Effects of Combination of Erythropoietin and Epidermal Growth Factor on Renal Ischemia/Reperfusion Injury: A Randomized Experimental Controlled Study

Abstract

OBJECTIVE:

To investigate effects of combination of erythropoietin (EPO) and epidermal growth factor (EGF) on renal ischaemia and on reactive oxygen species in a rat model.

MATERIALS AND METHODS:

In all, 90 male Sprague-Dawley rats were allocated into five groups of 18, designated: Sham; treated with right nephrectomy only; Control, subjected to left renal ischaemia for 45 min with no treatment; EPO-treated, as the control but with EPO pretreatment; EGF-treated, as the control but with EGF pretreatment; EPO + EGF-treated, as the control but with EPO and EGF pretreatment. Renal function, histopathology and malondialdehyde (MDA), superoxide dismutase (SOD) and reduced glutathione (GSH) levels in kidneys were assessed at 1, 2 and 7 days after ischaemia.

RESULTS:

All rats except the controls had a significant improvement in serum creatinine, creatinine clearance and fractional excretion of Na(+) ; all three were significantly better in EPO + EGF group than in all other groups Histopathological examination showed marked structural damage in control rats. The tubular damage was least in the EPO + EGF group. The control group had a significant increase in MDA level and a significant decrease in SOD and GSH, while the EPO + EGF group had a marked significant reduction in MDA and increase in GSH and SOD.

CONCLUSION:

The protection against ischaemia/reperfusion injury might be maximal when EPO and EGF are administered concomitantly, and their protective effect might be partly due to their antioxidant effects.