Evaluation of Metformin effects on oxidative stress factors in animal model of sepsis

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Abstract:
Sepsis is a systemic inflammatory response to infection and a major cause of morbidity and mortality. Standard protocols for sepsis treatment have remained essentially unchanged for last three decades. Metformin mainly is an anti-hyperglycemic drug, recommended as first line drug therapy of diabetes mellitus type-II. Anti-inflammatory effect of Metformin was proved in invivo /invitro studies in animal models.

Investigate effects of Metformin on some oxidative stress and anti-fibrinolysis factors.

CLP (cecal ligation and puncture) polymicrobial sepsis model was applied to the rats, except sham group. Rats divided in 4 groups which contains 10 rats in each group; (I) sham group; (II) CLP group; (III) 50 mg/kg Metformin 2h after CLP; (IV) 100 mg/kg Metformin 2h after CLP to evaluate the oxidative stress factors which were (GPx), (MDA), (SOD), (TAC), (PAI-1) and (MPO). Blood samples were collected 12 hours after CLP and stored at (-70°C) until the time of assay. All rats from all four groups were killed 12 hours after CLP. The lungs were removed quickly and one washed in ice-cold saline and frozen in liquid nitrogen and kept at (-70°C) for enzymatic activity analysis and the other were kept in formalin 10% until tissue section preparation performed.

Level of MDA was decreased in treated groups by Metformin but were not statistically significant. The MPO enzymatic activity in lung tissue were significantly lowered in Metformin treated groups. In this line, Metformin reduced inflammatory scores in lung tissue after induction of inflammation following sepsis.

Conclusion: It seems that Metformin may reduce sepsis manifestation. It may has a protective effect on lung inflammation during acute lung injury.

Keyword: Sepsis, Metformin, CLP, oxidative stress, organ dysfunction