

## **Achieving Targets in Secondary Prevention of Hyperlipidaemia in Patients with Coronary Artery Disease.**

**Dr Walid Sawalha , Dr Ashraf Ahmad Abu Alsamen , Dr Laith Saad Obaidat , Dr Ramzi Abdelmajeed Alhyari.**

Queen Alia Heart Institute – King Hussein Medical Centre Amman – Jordan.

For correspondence: Dr Walid Sawalha. Jordan. Amman 11814. Bayader Wadi Alseer PO BOX 143388.

Email sawalha\_md@yahoo.com. Tel 00962-777419331.

### **Abstract**

#### **Aim:**

We set our study to assess how good are we at achieving targets of lipid profile in patients with coronary artery disease at Queen Alia Heart Institute – King Hussein Medical Centre Amman – Jordan.

#### **Method:**

This was a retrospective analysis of the lipid profile of patients who are being followed up for coronary artery disease at Queen Alia Heart Institute. Lipid profile (total cholesterol, LDL cholesterol, HDL cholesterol and triglycerides) of patients who are legible for secondary prevention was collected and compared to the targets set by the Adult Treatment Panel (ATP) III guidelines. Demographic data and risk factors for coronary artery disease (CAD) were collected. The type and dose of lipid lowering drug was recorded.

#### **Results:**

Lipid profiles of 1250 patients were looked at. Their age ranged from 29 – 76 years with a mean age of 59.6 years ( $\pm 12.8$ ). 27% of our study were females. The mean age for females was 64.2 years ( $\pm 11.4$ ) and for males was 57.4 years ( $\pm 13.1$ ). The prevalence of diabetes was 48.5%, hypertension 59.2%, hyperlipidaemia in 30%, family history of premature CAD 28% and 44% were smokers. Target total cholesterol was achieved in 67% of patients, and target LDL in 54% and HDL in 49% of patients. Almost all patients were on statins or fibrates (94%). 52% were on Simvastatin (84% of them on 20mg) and 38% on Atorvastatin (88% of them on 20mg).

#### **Conclusion:**

Target lipid profile in our patients has only been moderately achieved in patients with coronary artery disease. Only modest doses of statins are used. More efforts with better follow up is needed.

**Key word; coronary artery disease, lipid profile, Jordan.**

### **Introduction:**

Over the past several years many studies have emphasized the importance of hyperlipidaemia as a major risk factor for coronary artery disease (CAD), and the impact of treating it (1,2,3,4). Cholesterol is a fat-like substance (lipid) that is present in cell membranes and is a precursor of bile acids and steroid hormones. It travels in the blood stream as particles of lipid and protein (lipoprotein). This has three main classes named Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL) and Very Low Density Lipoprotein (VLDL). The first stage of atherogenesis is the fatty streak, which consists largely of cholesterol-filled macrophages; most of the cholesterol in fatty

streaks is derived from LDL cholesterol. The second stage consists of fibrous plaques in which a layer of scar tissue overlies a lipid rich core. Other risk factors contribute to plaque growth at this phase. Thus in our daily practice we try to achieve the target lipid blood levels, not forgetting other modifiable risk factors for CAD.

#### **Aim:**

We set our study to assess how good we are at achieving targets of lipid profiles in patients with coronary artery disease at Queen Alia Heart Institute – King Hussein Medical Centre Amman – Jordan, as set by the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood

Cholesterol in Adults (Adult Treatment Panel III (ATP III)).

**Method;**

This was a retrospective analysis of the lipid profile of patients who are being followed up for coronary artery disease at Queen Alia Heart Institute. Lipid profile (total cholesterol, LDL cholesterol, HDL cholesterol and triglycerides) of patients who are legible for secondary prevention was collected and compared to the targets set by the Adult Treatment Panel (ATP) III guidelines. Demographic data and risk factors for coronary artery disease (CAD) were collected. The type and dose of lipid lowering drug was recorded.

**Results;**

Lipid profiles of 1250 patients were looked at. Their age ranged from 29 – 76 years with a mean age of 59.6 years ( $\pm 12.8$ ). 27% of our study was females. The mean age for females was 64.2 years ( $\pm 11.4$ ) and for males was 57.4 years ( $\pm 13.1$ ). The prevalence of diabetes was 48.5%, hypertension 59.2%, hyperlipidaemia 30%, family history of premature CAD 28% and 44% were smokers. Target total cholesterol was achieved in 67% of patients, and target LDL in 54% and HDL in 49% of patients. Almost all patients were on statins or fibrates (94%). 52% were on Simvastatin (84% of them on 20mg) and 38% on Atorvastatin (88% of them on 20mg).

**Discussion;**

Cholesterol is a fat-like substance (lipid) that is present in cell membranes and is a precursor of bile acids and steroid hormones. It travels in the blood stream as particles of lipid and protein (lipoprotein). This has three main classes named Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL) and Very Low Density Lipoprotein (VLDL). LDL cholesterol is atherogenic lipoprotein and constitutes two thirds of the total cholesterol. That is why it is taken as the primary target in lipid lowering therapy.

HDL cholesterol normally makes up 20–30 percent of the total serum cholesterol. Its levels are inversely correlated with risk for CAD. Some evidence indicates that HDL

protects against the development of atherosclerosis. The VLDL are triglyceride-rich lipoproteins, but contains 10–15 percent of the total serum cholesterol. Some forms of VLDL, particularly VLDL remnants, appear to promote atherosclerosis, similar to LDL.

The relationship between serum cholesterol levels and the development of CAD attacks of CAD is observed over a broad range of LDL-cholesterol levels; the higher the level, the greater the risk (5). Only in populations that maintain very low levels of serum cholesterol, e.g., total cholesterol <150 mg/dL (or LDL cholesterol <100 mg/dL) throughout life do we find a near-absence of clinical CAD (6,7). Atherosclerosis generally can first be identified by gross pathological examination of coronary arteries in adolescence or early adulthood (8,9). The subsequent rate of atherogenesis is proportional to the severity of ambient risk factors including serum cholesterol levels. We referred to the lipid levels quoted by the Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III (ATP III)). Table 1 show the ATP III Classification of Total Cholesterol and LDL Cholesterol levels.

Target total cholesterol ( $\leq 200$  mg/dL) was achieved in 67% of patients, while 18% had borderline levels (200–239 mg/dL), and the rest (15%) had high levels ( $\geq 240$  mg/dL). Optimal LDL level ( $\leq 100$  mg/dL) was achieved in 54% of our patients, 14% had near optimal levels (100–129 mg/dL), 16% had borderline high levels (130–159 mg/dL), while 16% had higher levels of LDL. These figures were comparable to recently published data (10).

Strong epidemiological evidence links low levels of serum HDL cholesterol to increased CAD morbidity and mortality (11,12). Table 2 shows the ATP III Classification of HDL Cholesterol levels. 49% of patients had HDL levels above the target level of 40mg/dL, while the rest had lower levels.

Many prospective epidemiological studies have reported a positive relationship between serum triglyceride levels and the incidence of

CAD (13,14). Table 3 shows the classification of serum triglycerides levels according to ATP III report. 44% of our patients had normal triglyceride level (<150 mg/dL), 22% had borderline levels (150-199 mg/dL), 27% had high triglyceride levels (200-499 mg/dL) and 7% had levels above 500 mg/dL. The majority of patients (78%) were diabetics. This comes to no surprise since poor diabetic control is one of the main causes of hypertriglyceridaemia.

Only 6% of our patients were not on treatment. The main reason for this was discontinuation of the treatment due to side effects.

Half of our patients (52%) were on Simvastatin (84% of them on 20mg once daily, 16% on 40mg once daily) and 38% on Atorvastatin (88% of them on 20mg once daily, 12% on 40mg once daily). Only 9% were on Gemfibrozil 600mg twice daily. 1% were taking Ezetimibe 20mg once daily.

There was no difference in the lipid levels of the patients who were on Simvastatin or Atorvastatin. But patients who were on higher doses had significantly better levels. Also we noticed that patients taking Ezetimibe had significantly higher HDL cholesterol ( $P \leq 0.005$ ). This is to be expected as this drug targets HDL more than the other statins.

### Conclusion;

Target lipid profile in our patients with coronary artery disease has only been moderately achieved. Only modest doses of statins are used. More efforts with better follow up are needed.

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**Table 1. ATP III Classification of Total Cholesterol and LDL Cholesterol Levels.**

Total Cholesterol (mg/dL)		LDL Cholesterol (mg/dL)	
<200	Desirable	<100	Optimal
200–239	Borderline	100–129	Near optimal/ above optimal
≥240	High	130–159	Borderline High
		160–189	High
		≥190	Very High

**Table 2. ATP III Classification of HDL Cholesterol.**

Serum HDL Cholesterol (mg/dL)	
<40 mg/dL	Low HDL cholesterol
≥60 mg/dL	High HDL cholesterol

**Table 3. Classification of Serum Triglycerides levels according to ATP III report.**

Triglyceride Category	Level
Normal triglycerides	<150 mg/dL
Borderline-high triglycerides	150–199 mg/dL
High triglycerides	200–499 mg/dL
Very high triglycerides	≥500 mg/dL