



Incidence and risk factors of diabetes mellitus in patients with newly diagnosed non-Hodgkin lymphoma (NHL) treated with CHOP based regimen

PREEDEE PATIPANBOONNUM, TEERAYA PUAVILAI, HATAIKARN NIMITPHONG

Department of Hematology, Department of Endocrinology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University

Introduction

Non-Hodgkin lymphoma (NHL) is the most common hematologic malignancy. The most commonly used chemotherapy regimen for treatment of NHL is CHOP-based regimen, which contains a high dose steroid. Patients treated with CHOP-based regimen are at high risk of developing steroid-induced diabetes mellitus (DM). This study aimed to estimate incidence and identify risk factors for steroid-induced DM in newly diagnosed NHL patients treated with a CHOP based regimen

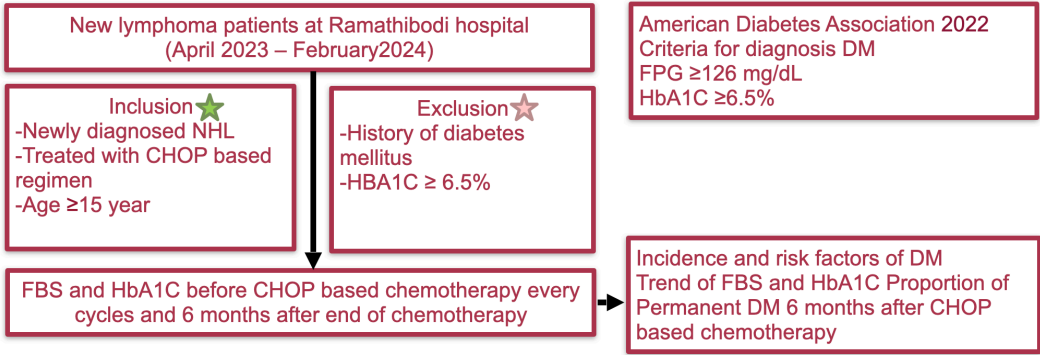
- ### Objective
- To investigate the incidence of diabetes and its risk factors in newly diagnosed patients with non-Hodgkin lymphoma (NHL) receiving chemotherapy with a CHOP-based chemotherapy regimen.
 - To evaluate the time trends of hyperglycemia, insulin resistance, and diabetes in newly diagnosed NHL patients following treatment with a CHOP-based chemotherapy regimen.
 - To assess the proportion of newly diagnosed NHL patients who develop diabetes after CHOP-based chemotherapy and determine the percentage of those with transient diabetes at six months post-treatment.

Methodology

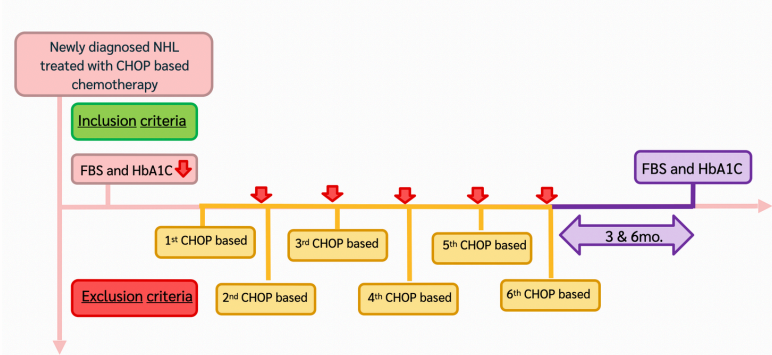
This prospective study was conducted in newly diagnosed NHL patients who were treated with CHOP-based regimen at Ramathibodi hospital between May 2023 and Aug 2024. Patients were followed up during each chemotherapy cycle and for six months after last cycle of chemotherapy. The primary outcome were the incidence and risk factors for the development of DM.

The secondary outcome were the trend in fasting blood sugar (FBS) and HbA1C levels after receiving CHOP-based chemotherapy and the proportion of patients who develop permanent diabetes six months after therapy. Data analysis was performed using descriptive statistics included percentage, mean, and standard deviation. Binary logistic regression analysis was used to analyze factors associated with DM.

Flow chart



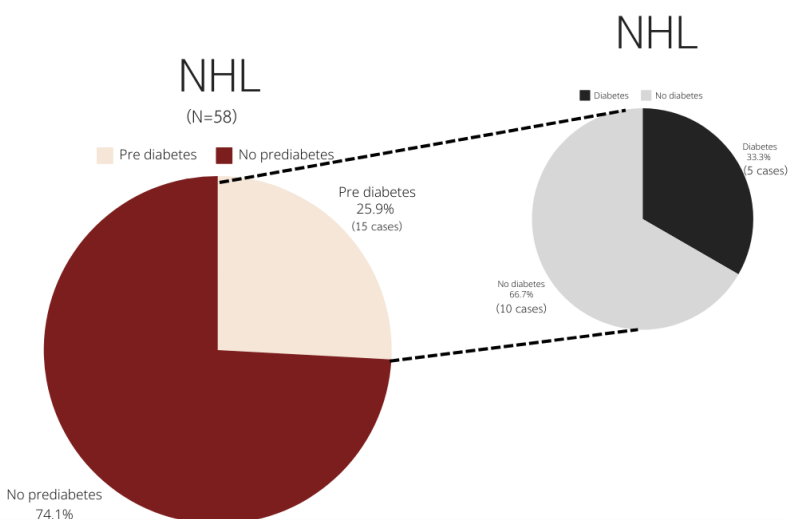
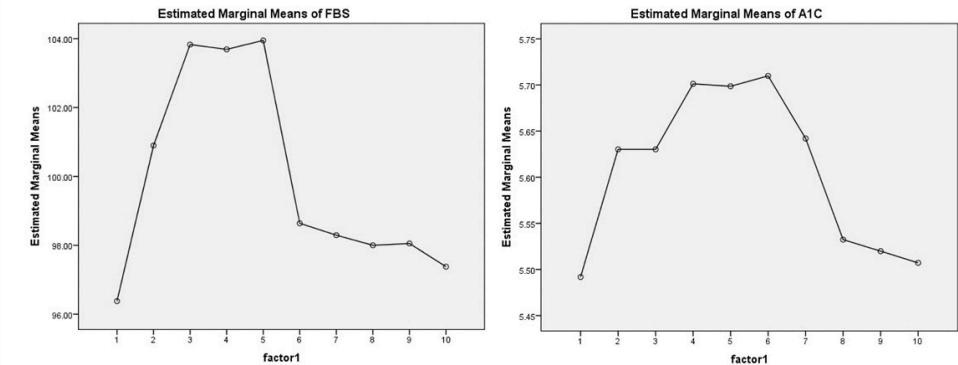
Research methodology



Results

A total of 58 NHL patients were included in this study. The mean age was 62 years, and 57% of the patients were female. The median number of chemotherapy cycles was 6 cycles. 68% of the patient were diagnosed with DLBCL. Other diagnoses included marginal zone lymphoma, follicular lymphoma, Burkitt lymphoma, mantle cell lymphoma and chronic lymphocytic leukemia. We collected data on factors that might be associated with DM, including weight, height, BMI, pre-treatment blood sugar and HbA1c levels, family history of DM, exercise habit, and disease characteristics. **The incidence of diagnosed with DM was 8.62% (5 of 58 patients).**

A significant risk factor of developed DM was a history of prediabetes at baseline. Patients newly diagnosed with DM had a mean initial HbA1C levels of 6.13% (range: 5.70-6.46%) and were treated with anti-diabetes medications. Notably, 80% of patients who developed DM achieved normalization of FBS or HbA1c levels within 3 months after completing the last cycle of chemotherapy.



- ### Conclusion
- The risk of developing DM in NHL patients receiving CHOP-based regimen was only 8%.
 - The significant risk factor for DM was prediabetes at baseline.
 - Therefore, patients with prediabetes should be closely monitored with FBS and HbA1c levels during and after treatment with a CHOP based regimen.
 - Among patients who developed DM, 80% of patients were able to achieve normalization of FBS or HbA1c with treatment.**
 - Appropriate diabetes screening may lead to early treatment in high-risk patients, helping to reduce the risk of infection, morbidity, and mortality.

- ### References
- Lee SY, Kurita N, Yokoyama Y, et al. Glucocorticoid-induced diabetes mellitus in patients with lymphoma treated with CHOP chemotherapy. Support Care Cancer 2014;22(5):1385-1390.
 - Lamar ZS, Dothard A, Kennedy LA, Isom S, Robinson M, Vaidya R, et al. Hyperglycemia during first-line R-CHOP or dose adjusted R-EPOCH chemotherapy for non-Hodgkin lymphoma is prevalent and associated with chemotherapy alteration – a retrospective study. Leuk Lymphoma 2018;59(8):1871-1877.
 - Baech J, Severinsen MT, Øvlisen AK, et al. Risk of diabetes and the impact on preexisting diabetes in patients with lymphoma treated with steroid-containing immunochemotherapy. Blood Adv 2022;6(15):4427-4435.
 - Clore JN, Thurby-Hay L. Glucocorticoid-induced hyperglycemia. Endocr Pract 2009;15(5):469-74.

Acknowledgements

- Participant of the research
- Department of Hematology, Faculty of medicine, Mahidol university