Review Article

Comparative Histological Study on the Possible Effect of Adipose-Derived Mesenchymal Stem Cells versus Platelet Rich Plasma in Adriamycin-Induced Chronic Kidney Disease in Adult Male Albino Rat

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ABSTRACT

Chronic kidney disease (CKD) is a major public health problem worldwide with rising morbidity and mortality. Therefore, this study was performed to evaluate and compare the possible effect of adipose tissue-derived mesenchymal stem cells versus platelet rich plasma on Adriamycin induced chronic kidney disease in a rat model.

Forty-six adult male albino rats were classified into a donor group and 4 experimental groups: Group I (Control group), Group II (Adriamycin group): rats received single I.V. injection of ADR (6 mg/kg). This group was further subdivided into subgroup IIa in which rats sacrificed after one week and subgroup IIb in which rats sacrificed at the end of the experiment to ensure the establishment of chronic kidney damage. Group III (ADR+MSCs treated group): rats received ADR then after one week, received single I.V. injection of MSCs (2 x 106) and Group IV (ADR+PRP treated group): rats received ADR then after one week, they received PRP (1 ml/kg) via intraperitoneal injection twice a week for six weeks. Blood samples were taken to estimate blood urea nitrogen (BUN) and serum creatinine levels. Kidney sections were stained with H&E, Masson's trichrome, PAS stains and immunohistochemical staining against caspase 3. A fluorescent microscopic study to detect the PKH-26 labeled ADMSCs was also done.

The results revealed degenerative features of renal specimens in subgroup IIa with declined kidney functions were detected. These changes were aggravated in subgroup IIb. Both MSCs and PRP had the ability to attenuate Adriamycin induced CKD and restore the normal renal structure and functions, PRP was much more effective in reducing damage and promoting healing of renal tissues. The results were further confirmed by statistical and morphometric analysis.

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