

# The Role of Some Biomarkers as Signs Predictive of Cardiac Injury with Age Progress Iraqi persons Apparently Healthy

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## ABSTRACT

The present study was designed in order to know the early diagnosis of heart disease using some vital indicators for the elderly. The study included 60 samples of natural people, whose ages were distributed in the age groups 45–54, 55–64, and 65–74; some variables were conducted, such as N-terminal-Pro Brain Natriuretic Peptide and High sensitive-C reactive protein (CRP) and some electrolytes like magnesium ion and potassium ion. The results showed a significant increase ( $p \leq 0.01$ ) in the concentration of the N-terminal-Pro Brain Natriuretic Peptide level in the blood for the age group 65–74 compared to the categories 45–54 and 55–64. The results also showed a significant increase at ( $p \leq 0.01$ ) in the concentration of the High sensitive-C reactive protein level for the age groups 55–64 and 65–74 compared to the age group 45–54. The study found a significant decrease in the level of magnesium ion at ( $p \leq 0.01$ ) for the 55–64 and 65–74 age groups compared to the 45–54 age group. As for potassium ion, the current study did not show any significant differences between age groups. Our study observed that the N-terminal-Pro Brain Natriuretic Peptide level increased significantly with the age of normal people, indicating a future heart injury. Also, an elevated High sensitive-C reactive protein in the elderly is considered a dangerous indicator of future heart diseases.

**Keywords:** Biomarkers, Cardiac injury, Elderly, Iraqi persons, N-terminal-Pro Brain Natriuretic Peptide.

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## INTRODUCTION

The age of 65 years age is often looked as the beginning of the elderly because of gradual decline in many organs such as the heart, lungs, kidney, bone, brain, and joint. Part of this reduction was because of a loss of cells from these organs, lowering an individual's metabolism. Moreover, the cells residual in the elderly peoples and its active metabolic may not functions as in the young.<sup>1</sup> though we are in the 21 century, still cardiac disease is the main cause of elderly death and morbidity throughout the world<sup>2</sup> heart disease, the issue one cause of death every year in the last century<sup>3</sup> Survival rates are high, as increasing those rates for individuals over the age of 65 years 19% by the year 2030, rising by 2.6% for ages above 85 years. The prevalence of heart disease among this growing group of older survivors is very rising and is the most common lead to morbidity and mortality. But, diagnosis, risk, and administration, of heart disease are more challenging concerning the elderly. There is still much to predict and use appropriate treatment. In addition, the treatment itself causes many problems with age. And the increase in problems and

thrombosis, ideally for all these reasons, the increase in diagnostic discrimination and risks for the elderly is one of the main management advantages.<sup>4</sup> Heart disease causes more deaths and failure and affords high economic costs than any other disease in the advanced world. Heart disease may affect persons at any age but becomes dramatically more popular at progressively elderly ages, with approximately a tripling with each living contract. Male affected more than females.<sup>5</sup> Heart disease has a number of risk factors. The most common risk factors include hypertension, family history, diabetes, smoking, obesity, hyperlipidemia, high alcohol-consuming and reduction of exercise.<sup>6</sup> The range of biomarkers has widened quickly as possible wherewithal to improve the administration of heart disease with apparent relevance to the defy pertaining to older patients. "Biomarker" is a general term used to describe a wide range of biological parameters, such as hormones and enzymes to characteristics on physiologic testing such as vital signs or electrocardiograms, which can be used in the assessment of disease.<sup>2</sup> Biomarkers mostly represent a biochemical alteration at the tissue or a body member's level.

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thus, they are linked with a biological or pathologic process.<sup>7</sup> Natriuretic peptides are hormones released from specific sites of the heart muscle in response to stress tolerance and overload associated with the stretch of the myocardium.<sup>8</sup> Pro Brain Natriuretic peptides (proBNP) is the cardiac neurotransmitter hormone that is released from the heart ventricles in response to dilated cardiomyopathy and that the human gene BNP is located on chromosome 1, ProBNP is inhaled by Furin enzymes and produces BNP, which is biologically active and consists of 32 amino acids and NT-ProBNP which consist of 76 biologically inactive amino acids, and the inactive ProBNP is NT-ProBNP.<sup>9</sup> N-terminal-Pro brain natriuretic peptide (NTproBNP) are greatly used as significant signals for the clinical diagnosis of cardiac dysfunction. In recent years, many studies have explained that NT-proBNP can be used to reflect the cardiac function of the deceased before their death.<sup>10</sup> High sensitive C-reactive protein is a vital sign primarily in the liver in response to cytokine inflammation, interleukin-6, and it is synthesized in adipose tissue, through smooth arterial muscle cells, and by the endothelial cells. Hs-CRP is a highly effective protein C associated with the risk of heart disease and stroke.<sup>11</sup> Concentrations of Hs-CRP were also associated with future risk of myocardial infarction. The highly sensitive Hs-CRP level C protein succeeded in identifying a group of “hidden risk” cardiovascular diseases and provided evidence of the potential benefit of Hs-CRP as an indication for treatment in the primary prevention of vascular heart disease.<sup>12</sup> considers The electrolytes existing as catalysts within cellular enzymes and have the main role in their metabolism. The functions of the electrolytes are to uniform the body fluids, maintain natural acid-base balance, clotting in the blood, muscle contractions and have a main part in nerve conduction. Electrolyte troubles also can lead to hepatic disease, coronary heart disease, renal failure, and endocrine disorders.<sup>13</sup> Electrolytes are cations or anions consist of whether they move in field electrical towards the cathode or the anode. The electrolytes included are potassium (K), sodium (Na), magnesium (Mg), calcium (Ca), chloride (Cl). The most concentrations ions are potassium and magnesium, predominantly intracellular and these closely correlated, hypomagnesemia and hypokalemia and have been related with lifetime menacing to cardiac arrhythmia.<sup>14</sup>

The research aims to measure the levels of some vital indicators used in diagnosing heart disease and know their role as predictive signs in older adults of ages between 45–74 years of sudden cardiac injury.

**MATERIALS AND METHODS**

The current study included 60 normal Iraqi people (25 females and 35 males), aged between 45-74 years; during January 2020, 3 to 20 years, blood samples were drawn from ordinary elderly Iraqis who do not suffer from any heart problem and do not enter the cardiac resuscitation unit. People data were recorded, and according to the model prepared for this purpose, blood samples were drawn by 5 milliliters of people, and the serum was isolated using a centrifuge and the serum was kept in a deep freeze until the estimated laboratory tests were completed, they are as follows:

- 1. Estimated of the NT-proBNP Levels:** The use of the diagnostic kit NT-ProBNP ichroma II, the Korean-made this diagnostic kit, is a measurement of fluorescence immune.<sup>15</sup>
- 2. Estimated of the Hs-CRP levels:** The use of the diagnostic kit Hs-CRP ichroma II, the Korean-made this diagnostic kit is a measurement of fluorescence immune.<sup>16</sup>
- 3. Measurement of the Mg<sup>+</sup> ion Levels:** The use of the diagnostic kit manufactured by a company has been used AGAPPE Switzerland Based on the color method using a spectroscope.<sup>17</sup>
- 4. Measurement of K<sup>+</sup> ion Levels:** The use of the diagnostic kit manufactured by a company has been used AGAPPE Switzerland Based on the color method using a spectroscope.<sup>18</sup>

**Statistical Analysis**

The results obtained from the current study were analyzed by using the ANOVA (Tukey test) whether group variance was not significant and significant and finding the mean value and the SD standard deviation value to describe the comparison variables for three groups of naturally aged people and by age.<sup>19</sup>

**RESULT**

The current study included 60 natural people. It was divided into three groups with age of 45–54 years, 55–64 years, and 65–74 years, the NT-ProBNP variable, as shown in Table 1.

**Table 1:** Characteristics of three groups for natural people :

<i>Parameter</i>	<i>Age vs. Age</i>	<i>Mean±SD</i>	<i>Significant</i>	<i>p value</i>
NT-ProBNP Pg/ml	45–54 vs. 55–64	146.8 ± 82.86 vs. 183.8 ± 64.34	NS	0.7176
	45–54 vs. 65–74	146.8 ± 82.86 vs. 530.0 ± 178.2	Yes **	<0.0001
	55–64 vs. 65–74	183.8 ± 64.34 vs. 530.0 ± 178.2	Yes **	<0.0001
Hs-CRP mg/L	45–54 vs. 55–64	1.35 ± 0.504 vs. 4.253 ± 1.198	Yes **	<0.0001
	45–54 vs. 65–74	1.35 ± 0.504 vs. 4.021 ± 1.226	Yes **	<0.0001
	55–64 vs. 65–74	4.253 ± 1.198 vs. 4.021 ± 1.226	NS	0.8438
Mg <sup>+</sup> mg/dL	45–54 vs. 55–64	1.729 ± 0.105 vs. 1.390 ± 0.114	Yes **	<0.0001
	45–54 vs. 65–74	1.729 ± 0.105 vs. 1.293 ± 0.09	Yes **	<0.0001
	55–64 vs. 65–74	1.390 ± 0.114 vs. 1.293 ± 0.09	NS	0.0712
K <sup>+</sup> mg/dL	45–54 vs. 55–64	4.423 ± 0.545 vs. 4.82 ± 0.523	NS	0.1387
	45–54 vs. 65–74	4.423 ± 0.545 vs. 4.85 ± 0.4661	NS	0.1096
	55–64 vs. 65–74	4.82 ± 0.523 vs. 4.85 ± 0.4661	NS	0.9922

NS=non-significant, \*\* p ≤ 0.01, \*p ≤ 0.05

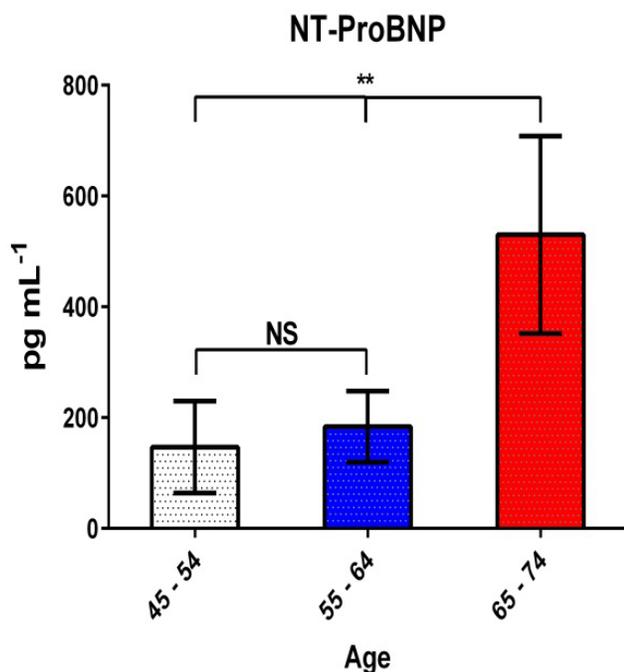


Figure 1: Level of NT-ProBNP in three groups

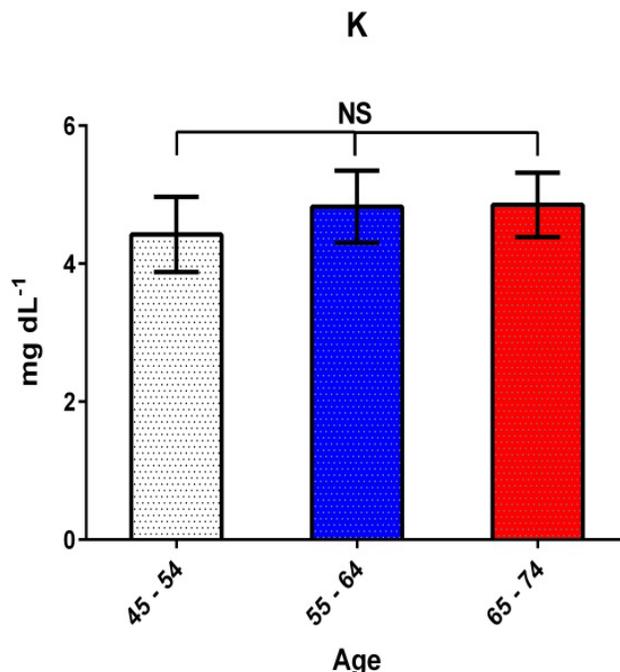


Figure 3: Level of Mg<sup>+</sup> ion in three groups

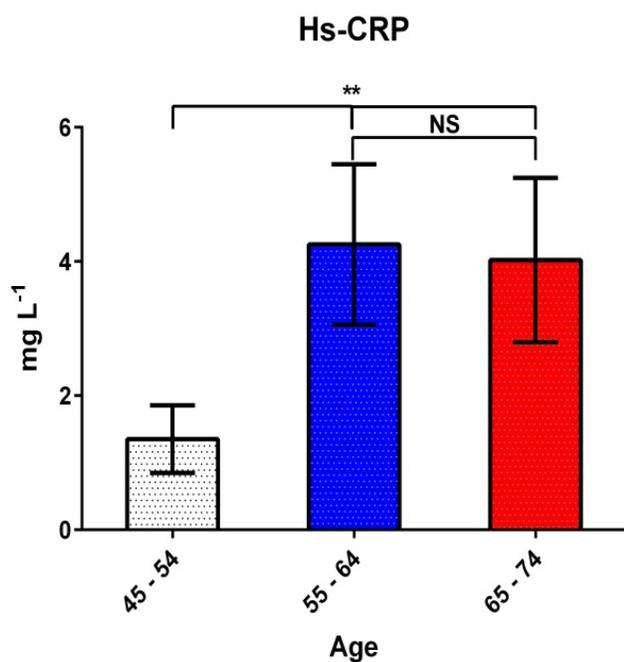


Figure 2: Level of Hs-CRP in three groups

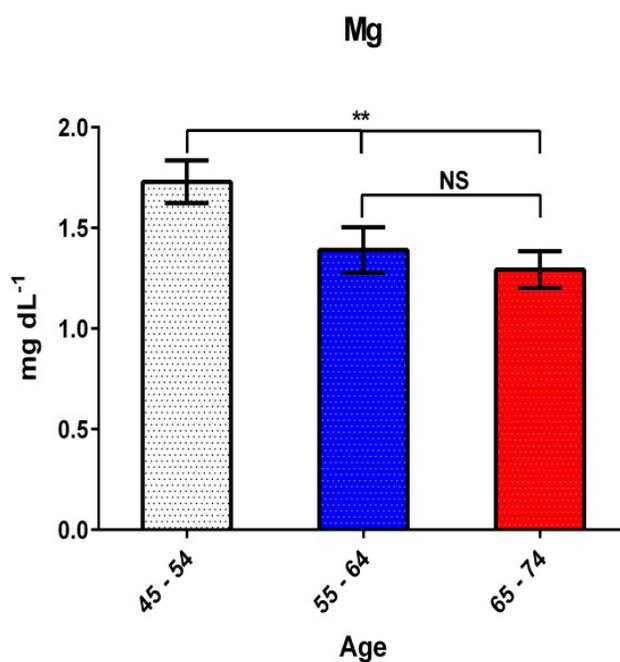


Figure 4: Level of K<sup>+</sup> ion in three groups

The results showed a significant increase in the level ( $p \leq 0.01$ ) for mean ages 65 to 74 compared to mean ages 45–54 and 55–64 while it did not show any significant difference between mean ages 45–54 and 55–64 shown in Figure 1. The study also showed that the vital Hs-CRP had a substantial increase at the level ( $p \leq 0.01$ ) for ages 55–64 and 65–74 compared to the average ages 45–54, while the study did not show any

probability level compared to the mean ages 55–64 and 65–74 as shown in Figure 2. The study also showed a significant decrease in the level ( $p \leq 0.01$ ) in standard of Mg<sup>+</sup> in the mean ages 55–64 and 65–74 compared to the mean ages 45–54. But the study did not show a difference between ages 55–64 and 65–74 (Figure 3), and in the level of K<sup>+</sup> at the ( $p \leq 0.01$ ) between average of all ages (Figure 4).

## DISCUSSION

This is a study to examine the prognostic value of the heart biomarkers that include: NT-proBNP, Hs-CRP and some electrolyte (K<sup>+</sup>, Mg) and compared the ages of natural people. In our study, NT-ProBNP levels were higher significantly in people with she was the ages 65–74 compared with persons she was the ages 45–54 and 55–64 years. This outcome is similar to the finding of Johnston, and Reny al, respectively.<sup>20,21</sup> That showed NT-ProBNP is affected by age. Some outcome suggests that mortality in elderly heart patient is determined by the gravity of the cardiac condition, age and NT-proBNP level that bears the best prognostic information.<sup>22</sup> The significant increase in NT-ProBNP levels with the increase in older adults ages due to the weakness of the function of the left ventricular contraction and the expansion of the left ventricular wall and the lack of cardiac ischemia working to increase the levels of NT-ProBNP. As well as ventricular dilatation and a change in its structure, therefore, NT-ProBNP are a great distinguishable value for early cardiac weakness as it is a more sensitive indicator with a defect in the left ventricle.<sup>23</sup>

As for the Hs-CRP level, the study showed a significant increase in the Hs-CRP levels at ( $p \leq 0.01$ ) for ages 55–64 and 65–74 compared to ages 45–54. These results may be consistent with a study<sup>24</sup> that confirmed that individuals who suffer from increased Hs-CRP levels are the most at risk for cardiovascular disease after 4 years of follow-up in the elderly. Also, our results are supported by another study that showed high levels of Hs-CRP, which is a strong independent predictor of all causes of heart disease.<sup>25</sup>

The significant increase with age in the levels of the Hs-CRP is attributed to the stimulation of endothelial infections and smooth muscle cells, which is associated with high blood pressure and an increase in the levels of lipid's and arteriosclerosis, and therefore the use of "CRP antibodies" can be used as a preventive measure to reduce the risk of "Ischemic cardiac disease."<sup>26</sup>

In measuring the level of magnesium, our study showed a significant moral decrease in the ages of 55–64 and 65–74 compared to the ages of 45–54, and these results may be consistent with another similar study that showed low blood magnesium, which indicated that it is considered as a possible independent risk factor for atherosclerosis.<sup>27</sup> Increased blood magnesium and moderate elevation of blood magnesium have a protective effect on endothelial dysfunction and improvement of endothelial function for coronary artery patients. Dietary magnesium intake has also been associated with a lower death rate from heart disease.<sup>28</sup> concerning potassium ion; the study showed a slight increase with age, consistent with a study.<sup>29</sup> This rise is due to the medication taken by the elderly, which works on a disturbance of potassium balance. But the study did not show any statistically significant differences between the age groups; these results may be consistent with the results of a similar study,<sup>14</sup> which confirmed the absence of significant differences in the natural elderly.

## CONCLUSION

The study present pointed out the following:

- The high levels of abnormal NT-ProBNP in elderly age 55–64 and 65–74 compared with age 45–54, which gives high diagnostic importance and an important indicator for a heart attack to come.
- The high levels of abnormal Hs-CRP, in elderly age 55–64 and 65–74 compared with age 45–54 Thus, it is an important indicator for diagnosing early heart disease.
- The low levels of abnormal magnesium ion, in elderly with age 55–64 and 65–74 compared with age 45–54.
- The absence of any significant difference in potassium ion levels in the studied age groups.

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