Application of real time quantitative PCR in evaluation of MRP1 mRNA level in Iranian AML patients

Multidrug resistance (MDR) is a complex phenomenon that is induced by expression of many different genes which regulate drug transport, detoxification, metabolism and cellular repair. The expression or co-expression of gene(s) such as multidrug resistance gene (MDR1) and multidrug associated protein gene (MRP1) is one of the main mechanisms for drug resistance phenotype both in vitro and in vivo. We developed a quantitative reverse transcriptase polymerase chain reaction method to evaluate MRP1 mRNA level in leukemic patients. We determined the cutoffs of MRP1 transcript copy number based on copy numbers in lymphocytes of healthy individuals. To confirm that the cutoffs reflected biological resistance we used HL60 cell line, known to have overexpression in MRP1. By employing real-time PCR we could detect over-expression of MRP1 in almost 33.3% of Iranian leukemic patients with clinical sign of MDR phenotype. No sign of overexpression of MRP1 was seen in our healthy control group and leukemic patients responsive to chemotherapy. Therefore, we have found a good correlation between the MRP1 transcript copy number and the clinical response to chemotherapy. In addition, in this study, we demonstrated the usefulness of real time PCR technology for evaluation of mRNA level of any gene of interest by more focus on MRP1.

Keywords:
Leukemia, MRP1, Real time PCR, Gene overexpression