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The Effects of Lipid Emulsion, Magnesium Sulphate and Metoprolol in Amitryptiline-Induced Cardiovascular Toxicity in Rats

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Abstract : Objective: The aim of this study was to evaluate histological, electrical and biochemical effects of metoprolol, lipid emulsion and magnesium sulphate as an alternative method to be used in preventing long QT emergence, that is among the lethal consequences of amitryptiline toxicity. Methods: Thirty Sprague- Dawley male rats were included. Rats were randomly separated into 5 groups. First group was administered saline only while the rest had received amitryptiline 100 mg/kg + saline, 5 mg/kg metoprolol, 20 ml/kg lipid emulsion and 75 mg/kg magnesium sulphate (MgSO4) intraperitoneally. ECG at DI lead, biochemical tests following euthanasia were performed in all groups after 1 hour of administration. Cardiac tissues were removed, sections were prepared and examined. Results: QTc values were significantly shorter in the rest when compared to amitryptiline+ saline group. While lipid emulsion did not affect proBNP and troponin values biochemically as compared to that of the control group, histologically, it was with reduced caspase 3 expression. Though statistically insignificant in the context of biochemical changes, pro-BNP and urea levels were lower in the metoprolol group when compared to controls. Similarly, metoprolol had no statistically significant effect on histological caspase 3 expression in the group that was treated with amitryptiline+metoprolol. On the other hand, there was a statistically significant decrease in Troponin, pro-BNP and urea levels as well as significant decline in histological caspase 3 expression within the MgSO4 group when compared to controls. Conclusion: As still a frequent cause of mortality in emergency units, administration of MgSO4, lipid emulsion and metoprolol might be beneficial in alternative treatment of cardiovascular toxicity caused by tricyclic antidepressant overdose, whether intake would be intentional or accidental.

Keywords : amitryptiline,cardiovascular toxicity, long QT, Rat Model
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