

Evaluation of Thyroid hormone and lipid profile in patients with myocardial infarction and find the relation between them

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Abstract: Myocardial infarction (MI) occurs when blood flow stops to part of the heart causing damage to the heart muscle. lipid profile increased are the major causes of myocardial infarction (MI). Patient presented with chest pain and increasing shortness of breath for several days. Myocardial infarction associated with Hyperthyroidism and patients with ischaemic heart disease was a very high prevalence of hyperthyroidism. This work aimed to measure level of lipid profile and T₃, T₄, TSH and correlation between them in patients with myocardial infarction and control groups. The results showed significantly increased in mean value of Ch, TG, LDL and VLDL and significantly decreased in mean value of HDL in patient with myocardial infarction when compared to control groups. Also the result appeared the mean value of T₃ and T₄ levels was significantly increased in patients with myocardial infarction when compared to control groups. In addition of that, the study showed the mean value of TSH decreased as compared to control groups, also there was positive significant correlation between T₄ with (Ch, VLDL) but negative correlation between T₄ and HDL.

Key words: Myocardial Infarction, Thyroid hormone.

1 Introduction

Myocardial infarction (MI) associated with iatrogenic hyperthyroidism where myocardial bridge can be possibly life threatening [1,2]. The most common cardiovascular manifestations of thyrotoxicosis recognized as angina pectoris, atrial fibrillation, myocardial infarction and heart failure [3]. MI known as a heart attack, results from the interruption of blood supply to a part of the heart, that causing heart cells to die. This is most commonly due to occlusion of a coronary artery following the rupture of vulnerable atherosclerotic plaque which collection of lipids in the walls of artery [4]. The diagnosis of MI is usually based on clinical symptoms and on electrocardiographic (ECG) findings of the patient [5]. Also myocardial infarction refers to coronary syndrome [6] that due to coronary artery disease.[7] the Risk factors of Myocardial infarction include high blood pressure, smoking obesity, high blood cholesterol, poor diet, and excessive alcohol[8] low-density lipoprotein (LDL) cholesterol, endothelial dysfunction and increased central arterial stiffness [9,10]. Lipids consider the primary targets of oxidative stress. Lipid peroxidation of the cellular structures, a consequence of increased oxygen free radicals, that play an important role in atherosclerosis and

microvascular complications of DM [11]. Hyperthyroidism is an overproduction of the thyroid hormones T₃ and T₄. This condition is most commonly caused by the development of Graves' disease, an autoimmune disease in which anomalous antibodies stimulate the thyroid to secrete excessive quantities of thyroid hormones.[12]

2 Aim of study

The aim of this study was to measured the level of T₃, T₄, TSH in patients with myocardial infarction and find the correlation between these parameters in sera of control groups and patients with myocardial infarction.

3 Materials and Methods:

Blood sampling were taken from 12 patients with myocardial infarction and 12 controls. 5 ml of Blood sample were collected from all patients. A questionnaire was designed with different questions including duration of myocardial infarction, heart disease, family history, drug duration, weight, height, smoking, usage of drugs, and hyperthyroidism for all patients groups, and controls group. The distribution of patients according to hypertension, smoking and and drugs was in Table (1):

Table (1) Distribution of patients according to hypertension, Respiratory diseases smoking and drugs

Disease	%
Hypertension	85%
smoking	37%
Respiratory diseases	21%
statin	50%

1-Cholesterol (Ch) :Serum cholesterol was determine by using enzymatic method [13]

2- Triglyceride (TG) : Serum triacylglycerol was determine by using enzymatic method[14]

3-High Density Lipoprotein(HDL): Serum HDL was determine by HDL kit [15]

4- Low Density Lipoprotein (LDL): LDL level was usually derived by friedwalds formula [16]
LDL = Total cholesterol – [HDL + TG/5]

5- Very Low Density Lipoprotein (VLDL): Very low-density lipoprotein was determine by using formula of friedwalds: [17]
VLDL-Ch = TG/5

6- T₃ (Triiodothyronine) level: Serum T₃ was determine by Human Free T₃ ELISA Kit [18]

7-T₄ (Thyroxine) level: Serum T₄ was determine by Human Free T₄ ELISA Kit [19]

8- TSH (Thyroid-Stimulating Hormone) level: Serum TSH was determine by Human Free T₄ ELISA Kit [20]

4 Statistical Analysis

Results are expressed as Mean±SD. and significant differences between means were assessed by student t-test using the available statistical software packages (Microsoft SPSS), statistical significance was set at P≤0.05, P≤0.01,..

5 Results and Discussions:

Table (1) showed mean value of Age and BMI was significantly increase in patients with myocardial infarction compared with control groups.

Table (1): Mean value of Age and BMI in myocardial infarction and control groups.

	Mean ± st control	Mean ± st Patients	p.value
Age	37.16 ± 5.27	57.00 ± 6.60	0.001
BMI (Kg/m ²)	23.19 ± 2.40	32 ±4.41	0.002
*Significant using spss for two independent means at significance * (P≤ 0.05), ** (P≤ 0.01)			

Table (2): Mean value of Lipid profile in myocardial infarction and control groups.

parameters	Mean± st control	Mean ±st Patients	p.value
Ch (mg/dl)	116.81±19.54	250.81±39.19	0.001
TG (mg/dl)	92.63±3.64	160.81±10.55	0.027
HDL (mg/dl)	53.36±3.90	43.36±3.90	0.001
LDL (mg/dl)	79.63±15.08	166.18±41.43	0.000
VLDL (mg/dl)	18.36±0.08	37.54±21.73	0.003
*Significant using spss for two independent means at significance * (P≤ 0.05), ** (P≤ 0.01)			

The results showed that significantly increased in Cholesterol, TG, LDL and VLDL also significantly decreased in HDL in patient with myocardial infarction when compared to control groups[21] Table (2) . High serum cholesterol level considered as a risk factor for cardiovascular disease [22]. Also Triglyceride another strong risk factor but it found that triglyceride levels stratifying led to more accurate detection of increased risk of coronary disease. [23].In addition elevated LDL is associated with 3-fold increase in the risk of myocardial infarction.[24] Increased VLDL in Myocardial infarction patients and the role of low HDL in the CHD development has been widely accepted.[25].The study showed levels of T₃and T₄ was significantly increased while TSH decreased in patient with myocardial infarction when compared to control groups⁽²⁶⁾ as shown in Table (3) .

Hyperthyroidism is the clinical syndrome caused by increase of circulating free Thyroxine T₄, free Triiodothyronine T₃, or both. It is a common disorder that affects approximately 2% of women and 0.2% of men [26]. Also the diagnosis of hyperthyroidism is confirmed by blood tests that show decreased of thyroid-stimulating hormone (TSH) [27].

Table (3): Mean value of T₃, T₄ and TSH in myocardial infarction and control groups.

parameters	Mean ±st control	Mean±st Patients	p.value
T ₃ (ng/ml)	1.05±0.08	1.11±0.08	0.008
T ₄ (mg/dl)	7.07±0.56	8.36±0.54	0.001
TSH (mIU/l)	1.58±0.63	1.22±0.97	0.226
*Significant using spss for two independent means at significance * (P≤ 0.05) and ** (P≤ 0.01)			

Levels of T₄ with (Ch, VLDL) showed positive significant correlation coefficient also there is negative correlation coefficient between T₄ with HDL in patients with myocardial infarction and control groups as shown in Table (4) and Figure (1,2,3).

Table (4): Baseline Pearson relation coefficients of T₄ levels with various lipid profile (Ch, HDL, VLDL) in myocardial infarction and control groups

Correlation	Ch	HDL	VLDL
T ₄	0.992 0.000	-0.885 0.001	0.886 0.001
* Correlation is significance * (P≤ 0.05), ** (P≤ 0.01)			

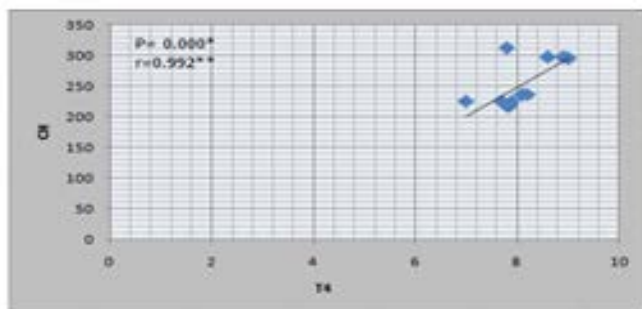


Figure (1): Relationship between T₄ with Ch in myocardial infarction and control groups

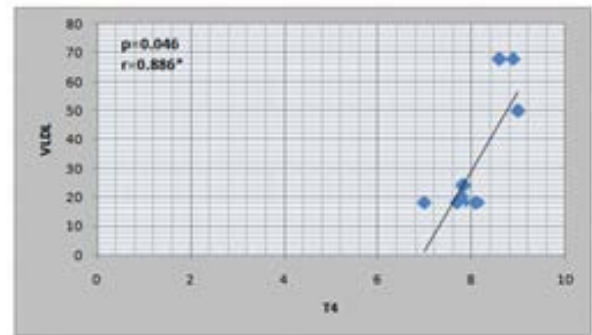


Figure (2): Relationship between T₄ with VLDL in myocardial infarction and control groups

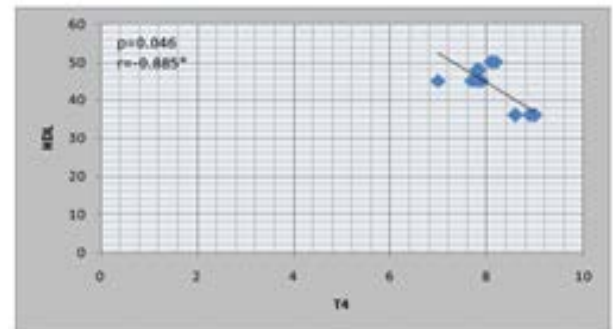


Figure (3): Relationship between T₄ with HDL in Myocardial infarction and control groups

The cardiovascular manifestations of hyperthyroidism have been recognized for more than two centuries and are a cornerstone for clinical diagnosis [28]. The peroxidation of lipids is basically damaging because the formation of lipid peroxidation products leads to spread of free radicals reactions.[29]. Where hydroxyl radical can initiate lipid peroxidation, which is a free radical chain reaction leading to damage of membrane structure and function. [30] Free radical-mediated oxidative stress (OS) implicated in the pathogenesis of thyroid disorders [31]. In addition Free radicals have the potential to damage the organism, their generation is inevitable for some metabolic process [32]. Variations in the levels of thyroid hormones can be one of the main physiological modulators of in vivo cellular oxidative stress and due to their known effects on mitochondrial respiration. [33].That thyroid hormones are involve in combating the toxicity of oxidative stress in humans [34].

6 References

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