Iranian Journal of Blood & Cancer

Journal Home Page: www.ijbc.ir

Systematic Review and Meta-Analysis

The effect of Vitamin E and N-acetyl cysteine on oxidative status and hemoglobin level in transfusion-dependent thalassemia patients: A systematic review and meta-analysis

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ARTICLE INFO

Article History:
Received: 04/01/2023
Accepted: 28/02/2023

Keywords:
Acetyl cysteine
Meta-Analysis
Transfusion-dependent thalassemia
Vitamin E

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Abstract

Background: This meta-analysis was conducted to summarize the comparative effect of Vitamin E and N-acetyl cysteine (NAC) on oxidative status, including total antioxidant capacity (TAC), total oxidative stress (TOS), oxidative stress index (OSI), and hemoglobin (Hb) in patients with TDT.

Methods: This systematic review and meta-analysis was done according to the PRISMA checklist. We searched databases including Web of Science (ISI), Scopus, Medline (via PubMed), and Embase. Meta-analysis was done using Stata statistical software version 16.0.

Results: Finally, four randomized-controlled trials (RCT) for Vitamin E and three RCTs for NAC were included. Our meta-analyses and review showed a significant increase in the weighted mean differences (WMD) of Hb and a significant decrease in the WMD of TOS and OSI in children subgroup of Vitamin E. Also, based on the results of the review in the NAC group, a significant increase in the WMD of Hb and a significant decrease in the WMD of TOS and OSI were found in children.

Conclusions: Vitamin E showed a beneficial effect on improving anemia in TDT children. Moreover, both NAC and Vitamin E seems to be effective antioxidant supplements in children with TDT. More well-designed randomized, controlled trials for the effect of NAC and Vitamin E in TDT patients are recommended with more focus on the essential influencing factors on the oxidative status in these patients.

Please cite this article as: Haghpanah S, Hosseini-Bensenjan M, Zekavat OR, Bordbar M, Karimi M, Ramzi M, Asmarian N. The effect of Vitamin E and N-acetyl cysteine on oxidative status and hemoglobin level in transfusion- dependent thalassemia patients: A systematic review and meta-analysis. Iranian Journal of Blood and Cancer. 2023; 15(1):22-35.

1. Introduction

Transfusion-dependent thalassemia (TDT) is one of the most common inherited disorders caused by a genetic mutation leading to hemolysis and impaired erythropoiesis (1, 2). Regular blood transfusion is an essential therapeutic option that has lowered the complications of severe anemia and increased the patients' survival.

However, repeated blood transfusions lead to iron deposition in various organs, including vital organs such as the heart and liver (3, 4). Although iron chelation therapy is used as an essential treatment option for iron overload, heart disease caused by cardiac hemosiderosis remains the leading cause of

Abbreviations

Transfusion-dependent thalassemia (TDT)
N-acetyl cysteine (NAC)
Total antioxidant capacity (TAC)
Total oxidative stress (TOS)
Oxidative stress index (OSI)
Randomized-controlled trials (RCT)
Weighted mean differences (WMD)
Hemoglobin (Hb)
International Prospective Register of Systematic Reviews (PROSPERO)

Acknowledgements

The authors would like to thank Shiraz University of Medical Sciences for their approval support (Grant number23341). The authors would also like to thank Center for Development of Clinical Research of Nemazee Hospital and Dr. Nasrin Shokrpour for editorial assistance.

Funding

Shiraz University of Medical Sciences

Conflict of Interest

No conflict of interest

Ethics approval

The study was approved by the Ethics Committee of Shiraz University of Medical Sciences (Ethics code: IR.SUMS.REC.1400.188).

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