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Therapeutic role of bone marrow derived mesenchymal stem cells and the protective effect of silymarin in cisplatin-induced acute renal failure in adult male albino rats

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Background: Cisplatin is a highly effective antitumor agent whose clinical application is limited by its nephrotoxicity which is associated with high mortality and morbidity rates. We aimed to study the protective role of silymarin and mesenchymal stem cells as a therapeutic tool of cisplatin nephrotoxicity.

Methods: We injected the rats with cisplatin in a dose of 5 mg/kg BW for five days to induced acute renal failure (ARF). Silymarin was administrated 6 hours before cisplatin injection and mesenchymal stem cells were injected 24 hours after cisplatin induced ARF.

Results: We assessed the ARF biochemically by elevation of kidney function tests and histopathologically by an alteration of the histological architecture of the renal cortex in form of shrinkage of glomeruli, lobulated tufts and glomerular hypertrophy with narrowing capsular space. The tubules showed extensive tubular degeneration with cellular hyaline materials and debris in the lumen of the renal tubules. The renal blood vessels appeared sclerotic with marked thickened walls. When silymarin was given in different doses before cisplatin, it decreased the toxic effect of cisplatin in the kidney but sclerotic blood vessels remained. Injection of mesenchymal stem cells in rats with ARF induced by cisplatin improved the histopathological effects of cisplatin in renal tissues and kidney function tests were significantly improved.

Conclusions: There was a significant improvement in kidney function tests and renal histopathology by using silymarin as protective mechanism in cisplatin-induced ARF and mesenchymal stem cells administration denoted more remarkable therapeutic effect in ARF.

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