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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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COMPARATIVE STUDY OF OXIDATIVE STRESS IN PATIENTS WITH B -THALASSEMIA MAJOR ON DEFERASIROX VERSUS DEFEROXAMINE THERAPY

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Abstract.

Background: Accumulation of iron in vital organs is increasingly challenging in clinical settings during the lifespan of thalassemia patients. Iron overload hurdle these organs to redox imbalances. Commonly used iron-chelating agents in (deferasirox and, deferoxamine) could have a positive antioxidant role. **Objective:** Therefore, the aim of this study was designed to compare the effects of deferasirox and, deferoxamine, iron-chelating agents in oxidative stress in patients with β-thalassemic major. **Methods:** In this case series comparative study, 60 known cases of β-thalassemic patients receiving chelating agents therapy were divided into two groups of thirty, group one consisted of 30 patients 16 male and14 female, who received oral agent deferasirox tablets at dose 20-40mg/kg. Group two consisted of 30 patients, 16 male and 14 female, on intravenous therapy with Deferoxamine at a dose of 20-50mg/kg, Another thirty healthy individuals matched with age and gender, were kept as a control group. Total antioxidant capacity (TAOC) and Malondialdehyde (MDA) were measured in all studied groups.

Results: The three groups were similar in terms of age, and gender, A statistically non-significant difference in age ($p>0.05$) existed between the control and patient groups (10.9±2.93; 11.2±4.1*;11.6±3.6*) respectively. The number of patients in to control group and male-to-female numbers were matched since the ratios were similar. A statistically non-significant difference in BMI ($p>0.05$) existed between the control and patient groups (17±2, 17.2±2, 18±2.4*) respectively. TAOC is lower in-patient groups, when compared with the control group (27.8 ± 10.7; 32.5 ± 10.2; and 79.5 ± 7 u/ml) respectively, while the MDA value is higher when compared with the control group (7.2±4.6 and, 6.6±4.42; and 0.57±0.26; nmol/ml) respectively. The TAOC in patients group on Deferoxamine, is higher, while MDA is lower than in patients on Defrasirox. **Conclusion:** The TAOC in patients was reduced and Oxidative stress was enhanced in patients with thalassemia. Deferoxamine is more effective in modulating redox status.

Key words. Thalassemia, oxidative stress, antioxidants, deferoxamine, deferasirox.

Introduction.

β-Thalassemia is a lifelong hereditary pathology characterized by abnormal haemoglobin synthesis and functions, ended by the buildup of fragmented unpaired α-globin subunits, these latter ruin oxidant/prooxidant potential of bone marrow vitiating erythropoiesis [1-3]. subsequently, blood cell lysis, chronic anaemia, and iron accumulation coupled with encouraged intestinal iron absorption secondary to ineffective erythropoiesis and blood transfusion [4,5].

The increase in iron accumulation forms non-transferrin-bound iron (NTBI) which is the most toxic labile plasma iron (LPI) fraction [6], in addition, NTBI ferrous iron (Fe +2) provokes the increased production of reactive oxygen species (ROS), mainly hydroxyl radicals (OH•), by the Fenton and Haber Weiss reaction [7-9]. In patients with β-thalassemia, the unpaired globin chains and increased iron levels in the cells may facilitate oxidative mutilation to erythrocytes with reduced lifespan in the blood [10] and lead to lipid peroxidation of the cell membrane [4], increased lipid peroxidation processes with subsequent consumption of antioxidants. This consumption of antioxidants is responsible for constant intracellular oxidative stress [11].

Repeated blood transfusions are mandatory for patients' survival, free iron can be steadily deposited as insoluble hemosiderin mainly in the reticuloendothelial system such as the liver, as well as in endocrine organs and causing complications in these organs or systems [12-14]. Henceforth, no process exists for the active excretion of surplus iron in the body, therefore chelating therapy is an important tool in the management of β-thalassemia patients that are blood transfusion dependent and non-transfusion dependent [15,16].

Iron-chelating drugs such as deferoxamine, and deferasirox decrease iron overload in thalassemic patients to different degrees and reduce chronic and life-threatening complications including cardiac complications [17]. These agents gradually mobilize iron by continuously chelating labile iron present in a 'transit pool' this solubilized, chelated iron form will be excreted in the urine and stools [18,19].

Patients and Methods.

The present research was a comparative descriptive clinical trial. Ethical approval was obtained from the University of Nineveh/College of Medicine. Parental consent was recorded from all participants before enrollment in the study and carried out on 60 known cases of β-thalassemic patients receiving chelating agent therapy under follow-up, divided into two groups, group one enrolled 30 patients (16 male; and 14 female), on oral agent on deferasirox DFX (Exjade) tablet on dose 20-40mg/kg. Group two enrolled 30 patients (16 male; 14 female), on intravenous therapy with Deferoxamine DFM (Desferal) at a dose of 20-50mg/kg, attended the thalassemia centre at Ibn-Alatheer Teaching Hospital, Mosul City (Iraq), from November 2021 till April 2022. Another 30 healthy individuals matched with age and gender, were kept as a control group.

Patients to enrol in the study should be on continuous iron-chelating agent therapy either deferasirox or deferoxamine for at least six months, alongside no antioxidant supplementation should be taken for the last 6 months. All patients should have no other diseases and should have no complications of thalassemia.

Age, height, weight, and body mass index were recorded for each patient. Biochemical analysis of TAOC, and serum MDA, were measured using Colorimetric Assay Kit Elabscience®. (USA).

Statistical analysis: Data expressed as mean and standard deviation. Using the Excel 2016 data spreadsheet, the t-test was calculated and $p<0.05$ was considered significant.

Results.

The demographic parameters of the enrolled subjects are represented in Table (1). Age comparison has shown non-significant ($p>0.05$) differences between the control and patient groups (10.9±2.93; 11.2±4.1;11.6±3.6) respectively. The number of patients in to control group and male-to-female numbers were matched since the ratios were similar. BMI comparison has shown non-significant ($p>0.05$) differences between the control and patient groups (17±2, 17.2±2, 18±2.4), respectively.

Table 1. *The demographic parameters of the studied groups.*

Parameters	**Control (n=30)**	**DFX (n=30)**	**DFM (n=30)**
Age (years)	10.9± 2.93	11.2± 4.1*	11.6± 3.6*
Gendre (M/F)	15/15	16/14	16/14
BMI (kg/m^2)	17± 2.0	17.2± 2.0	18± 2.4*
*p<0.05 as compared to other groups			

Table 2. *The TAOC, MDA and Hb parameters of the studied groups.*

Parameters	**Control (n=30)**	**DFX (n=30)**	**DFM (n=30)**
T-AOC (u/ml)	79.5±7	27.8±10.7	32.5±10.2
MDA (nmol/ml)	0.57±0.26	7.2±4.6	6.6±4.42
Hb (g/L)	10.9±2.9	6.4±0.8	6.2±1.07
*p<0.05 as compared to other groups, DFX=Deferasirox, DFM=Deferoxamine			

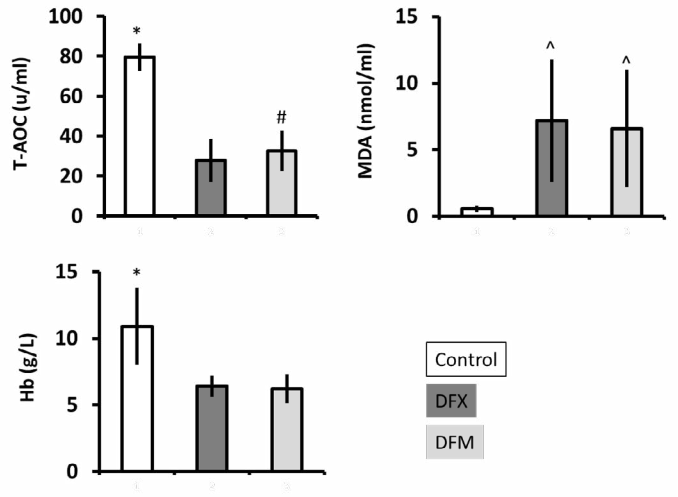

Figure 1. *Iron chelating agents modulated the redox status in the patient groups. Data expressed as mean±SD. *#^p<0.05. * significantly higher as compared to other groups. # significantly higher in DFM as compared to DFX. Significantly higher as compared to the control group. One-way ANOVA with a series t-test to identify differences between groups. DFX=Deferasirox, DFM=Deferoxamine, MDA=malondialdehyde, T-AOC=total antioxidant capacity, Hb=hemoglobin.*

Table (2), and Figure (1) show the TAOC, MDA, and Hb parameters of the studied groups, TAOC is lower in patients groups, when compared with the in the control group (27.8±10.7; and 32.5±10.2; and 79.5±7 u/ml) respectively, while MDA value is higher when compared with the in the control group (7.2±4.6 and, 6.6±4.42; and 0.57±0.26; nmol/ml) respectively

The TAOC in patients group on deferoxamine, is higher, while MDA is lower than in patients on Defrasirox. Haemoglobin value is lower in-patient groups than in the control group. (6.4±0.8; 6.2±1.07; and 10.9±2.9 g/l) respectively.

Discussion.

Beta thalassemias are hereditary disease caused by decreased or absent beta chain formation resulting in abnormal globin chain with premature destruction of RBCs and subsequent anaemia. Patients with thalassemia major become dependent on blood transfusion, with excess iron deposited in major organs resulting in their damage [20].

The principal hurdles in β-thalassemia are caused by iron-interven oxidative injury on vital organs. In overexert iron becomes available as low molecular weight iron, these arbitrated low biomolecules carry potential oxidant impacts liable for catalysing free radical reactions and cause intra- and extracellular oxidant mutilation [21]. Henceforth, confiscation of redox-active iron is an intention for chelation rehabilitation to moderate redox imbalances in thalassemia patients.

Deferasirox is one of the new class of oral chelators, that scavenge the non–transferrin-bound "labile plasma iron," the chemical substances accountable for organ damage in iron-overloaded patients, through toxic oxygen intermediates. The complexes formed are eliminated in the faeces.

Deferoxamine has been the standard effective iron chelator for transfusional hemosiderosis., it binds iron tightly, and the iron-DFM complex is excreted in urine and stool [22]. This study was designed to assess and compare the oxidative stress status by quantification of TAOC and MDA the end product of lipid peroxidation commonly used as a biomarker of oxidative stress, in patients with β -thalassemia major on deferasirox as opposed to deferoxamine therapy on follow-up of regular administration of these iron chelators attended the thalassemia centre at Ibn Alatheer Teaching Hospital, Mosul city (Iraq).

In the present study, TAOC is lower in the patients group, when compared with the control group (27.8±10.7; 32.5±10.2, and 79.5±7 u/ml) respectively, while malondialdehyde (MDA) value is higher when compared with the in the control group (7.2±4.6; 6.6±4.42, and 0.57±0.26 nmol/ml), respectively.

These results were supported by previous studies. A study done by Ahmed and Yenzeel, [23] in patients with beta-thalassemia major, showed a highly significant significant decrease in the levels of vitamin E a component of the antioxidant defence mechanism, with an increase in the MDA levels.

Mohammed & Abd-El Rasoul, [24], found a substantial decline in TAOC and individual antioxidants and an elevation of serum MDA in patients with thalassemia major than control. The key instigates of oxidative stress in thalassemia are the dilapidation of the unbalanced haemoglobin and iron surplus, the iron overload catalysed the Fenton and Haber- Weiss reactions that

stimulate the assembly of excess free radicals (hydroxyl OH and superoxide ion (O^{2-}), respectively and patients with transfusion dependency, severe anaemia itself induces oxidative stress [25,26].

The diminution in the level of TAC could be probably related to the depletion of antioxidant molecules for offsetting the surplus ROS produced in thalassemia patients. Therefore, the assessment and maintenance of antioxidant defence mechanisms can be useful in protecting β-thalassemia patients from more life-threatening complications of the disease [27].

In this study, the TAOC in patients group on Deferoxamine, is higher, while MDA is lower than in patients on Defrasirox. Confirming that the use of a combination of antioxidants with deferasirox and deferoxamine has improved the redox status of beta thalassemia major [28].

A review of the literature provides limited studies about the comparison between the effect of deferasirox and deferoxamine on oxidative stress markers, majorities of studies evaluate their effects of iron chelation and serum ferritin which finally means oxidative stress since iron catalyzes the production of free radicals.

An iron overload mouse model done by Wu et al., [29], showed non-significant differences in iron chelation capacity between deferasirox and deferoxamine. While Al Mosawi and Kadhim, 2024, [30] showed that serum ferritin levels were significantly lowered by DFX therapy. Saigo et al., [25] investigated the influence of Deferasirox on redox balance in thalassemia patients with transfusion dependency, their study showed a significant reduction in reactive oxygen metabolite levels, and this could be explained in the context of the impact of DFS on the redox molecules produced by neutrophil, side by side with their impact on iron storage. Tackling oxidative stress through selection of proper chelating agent might also reduce the risk of thrombosis [31,32].

Conclusion.

The TAOC in patients was reduced and Oxidative stress was enhanced in patients with thalassemia. Deferoxamine is more effective in modulating redox status and may exert antioxidant properties more than deferasirox.

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