Cytotoxicity of verapamil in human immunocompetent cells in vitro

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Objective: Verapamil as a calcium channel blocker has been largely used in treatment of several cardiovascular diseases such as hypertension and arrhythmia. Moreover the cytotoxic effects of verapamil on cancerous cells have been shown. The apoptotic properties of verapamil have also been reported. In the present study, the cytotoxic effect of verapamil on human peripheral blood mononuclear cells (PBMCs) has been evaluated in vitro.

Methods: Human PBMCs were cultured in complete RPMI medium. Then the cells at logarhytmic growth phase were incubated with different concentrations of verapamil (2×10^{-6} _2×10^{-3}) for 24, 48 and 72 hours. Next the cell viability was assessed with Trypan blue dye exclusion and MTT (3-[4, 5-dimethyl thiazol-2, 5-diphenyltetrazoliumbromide]) methods.

Results: Verapamil significantly decreased the proliferation of the human PBMCs dose-dependently. This cytotoxic effect was shown at $\geq$ 1 mM concentration of the verapamil after 24h incubation time onwards. Moreover the cytotoxic effect of verapamil at 1mM concentration of the drug increased with time in this order: 24h> 48h>72h.

Conclusion: In this study, verapamil showed a dose -dependent cytotoxic effect on the human PBMCs. The cytotoxic dose of verapamil shown in this study is higher than its therapeutic dose used in cardiovascular patients. However as this drug is used for long periods in some cardiovascular diseases, further studies are warranted to assess the verapamil cytotoxicity in cardiac patients in vivo.

Keywords: *Cytotoxicity; verapamil; mononuclear cells .*