

Impact of lipid disorders on mortality among Saudi patients with heart failure



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Background: Dyslipidemia, a known cardiovascular risk factor, is extremely common among Saudis, both adults and children. The impact, however, of dyslipidemia and several other lipid disorders in patients with congestive heart failure in this particular population has not been documented. This study aims to fill the gap.

Methods: This retrospective, single center study was conducted at King Abdulaziz Medical City, Riyadh, Saudi Arabia. Of the 500 cases seen during the period between 2002 and 2008, 392 were included in the study. Charts were reviewed and information on medical history, medications, and lipid status were documented.

Results: Low HDL-cholesterol level was the most common lipid disorder with 82.9%, followed by hypertriglyceridemia (35.2%), atherogenic dyslipidemia (27.8%), and hypercholesterolemia (9.2%). Diabetes mellitus was the single most significant predictor of mortality ($p = 0.001$). Among the lipid disorders, only low levels of HDL-cholesterol contributed to significant mortality risk [OR 1.29 (Confidence Interval 1.04–1.59) (p -value < 0.01)] adjusted for age, gender and statin use.

Conclusion: The results of this study suggest that emphasis should be on the elevation of HDL-cholesterol levels among subjects with congestive heart failure, without compromising any ongoing management of LDL-lowering drugs. Management should not be limited to conventional statin use and should promote other treatments to elevate HDL-cholesterol levels.

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Keywords: Congestive heart failure, Lipid disorders, Saudi Arabia

Background

Lipid disorders are considered major risk factors for vascular diseases including coronary heart diseases that account for the majority of

over-all cause mortality [1]. Furthermore, dyslipidemia, defined as having abnormal levels of circulating lipids, is common even among apparently healthy individuals with no manifestations of cardiovascular disease [2]. While studies conducted

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in the Kingdom of Saudi Arabia (KSA) with regards to dyslipidemia have only recently begun to flourish, recent epidemiologic data reveal that dyslipidemia is the most common cardiovascular risk factor in both children [3] and adults [4], with an estimated nine out of every 10 Saudis having low levels of HDL-cholesterol. Despite these staggering figures, however, the country has a relatively low prevalence of coronary heart disease (age-adjusted prevalence of 6.9%) as compared to other developed nations, and this is primarily due to the relatively young population in the kingdom [5]. Nevertheless, having the predisposition to develop dyslipidemia, or any other cardiovascular risk factors at an early age, may potentially overwhelm the public health sector in the long run if no aggressive interventions are carried out. In fact, regional information, though scarce, already reveals that people from Africa and the Middle East present with myocardial infarction at a relatively younger age when compared to other ethnicities, and deaths attributed to coronary artery diseases are projected to increase at an overwhelming rate of 171% between 1990 and 2020 [6].

In the present single-center retrospective study, and for the first time in the Saudi Arabian population, we sought to determine which among the commonly encountered lipid disorders (low HDL-cholesterol, hypertriglyceridemia, hypercholesterolemia and atherogenic dyslipidemia) predispose patients with established heart failure (HF) to increased mortality. We also assessed the prevalence of the various lipid disorders among this population group.

Materials and methods

This single-center, retrospective study was conducted at King Abdulaziz Medical City (KAMC), Riyadh, KSA. The charts of 500 patients, admitted secondary to HF [defined as systolic heart failure or HF with reduced ejection fraction (EF) \leq 40%] and/or HF with preserved EF (EF \geq 50), [7] who were diagnosed either clinically and/or by echocardiogram and/or cardiac catheterization], or who visited the out-patient department for the same complaint between the years 2002 and 2008 were reviewed and screened for inclusion. Cases were excluded if the HF was congenital in origin, end-stage renal disease (ESRD), or if the patient was above 90 years of age. From the roster of cases, a total of 392 cases met the criteria for this study. Information gathered included demographics, medical history, and medications taken.

Abbreviations

HF	heart failure
DMT2	diabetes mellitus type 2

Laboratory results obtained during admission/evaluation were also obtained and included lipid profiles. For the purpose of this study, atherogenic dyslipidemia was defined as triglycerides $>$ 1.69 mmol/l and either HDL $<$ 1.03 mmol/l (men) or HDL $<$ 1.29 mmol/l (women) [8]. Hypercholesterolemia was defined as serum total cholesterol concentration \geq 5.18 mmol/l [9].

Data analysis

Raw data were encoded in MS Excel spreadsheet. Data were analyzed using the Statistical Package for the Social Sciences version 17.0 (SPSS, Chicago, IL, USA). Frequencies were presented as percentage (%). Odds ratio was obtained to determine mortality risk among lipid disorders. Multinomial logistic regression analysis was performed using mortality as dependent variable and all the categorical variables (medications as confounders) measured as independent variables to determine which among the diseases of interest had the most significant impact in predicting mortality in the cohort. Significance was set at $p < 0.05$.

Results

Table 1 highlights the demographic characteristics of the subjects. More than half of the subjects included were men (53.1%) and the over-all mortality was 52.3%. No significant difference was observed between the mortality of males versus females ($p = 0.56$). Among the diseases listed,

Table 1. General characteristics of patients.

N	392
Males	208 (53.1)
Age (years)#	67.77 (12.8)
Mortality	205 (52.3)
Hypertension	333 (84.9)
Low HDL-cholesterol	325 (82.9)
Hypertriglyceridemia	138 (35.2)
Hypercholesterolemia	36 (9.2)
Atherogenic dyslipidemia	109 (27.8)
Smokers	60 (15.3)
Diabetes mellitus type 2 (DMT2)	242 (61.7)
Valvular disease	45 (11.5)
Ischemic cardiomyopathy	268 (68.5)
Chronic atrial fibrillation	103 (26.3)
PTCA/CABG	91 (23.2)
Stroke/TIA	89 (22.7)

Note: Data presented as N (%); # denotes mean (standard deviation).

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