Some biochemical changes due to use of some anti-allergic, anti-inflammatory and anti-oxidant drugs in experimentally induced diabetes mellitus in rats

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Abstract

With increasing numbers of individuals diagnosed with diabetes mellitus, there is a need not only for more mechanistic studies to completely understand insulin action but also to better design and provide therapies that meet the needs of the patients. The present investigation aimed to assess some biochemical changes that occur in serum, blood and tissues of alloxan-induced diabetes after administration of one of anti-oxidant; lipoic acid, one of NSAIDs; meloxicam, and one of anti-allergic; fexofenadine. In addition, an attempt was made to clarify any correlation between the uses of the tested drugs alone or combined with LA. 224 white male albino rats were subcutaneously injected with (120 mg/kg b.w) alloxan to induce experimental diabetes. The diabetic rats were then divided into four groups; one remained without treatment as a diabetic group (D or group I). The second group was treated with lipoic acid (D+LA), the third group was subdivided into subgroup A that was treated with meloxicam (D+M), and subgroup B was treated with meloxicam and LA (D+M+LA). The last group was subdivided into subgroup A that was treated with fexofenadine (D+F) and subgroup B was treated with fexofenadine and LA (D+F+LA). Another group of normal non-diabetic untreated rats was left as a normal control for diabetic group only (NC). The period of treatment was persisted for four successive weeks.

Results revealed that Alloxan-induced diabetes resulted in a significant increase in fasting and pp serum glucose, blood pyruvate levels and serum LDH activities, serum total lipid, TG, LDL and MDA levels. In addition,

significant decreases in liver glycogen content, serum total protein, albumin, globulins and GSH concentrations were observed in diabetic rats. These abnormalities were significantly ameliorated by LA administration when used separately or in combination with meloxicam or fexofenadine. Meloxicam improved these abnormalities in diabetic rats. Fexofenadine administration induced no significant changes in the above-mentioned parameters. The results showed that the combination between LA and meloxicam significantly improved the lipid profile more than the use of each of them alone, suggesting an augmenting effect of both. The administration of LA alone as well as meloxicam alone significantly increased liver GSH levels throughout the experimental period while that in brain was not affected. Liver and brain MDA levels were decreased after administration of LA or meloxicam compared to diabetic group. Fexofenadine had no significant effect on both liver and brain GSH and MDA concentrations throughout the experimental period compared to diabetic group.

Conclusion and recommendations:

Lipoic acid is a powerful antioxidant and diabetics should take it as a supplementary treatment due to the observed low levels of LA in diabetic patients. Meloxicam can be used not only as anti-inflammatory but also as free radical scavenger and it is also quite useful in reducing the incidence of metabolic syndrome alone or in combination with LA. Fexofenadine potentiates the effect of LA in the improvement of GSH levels in both liver and brain of diabetic rats.