Evaluation Of Iron Overload Approach in Thalassemia Patients at The Thalassemia Center

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Abstract

Background: Thalassemia is a genetic blood disorder as a result of a defect in the genes responsible for the production of globin chains in hemoglobin, which is responsible for transporting oxygen to the cells of the body. Iron buildup is common in thalassemia patients as a result of frequent blood transfusions or because of the disease itself. The objectives of this research depend on the approach of iron overload in thalassemia patients, its causes and the resulting complications.

Methods: A cross-sectional study was conducted in July 2022 by collecting data for thalassemia patients at the Damascus University Center, and work was done to convert this information into statistical tables and graphs in order to obtain the required objectives of this research.

Results: By studying and comparing the serum ferritin values and following up the iron chelates used in thalassemia patients, these inferential statistics were reached: An increase in serum ferritin values in 70.6% of thalassemia patients while taking iron chelates. After discussing the reasons with the Thalassemia Center doctors supervising these cases, it was concluded that the reasons for the increase are due to: Non-compliance and lack of commitment with iron chelates as a result of its side effects such as nausea or vomiting, flatulence and abdominal pain, constipation or diarrhea, Material costs, Neglecting to take medication (either disregard for medical importance or as a result of being busy with work). We note from the cases of the 29.4% of patients whose ferritin values decreased that: 50% of cases were treated with the combination of deferiprone with another drug, and this indicates its effectiveness more than others.

Introduction

Hematology is known as both inherited and non-inherited blood diseases. As for the inherited ones, it is a group of diseases that are transmitted from parents to children, and the reason for their occurrence is a defect in the composition and components of red blood cells, so they produce red blood cells that are unable to perform their normal functions and the appearance of disease symptoms on the injured person, and one of the most important types is thalassemia.  

A genetic blood disorder that leads to lower hemoglobin in the body than normal, and it is one of the most common hemoglobin diseases in the world. [1] [2]

Thalassemia constitutes a heterogeneous group of genetic disorders that are associated with defects in the synthesis of one or more hemoglobin chains. They are caused by mutations affecting the gene or genes responsible for manufacturing globin chains that form normal hemoglobin. According to the chain in which a defect occurs, thalassemia is called either (α, β, γ, or δ).

Iron overload mediated damage to various vital organs including liver, heart, and endocrine glands is the major cause of mortality and morbidity in patients with transfusion-dependent thalassemia (TDT). [3]
Objectives:

To approach the theoretical information that was found in the international references and treatment protocols used in this research on the ground. We visited the Thalassemia Center in Damascus and were briefed on the patient management protocol (diagnostic methods used, assessing the need to start a blood transfusion, treatment with iron chelates and the types of chelates used in Syria, how to follow up on patients...).

Methods

This was a review of Damascus University Center, was conducted in July 2022. Approval was obtained from the institutional ethics committee.

Data Collection Tool:

The data related to this study were collected using paper questionnaire forms. These forms were designed by the student in charge of the research under the supervision of the professor in charge of the thesis.

Statistical analysis:

The data was entered into the Excel program, then an analysis of the data was performed and the results were obtained in the form of tables and graphs.

Results

The sample of patients studied was 58 male and female patients, the percentage of males was greater than that of females, with a percentage of 58% (34), compared to females, whose percentage was 42% (24). (Fig. 1)

As for the patients' ages, they ranged from 7 years as a minimum to 34 years as a maximum, and the average age was approximately 15 years.

The most common group among patients was A+, followed by O+, while the lowest group was for both groups AB- and B-. (Fig. 2)

It was found that most of the thalassemia patients did not undergo splenectomy, and by calculating their average age, it was found that it was about 13 years, and it is not recommended for splenectomy. (Fig. 3)

It was found that the largest percentage 98.2% of patients had a negative direct Coombs test, and also with a large percentage 91.3% of patients had a negative indirect Coombs test.

We found that 94.8% of the patients were HCV negative, and 98.2% of the patients were HBSag negative.
The drug most commonly used as an iron chelator was Deferiprone, followed by the combination of Deferiprone and alosviral.

By studying and comparing the serum ferritin values and following up the iron chelates used in thalassemia patients, these inferential statistics were reached: An increase in serum ferritin values in 70.6% of thalassemia patients while taking iron chelates. After discussing the reasons with the Thalassemia Center doctors supervising these cases, it was concluded that the reasons for the increase are due to: Non-compliance and lack of commitment with iron chelates as a result of its side effects such as nausea or vomiting, flatulence and abdominal pain, constipation or diarrhea, Material costs, neglecting to take medication (either disregard for medical importance or as a result of being busy with work).

We note from the cases of the 29.4% of patients whose ferritin values decreased that: 50% of cases were treated with the combination of deferiprone with another drug, and this indicates its effectiveness more than others.

Statistics: As a result of the difficulty of obtaining sufficient information from the Thalassemia Center in Damascus due to the lack of sufficient cooperation and the inability to access patient data to complete the research and complete the results, the Damascus University Center was resorted to.

The number of thalassemia patients in Syria until May 2022, according to the Ministry of Health, was 5842.

Each thalassemia patient needs, on average, 18 units of blood annually, according to the Ministry of Health. Thus, the annual need of thalassemia patients is \( (5842 \times 18) = 105156 \) blood units.

The number of blood units that were secured for thalassemia patients in Damascus governorate reached 85 red blood cell units for the RH-K system for the year 2021.

The number of thalassemia patients whose blood pattern was determined at the Damascus University Center reached 378 patients.

The number of blood units secured for thalassemia patients in Homs governorate reached 125 normal red blood cell units for the RH-K system for the year 2021.

The number of normalized blood units secured for thalassemia patients in Tartous governorate reached 71 red blood cell units for the RH-K system for the year 2021.

The total number of RH-K units in the Damascus University Center for Blood Transfusion for Thalassemia Patients in 2021 will be 281 blood units.

**Conclusions**

Most of the thalassemia patients did not undergo splenectomy, and we found that the average age was about 13 years, which is not recommended for splenectomy.
We note that the most commonly used drug for iron chelation is deferiprone, followed by the combination of deferiprone with alosviral.

We noticed an increase in serum ferritin values in 70.6% of thalassemia patients while taking iron chelates, and after discussing the reasons with the doctors of the Thalassemia Center supervising these cases, it was concluded that the reasons for the increase are due to: non-compliance and non-compliance with iron chelates as a result of its side effects such as nausea or vomiting Flatulence and abdominal pain Constipation or diarrhea Material costs Neglecting to take medication (either disregard for medical importance or as a result of being busy with work).

We noticed from the cases of the 29.4% of the patients whose ferritin values decreased that: 50% of the cases were treated with the combination of deferiprone with another drug, and this indicates its effectiveness more than any other drug.

**Declarations**

**Declaration of competing interest:**

All the authors declared that they have no conflicts of interest.

**Consent:**

Written patient consent was obtained before reporting this case and before using any of his medical information.

**Ethical approval:**

This study has been approved by the ethical committee of Syrian private University.

**Availability of data and materials:**

All data are available from the corresponding author on reasonable request.

**Funding:**

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**References**

1. mckenzie (clinical laboratory hematology) book by Shirlyn B. mckenzie 2nd ed.

Figures

![bar chart showing gender distribution](image)

**Figure 1**

Gender
Figure 2

blood type

Figure 3
undergo splenectomy