Reviewing EKGs in Thalassemia Patients to Evaluate Their Cardiac Function

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Abstract

Introduction: There are more than 18000 thalassemia patients in Iran. In a current study, a high rate of mortality in these patients due to heart failure, is shown. Main factors for evaluating this disorder in thalassemia patients were their electrocardiograms (EKGs) and Serum Ferritin Levels (SFLs).

Methods: We studied the cardiac function in 91 patients (73 major and 18 intermediate thalassemia patients) treated in Zafar Thalassemia Center, of whom 35 (38.45%) were male and 56 (61.55%) were female. The Factors in this study contains: EKGs, mean annual serum ferritin (at least, three SFL had been recorded in each patient treatment file in 2009), mean annual hemoglobin (Hb) levels and mean annual hematocrit (Hct) levels (average, 12 recorded hematocrit levels during 2009).

Results: Our findings have shown that Q-T interval did not correlate with ferritin (r = 0.05, P > 0.05). In both patients with LVH and without LVH, there was no significant difference in SFL (P > 0.05). Although, the mean rate among the thalassemia patients was 85.34 ± 12.91, it did not correlate significantly with QRS duration and P-R Interval (r = -0.08, P > 0.05). In addition, ferritin did not correlate significantly with QRS duration and P-R Interval (r = 0.1, r = 0.05 and P > 0.05, P > 0.05). Furthermore, there was no difference in SFL in patients with normal cardiac axis and those with cardiac axis deviation.

Conclusion: There is no correlation between SFL and variations in EKG. Although EKG is an available method for checking cardiac function in thalassemic patients, especially in developing countries, physicians cannot rely on it for diagnosis or prognosis of cardiac failure in thalassemia patients. Therefore, other methods such as MRIT2* and Echocardiography are suggested to be used periodically in order to check the cardiac function in thalassemia patients.

INTRODUCTION

Thalassemia is a prevalent inherited blood disorder. According to Iranian Thalassemia Society, more than 18000 patients had been registered in Iran by 2006. During two last decades, mean age of the patients has increased due to the better care. However, like other parts of the world, cardiac failure is the most crucial problem among young and teenagers with thalassemia [1, 2]. Hadaegh F. reported that 21.8% (22.3% women and 18.8% men) of thalassemia patients in Tehran (capital of Iran) are affected by different levels of cardiac failure [3]. Therefore, it is a prioritized duty of care groups to check cardiac function in all patients in order to prevent cardiac failure. The main cardiac abnormalities reported in patients with thalassemia are iron overload and left ventricular systolic and diastolic dysfunction, pulmonary hypertension, valvulopathies, arrhythmias, and pericarditis [2]. Its prevalence varies according to the type of thalassemia. Even though thalassemia intermedia patients require less transfusions than thalassemia major patients, they are still at risk of cardiac complications. With the introduction of new technologies, such as cardiac magnetic resonance T2*, the early detection of cardiac iron overload and associated cardiac dysfunction can be presently possible. In addition, an EKG and a chest radiograph (X-Ray) should also be obtained. Two-dimensional echocardiography helps differentiate systolic from diastolic dysfunction. However, MRIT2* is not accessible in all centers where thalassemia is of high prevalence and Echocardiography is an expensive method which can be conducted merely with an all - and - out expert [2, 4-6].

Hence, it is not possible to follow thalassemia patients relying on both methods in all parts of developing countries like Iran. As a result, EKG is used to determine the reliability of prognostication and prevention of cardiac dysfunction in thalassemia patients in Iran.

METHODS

In this study, the heart function in 91 patients (73 major thalassemia and 18 intermedia) treated in Zafar Thalassemia Center in Tehran, was studied. The patients were between 15 and 45 years old; 35 (38.45%) of these patients were male and 56 (61.55%) were female. EKG of patients was considered as well as the mean level of annual serum ferritin (at least three SFLs had been recorded in each patient treatment file in 2009), mean of annual hemoglobin and hematocrit levels (on average, 12 records of the results of hematocrit tests during 2009). Serum ferritin and hematocrit levels have been found in the patient's clinical files which are maintained in the clinic. A cardiologist has tested patients' heart function using EKG.
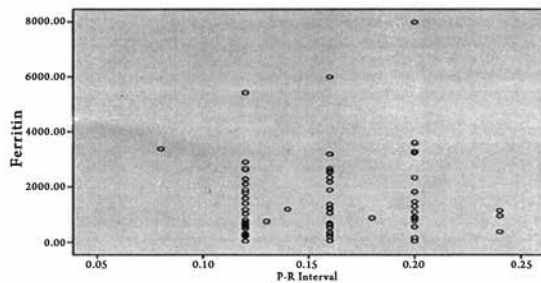

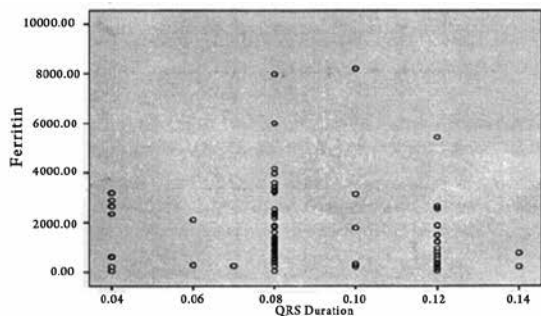**Figure 1:** PCorrelation Between Ferritin and P-R Interval

Figure 1: Correlation Between Ferritin and QRS Duration

RESULTS

Our findings show that Q-T interval did not correlate with ferritin (r = 0.5, P > 0.05). Both in patients with LVH and without LVH, there was no significant difference in serum ferritin level (P > 0.05). Although the mean rate among the thalassemic patients was 85.34 ± 12.91, it did not correlate significantly with serum ferritin level (r = -0.08, P > 0.05). In addition, ferritin did not correlate significantly with QRS Duration and P-R Interval (r = 0.1, r = 0.05 and P > 0.05, P > 0.05) (Figs 1 and 2). Furthermore, there was no difference between serum ferritin level in patients having normal axis and patient with axis deviation.

DISCUSSION

There is no correlation with serum ferritin level and contents of Electrocardiogram (EKG). Albeit EKG is an available and inexpensive method, especially in developing regions, to check patient's heart function physicians cannot find a logical correlation between EKG and ferritin to show whether the increase of level of ferritin could affect patient EKG. Furthermore, we are not able to correlate EKG to levels of hematocrit. Our findings prove that new methods like MRIT2* and Electrocardiography play a vital role in preventing and discriminating heart problems in thalassemia patients. At least, in case of patients with thalassemia, EKG cannot be reliable to diagnose the dysfunction in heart. Health care decision makers should be responsible to furnish new methods and make them available and free of charge for all thalassemics.

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CONFLICT OF INTEREST

Authors have no conflict of interest to declare.

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