out the association of SX score with HbA1C and different parameters of lipid profile.

Patients with increased HbA1C (≥6.5%) and triglyceride levels (≥150 mg/dl) and decreased HDL-C levels (≤40 mg/dl) were tend to have high Sx score. However, we did not find any significant relationship of SX score with total cholesterol and LDL-C levels [Presented via Figure- 2,3,4,5 and 6].

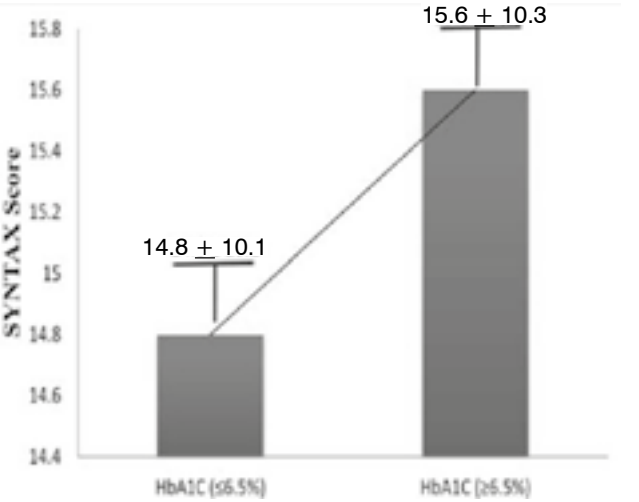

Figure No: 2. Comparison of SYNTAX with HbA1C

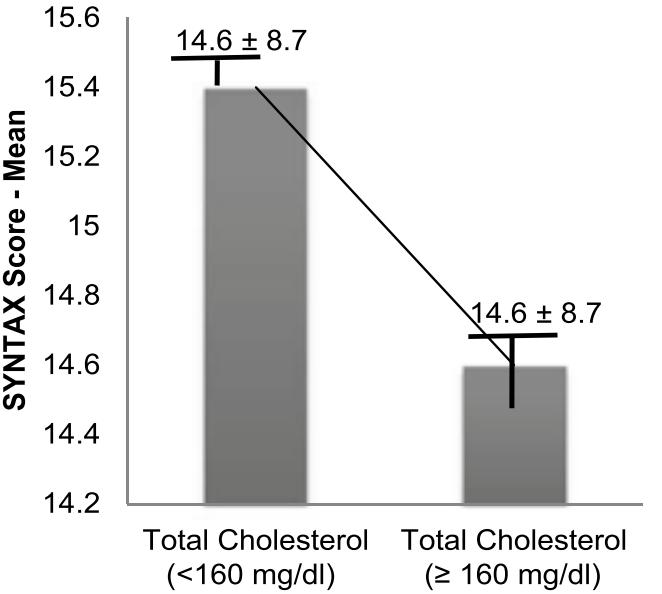

Figure-3. Comparison of SYNTAX with Total Cholesterol levels

DISCUSSION

Our present study is the first scientifically done to determine the Correlation of Glycosylated Hemoglobin and Lipid Profile with the complexity of Coronary Artery Disease in a Pakistani population.

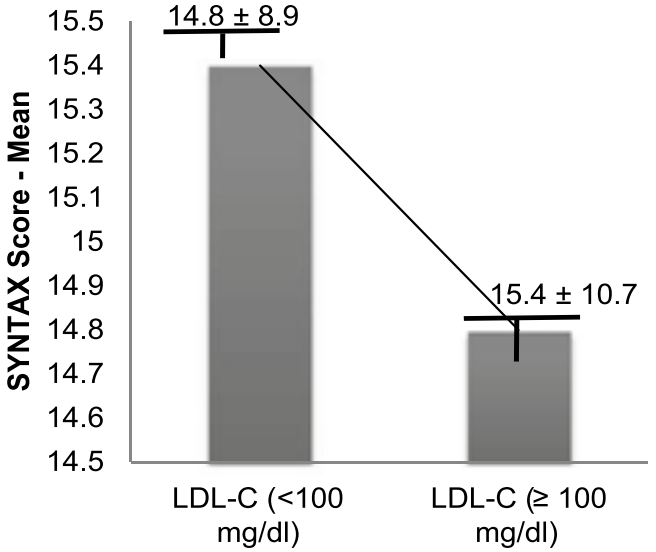

Figure-4. SYNTAX with LDL-C

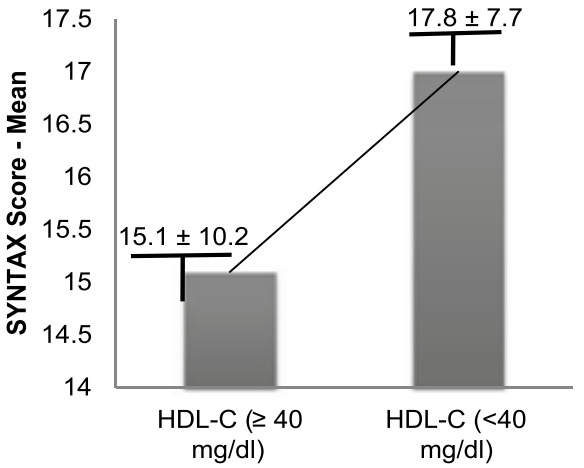

Figure-5. SYNTAX with HDL-C

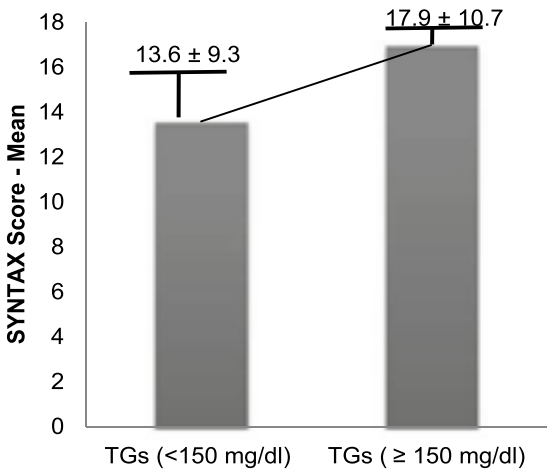

Figure-6. SYNTAX with TGs

For cardiologists and cardiothoracic surgeons the SYNTAX score is the only coronary artery disease severity predictive score to determine the postoperative outcome of patients after CABG in which left main coronary artery is involved. Majority of the previously conducted studies has shown that patients with higher SYNTAX score are least favorable for PCI than CABG and there are more chances of developing myocardial infarction, target lesion revascularization, and death more than double.

The previous study shows that in patients with ULMCA, the presence of a SYNTAX score >34 is associated with a higher risk of death after PCI compared with that of patients treated with CABG. In particular, after adjustment for potential confounders, patients with a SYNTAX score >34 treated with PCI had an almost 3-fold increase in the likelihood of 2-year mortality, whereas no differences between PCI and CABG outcomes were noted among patients with a SYNTAX score ≤34. Overall, these findings support the hypothesis that a SYNTAX score threshold of 34 is clinically useful to select patients with left main disease who benefit most from revascularization by CABG. Importantly, a sensitivity data analysis showed that these findings are consistent irrespective of the disease location (e.g., ostium/shaft or bifurcation) within the left main.

Diabetes and coronary artery disease (CAD) frequently coexist, leading to additive increases in the risk of life-threatening cardiovascular events. Coronary artery disease is a common comorbids condition in patients with type 2 diabetes when compared with the general population.

In our study mean and SD of age was 54.16 years (9.74 ± SD) and among them male percentage was noticed higher compared to female ones 67.86% % vs. 32.14%, respectively. This favors that most of the study population based on middle aged population. There is no bigger difference in the basic demographics of patients with coronary artery disease in our study and when it compared with the studies conducted nationally and internationally.

The mean SYNTAX score in our study was 15.22 which is almost favors revascularization vs. CABG in our study population. But in a previously published data their mean SYNTAX score was 26.3. This significant difference in the mean SYNTAX score could be due to their underlying presence of risk factors such as Dyslipidemia and uncontrolled diabetes mellitus and hypertension.

A systemic review and meta-analysis has been conducted in which data were compiled from seven different clinical trials of patients more than 6500 has shown that SYNTAX score was an independent predictor of mortality and other revascularization related complications at one year regardless of their presentation.

When looking at the observations of our study in correlation with other parameters we have find out that patients with increased HbA1C (≥6.5%) and triglyceride levels (≥150 mg/dl) and decreased HDL-C levels (≤40 mg/dl) were tend to have high Sx score. However, we did not find any significant relationship of SX score with total cholesterol and LDL-C levels. More or less these findings of our study have also been observed in a previously conducted international study.

The anticipated outcome which has been taken through calculation from SYNTAX score after coronary angiography provides an economical advantage in the making of final decisions whether patients is a candidate for PCI or CABG. Our study now provide scientific data through which conclusion can be drawn from Southeast population that which group is more in a favor of PCI and or CABG.

CONCLUSION

It was found that the trend of complexity of CAD increased with increasing age, high HbA1C, high LDL-C, high serum triglyceride, and low HDL-C levels.

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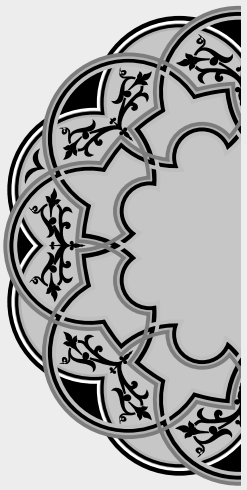

"A negative mind will never give you a positive life."

Unknown

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Faraz Farooq Memon	All authors have contributed equally.	
2	Dr. Nandlal Rathi		
3	Dr. Qurban Ali Rahoo		
4	Dr. Bhunesh Maheshwari		
5	Dr. Mariya Maheshwari		
6	Dr. Feroz Memon		