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Effects of ascorbic acid and ferulic acid on ECG, myocardial oxidative stress and connexin 43 expression in isoproterenol-induced myocardial infarction in rats

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Objectives: To assess the effects of ferulic acid and ascorbic acid and combination of both on ECG variables, serum cardiac enzymes (AST, ALT, LDH, CK-MB), myocardial oxidative stress markers (MDA,SOD and GSH) and connexin 43 expression in isoproterenol induced myocardial infarction.

Methods: 50 male rats subdivided into equal 5 groups, a) normal group, ISO group (rats received isoproterenol 150 mg/Kg i.p. for 2 consecutive days at 24 hrs intervals), c) FA group (rats received ISO + ferulic acid 20 mg/kg/day p.o for 6 days), d) AA group (rats received ISO + ascorbic acid 80 mg/kg/day p.o for 6 days) and e) combined group (rats received ISO + AA+ FA in the same previous doses).

Results: ISO group showed significant elevation in serum cardiac enzymes (AST, CK-MB, LDH), myocardial MDA (marker of lipid peroxidation) and myocardial histopathological damage score with significant decrease in myocardial antioxidants (SOD and GSH) and expression of connexin 43 compared to normal group (p< 0.05). Also, rats of ISO group showed ECG changes such as ST segment elevation, prolonged QT interval, short RR interval and heart rate. Pretreatment with a combination of FA and AA caused more significant improvement in all studied parameters than did each agent alone. Moreover, ECG changes were improved significantly improved in combined group only.

Conclusion: We concluded that a combination of FA and AA has a synergistic protective effect against ISO induced myocardial infarction. This might be due to their antioxidant effects as well as their effects on connexin 43 expression in myocardium.

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