Assessment of Serum Total Cholesterol, High-Density Lipoprotein, and Low-Density Lipoprotein Concentrations among Sudanese Patients with *Helicobacter pylori* Infection attending Omdurman Teaching Hospital

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Abstract

Background: *H. pylori* infection is associated with hyperlipidemia and other risk factors of coronary artery disease. Several studies were conducted regarding the role of *H. pylori* as a risk factor of coronary artery disease, hypertension, dyslipidemia, obesity and metabolic syndrome.

Objective: To assess the serum concentrations of total cholesterol, high-density lipoprotein, and low-density lipoprotein among Sudanese patients with *Helicobacter pylori* infection attending Omdurman Teaching Hospital.

Materials and methods: This was a case-control study conducted from March to April 2018. 30 blood specimens were collected from diagnosed *H.pylori* infection patients (test group) at Omdurman Teaching Hospital. Another 30 blood specimens were collected from apparently healthy participants (control group). The levels of total cholesterol (TC), high density lipoprotein (HDL) and low density lipoprotein (LDL) were measured by the Mindray BS-120.

Results: There were significant increase in the levels of TC and (LDL) in patients with *H. pylori* infection (p = 0.000, p = 0.035 respectively) when compared with control participants. While, there was a significant decrease in the level of high density lipoprotein (HDL) in patients with *H. pylori* infection (p = 0.025) when compared with control group participants. Regarding gender incidence among patients with *H. pylori* infections, there was significant increases in the levels of TC and LDL (p = 0.000, and p = 0.000 respectively). Also there was a significant decrease in the level of HDL (p = 0.002) among females when compared with males. There was a significant negative correlation between the levels of TC and HDL (R = - 0.370, p = 0.044) and a significant positive correlation between the levels of TC and LDL (R= 0.854, p = 0.000).

Conclusion: The levels of total cholesterol and LDL were high in patients with *H. pylori* infection and the concentration of HDL was Low in patients with *H. pylori* infection. There was no significant correlation between the concentrations of total cholesterol and HDL with age incidence among *H. pylori* infection patients. Regarding gender incidence, females had higher total cholesterol and LDL levels and lower HDL levels as compared with males investigated.

Introduction

Helicobacter pylori infection affects more than 50% of the world population. Its prevalence and incidence rates reveal variation among countries depending on the development status and age incidence. *H. pylori* infection is diagnosed on the basis of clinical and laboratory finding microbiological methods, and histopathological examinations. Although endoscopic examination is invasive, expensive, and time consuming, it is of critical importance in determining clinical prognosis on the basis of the localization of a lesion[1].

Clinical manifestations of *H. pylori* infection include peptic ulcer disease, adenocarcinoma, and gastric mucosa-associated lymphoid tissue lymphoma. Most patients with *H. pylori* infection remain asymptomatic throughout life despite chronic gastritis. Coronary artery disease (CAD) is one of the main causes of mortality in the developed countries. Diabetes, lipid profile disorders, hypertension, and smoking are the common risk factors of atherogenesis, which results in the coronary artery disease[2].

Over the past few decades, large amount of epidemiologic and clinical data regarding associations with non-gastric systemic diseases and *H. pylori* infection had been reported. Such diseases include dyslipidemia and coronary artery disease and its risk factors. However, the results of several other studies failed to confirm the association. The inconsistent findings of these studies may be explained by the varying study methodologies, such as different study population, limited sample size, or inadequate consideration of potential confounders. In particular, most previous studies did not control for socioeconomic status, which is significantly related with prevalence of *H. pylori* infection[3].

The present study was conducted to assess the serum concentrations of total cholesterol, high-density lipoprotein and low-density lipoprotein among Sudanese patients with *H. pylori* attending Omdurman Teaching Hospital.

Materials and methods

This was a cross-sectional, case control study conducted at Omdurman Teaching Hospital during the period from March to April 2018. Exclusion criteria were patients with a past history of a disease that can interfere with the lipid profile results, e.g. diabetes mellitus, liver diseases, renal diseases, familial hyperlipidemia, smoking, and obesity. Inclusion criteria include all patients presenting with *H. pylori* infection. The study was approved by the Scientific Research Committee of Al Neelain University. Permission to collect the specimens was granted by authorities of Omdurman Teaching Hospital. All study participants were informed with the aims of the study and its importance, and a verbal consent was obtained from each participant. Data was analyzed using the SPSS program, version 21. The results were expressed as percentages, mean, and standard deviation (SD). Independent T-test was performed to compare the study parameters in cases versus control groups. Correlation was done to study the relationship between study parameters and study variables. A p-value less than 0.05 was considered as significant. A well-structured questionnaire was used to collect clinical and demographical data of all participants. 30 blood specimens were collected from diagnosed *H.pylori* infection patients (test group) at Omdurman Teaching Hospital. Another 30 blood specimens were collected from

apparently healthy participants (control group).

Blood specimens were collected from all study population, and serum was separated. The concentrations of total cholesterol, high density lipoprotein (HDL) and low density lipoprotein (LDL) were measured by the Mindray BS-120 analyzer.

Pathological and normal control sera were included and analyzed to assure accuracy and precision of results.

Results

In this study, the (Mean ± SD) of total cholesterol was (241.1±81.5 mmol/L) in test group patients; and the (Mean ± SD) of total cholesterol was (154.0±61.5 mmol/L) in control participants group. The (Mean ± SD) of HDL was (39.30±9.58 mmol/L) in patients with *H. pylori* infection and was (44.87±9.17 mmol/L) in control participants. The (Mean ± SD) of LDL was (109.23±46.45mmol/L) in patients with *H. pylori* infection and was (88.00±27.17 mmol/L) in control participants.

Statistical analysis showed a significant increase in the concentrations of cholesterol and LDL among patients with *H. pylori*, when compared to control group($p = 0.000$, and $p = 0.035$ respectively). While significant decrease in the levels of HDL among patients with *H. pylori* infections, when compared with the control participants ($p = 0.025$).

Regarding gender incidence, among patients with *H. pylori*, there was a significant increase in the levels of total cholesterol and LDL, and a significant decrease in the level of HDL among females when compared with males ($p = 0.000$, $p = 0.000$, $p = 0.002$ respectively). The (Mean ± SD) of total cholesterol, HDL, and LDL varies among males and females in patients with *H. pylori* infection and in control participants (Table 1).

Table (1): Distribution of total cholesterol, HDL, and LDL concentrations according to gender incidence

Parameters	Male (Mean ± SD)	Female (Mean ± SD)	p -value
Total cholesterol	160.0±44.59	281.7±63.34	0.000
HDL	46.40±8.47	35.75±8.14	0.002
LDL	65.20±24.17	131.3±38.56	0.000

No significant correlation was observed between levels of cholesterol and HDL and age incidence ($R = -0.324$, $p = 0.080$, and $R = 0.183$, $p = 0.334$ respectively).

As shown in Fig. (1) and Fig. (2), there was a significant negative correlation between the level of HDL and total cholesterol among patients with *H. pylori* ($R = -0.370$, $p = 0.044$). Also, there was a significant positive correlation between the levels of LDL and cholesterol among patients with *H. pylori* ($R = 0.854$, $p = 0.000$).
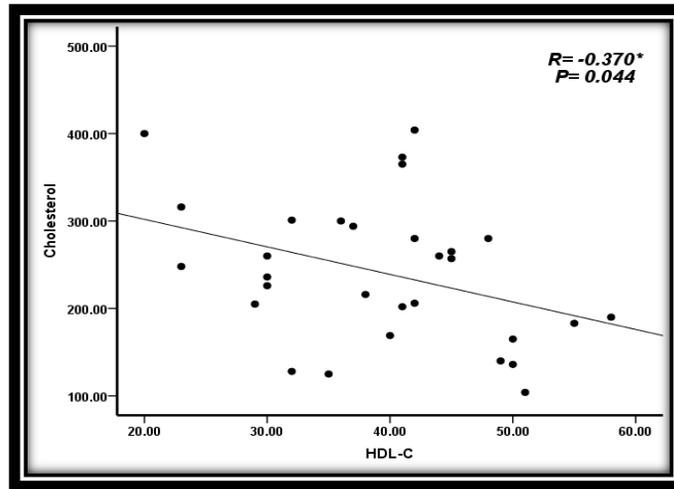
Fig. (1): Correlation between the concentrations
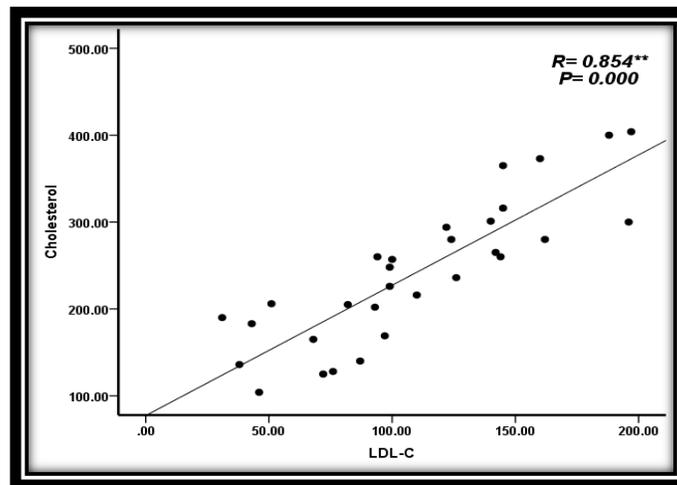of HDL and total cholesterol among test group patients

Fig. (2): Correlation between the concentrations
of LDL and total cholesterol among test group patients

Discussion

Helicobacter pylori infection is the most common bacterial infection worldwide, especially in developing countries. Its prevalence rate varies in different countries, approximately, 30% in the developed countries versus 80% in the developing countries. In addition, several studies reported *H. pylori* infection as a risk factor for coronary artery disease. On the other hand, dyslipidemia is a primary, widely established as an independent major risk factor for coronary artery disease and

Mohammed, *et al.,* **2019: Vol 4 (2)**

4

may be a prerequisite for CAD, occurring before other major risk factors come into play[4]. The present study revealed significant increase in the levels of cholesterol and LDL among patients with *H. pylori* infection when compared with healthy individuals (p = 0.000 and p = 0.035 respectively); and also revealed a significant decrease in HDL level (p = 0.025). These findings suggest hyperlipidemia that might be due to *H. pylori* infection.

The present study findings were found compatible with several studies conducted in Korea by Kim and his colleagues[5] and by Sung and his co-workers[6] in Iran.

There are some controversial studies regarding lipid profile among *H. pylori* patients. They have reported insignificant differences in the serum lipid profile between people with or without *H. pylori* infection. The inconsistent findings of these studies may be explained by the varying study methodologies employed such as different study population, limited sample size, or inadequate consideration of potential confounders[5]. However, regarding LDL rather than other lipid parameters, Erdogan and his co-authors[7] studied the association between *Helicobacter pylori* infection and the elevated LDL among patients admitted to Baskent University Adana Teaching and Medical Research Center (Turkey). They reported that LDL was found significantly high among the *H. pylori* positive patients compared with *Helicobacter pylori* negative ones. Such a finding was really compatible with the findings of the present study.

Conclusion: The levels of total cholesterol and LDL were high in patients with *H. pylori* infection and the concentration of HDL was Low in patients with *H. pylori* infection. There was no significant correlation between the concentrations of total cholesterol and HDL with age incidence among *H. pylori* infection patients. Regarding gender incidence, females had higher total cholesterol and LDL levels and lower HDL levels as compared with males investigated.

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Mohammed, *et al.,* **2019: Vol 4 (2)**