

## Determination of Epstein-Barr virus (EBV) DNA Load as A Biomarker to Follow up EBV Related Hodgkin's and Non Hodgkin's Lymphoma Patients Using Quantitative Competitive Polymerase Chain Reaction Technique

Elham A. Alaswad<sup>1</sup> PhD, Nidhal AM. Mohammed<sup>2</sup> PhD, Khudair J. Al-Rawak<sup>3</sup> MBChB MRT

<sup>1</sup>Dept. of Medical Biology, <sup>2</sup>Dept. of Medical Microbiology, College of Medicine, Al-Nahrain University, <sup>3</sup>Dept. of Surgery, College of Medicine, Baghdad University

### Abstract

- Background** The Epstein -Barr virus (EBV) is the first human virus implicated in the carcinogenesis. EBV contributes to the carcinogenesis like Hodgkin's Lymphoma (HL) and Non Hodgkin's Lymphoma (NHL).
- Objective** Quantitative Competitive Polymerase Chain Reaction (QC-PCR) and ELISA was used to quantitate the EBV DNA load in blood samples of HL and NHL patients pre and post therapy.
- Methods** EBV DNA extracted from blood samples of 18 HL and NHL patients pre and post therapy, 9 apparently healthy controls used to quantify the EBV DNA load. Quantitative Competitive Polymerase Chain Reaction (QC-PCR) and ELISA were used to quantify EBV DNA load. Wild EBV DNA (WT) obtained by Transformation of Escherichia coli MM 294 with Wild type (WT) DNA plasmid *pGEMBamHI-K*.
- Results** EBV DNA load in controls was found to be  $7-1.99 \times 10^3$  in HL and NHL patients, while in patients it's ranged from zero to  $1.936 \times 10^9$  copy numbers per ml of blood. High EBV load with the range of 10715( $1.071 \times 10^4$ ) to 1936421960 ( $1.936 \times 10^9$ ) above cut-off value was detected in 66.7% of HL and 5861( $5.86 \times 10^3$ )-50118( $5.01 \times 10^4$ ) copies/ml blood in 44.5 % of NHL patients pretherapy. After chemotherapy, 60% of HL patients and 100% of HL patients with high EBV load showed significant response. Low viral load was found in 44.45% of patients. Only 55% of lymphoma patients with high EBV load, after chemotherapy 16.6% of them continue to have high EBV DNA load compared to the control group, 38.3% of the patients showed response to chemotherapy when their viral load decreased below cut off value. While 11.1 % continue to have high DNA load. One patient (5.5%) showed an elevated EBV load after completion of chemotherapy.
- Conclusions** EBV DNA load estimated by Quantitative Competitive Polymerase Chain Reaction considered as valuable promising tumor biomarker in the diagnosis and monitoring of EBV related HL and NHL patients.
- Key words** Quantitative Competitive Polymerase Chain Reaction (QC-PCR), Epstein-Barr virus (EBV), Viral DNA load, Hodgkin's (HL) and non Hodgkin's Lymphoma (NHL) Patients.

### Introduction

The Epstein Barr virus (EBV) is a immortalizes B-lymphocytes, which lymphotropic virus that infects and maintained their viral genome in a non-