

Abstract

Introduction: Ketamine is an NMDA receptor antagonist with anesthetic properties. Nowadays it is used as anti-depression and pain-killer in acute and chronic pains. Nervous, cardiovascular and hepatic side-effects of ketamine are the most frequent. It is reported ketamine can cause cardiotoxicity in mammals through mitochondrial dysfunction and depletes ATP from cardiomyocytes. Mitochondrial dysfunction in cardiomyocytes can induce oxidative stress, inflammation and toxicity due to high demand of energy. Thus, natural components with anti-oxidative and mitochondrial protection properties can play a significant role in ketamine-induced cardiotoxicity. Sesame oil is rich source of lignans which are active phenolic compounds. The lignans are efficient in oxidative stress, inflammation reduction and cardioprotection due to their antioxidative properties. In this research we investigated the effect of sesame oil on ketamine induced cardiotoxicity in rats.

Methods and Materials: Male Wistar rats were randomly divided into four groups: control group, ketamine group, ketamine+sesame oil group and sesame oil group. Rats were given 5 ml/kg daily for 14 consecutive days. Ketamine was then injected intraperitoneally at a dose of 60 mg/kg every 10 minutes for 3 hours to induce cardiotoxicity on the 15th day. Mitochondrial parameters, oxidative stress, serum cardiac markers, and histopathological damage to heart was evaluated.

Results: Our results show that ketamine significantly increase serum cardiac markers, oxidative stress parameters, histopathological alteration and mitochondrial dysfunction in cardiac tissue. Sesame oil administration in presence of ketamine was observed to decrease serum cardiac markers, oxidative stress parameters, histopathological alteration and mitochondrial dysfunction in cardiac tissue.

Discussion and Conclusion: The obtained results suggest that sesame oil exert cardioprotection via mitochondrial protection, antioxidants properties and ultimately improving mitochondrial function and cardiac function.

Key Words: Cardiotoxicity, Mitochondrial dysfunction, Natural compounds, Ketamine, Sesame oil