Assessment of P-gp and MRP1 activities using MultiDrugQuant Assay Kit : a preliminary study of correlation between protein expressions and its functional activities in newly diagnosed acute leukaemia patients.

ABSTRACT

Multidrug resistance (MDR) is believed to be responsible for poor response of patients towards chemotherapy particularly patients with acute myeloid leukemia (AML) and acute lymphoblastic leukemia (ALL). The best-characterized resistance mechanism is the one mediated by permeability-glycoprotein (P-gp) encoded by MDR1 gene, which is responsible for drug efflux. We studied P-gp and multidrug resistance-associated protein 1 (MRP1) expression and functional activities in 43 newly diagnosed acute leukemia cases (19 paediatric ALL cases and 24 adult AML cases). The expression and functional activities were examined using flow cytometry and MultiDrugQuant assay kit (involving calcein AM uptake and efflux). P-gp and MRP1 expression and its functional activities were observed in 68.4% of paediatric ALL. In adult AML cases, all cases expressed MRP1 and its functional activities but only 58.3% were positive for P-gp and its functional activities. We were able to show a significant correlation between the expression of the multidrug resistant protein (P-gp and MRP1) and their functional activity in adult AML and paediatric ALL samples.

Keyword: Acute leukaemias; Drug resistance; Multi-drug resistance-associated protein 1; Permeability-glycoprotein