EVALUATION OF RENAL FUNCTION AND OXIDATIVE STRESS IN DIABETIC RATS TREATED WITH INSULIN AND METFORMIN

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Introduction and objectives: Hyperglycemia promotes oxidative stress and increases the production of reactive oxygen species, which have a crucial role in reducing kidney functions. Exogenous insulin and metformin are used for glycemic control. Thus, the aim of this study was to evaluate the effects of association between insulin and metformin on markers of kidney injury (blood and urine) and oxidative stress (renal tissue) in male Wistar rats. Materials and methods: Diabetes mellitus was induced by streptozotocin and the diabetic rats were divided into: untreated, treated with insulin, treated with insulin plus metformin and treated with metformin; a non-diabetic group was used as control. Urine was collected in metabolic cages at the beginning and end of the treatment. Blood and kidneys were removed after the animals’ euthanasia. Urea and creatinine, and protein and creatinine were measured in the blood and urine, respectively, using a biochemical analyzer. The homogenized kidney was used to analyze the total antioxidant activity, catalase activity, sulfhydryl content, lipid peroxidation and reduced glutathione, spectrophotometrically. Results and conclusions: Diabetes changed the renal function, shown by the changes in the biochemical values of blood urea and creatinine, and urine creatinine and protein. We observed that the treatment with insulin plus metformin was able to normalize the levels of these compounds in the blood and urine. In relation to renal oxidative stress, only the sulfhydryl content and catalase activity were affected by diabetes induction. However, the treatment with insulin plus metformin also recovered the catalase activity at basal levels. The association between metformin and insulin showed better results than the individual drugs, once this combination attenuated acute kidney damage, which may represent a new approach to prevent chronic kidney injury.

Keywords: kidney markers, antioxidant status, hyperglycemia.

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