Abstract

Introduction:

Previous studies have shown that the use of trastuzumab in the treatment of cancer patients can cause an important complication of cardiotoxicity and death of cardiomyocytes, and one of the proposed mechanisms for this issue is the disruption of mitochondria function. Also, the composition of curcumin has shown good antioxidant and anti-inflammatory effects in many studies. Based on this, this study was designed to evaluate the protective effects of curcumin in cardiotoxicity caused by trastuzumab and to investigate its potential effects on mitochondria in rats.

Materials and methods:

24 adult male Wistar rats were divided into 4 groups: the first group (control) treated with normal saline, the second group treated with trastuzumab (2.25 mg/kg intraperitoneal injection daily), the third group treated with curcumin (10 mg/kg, intraperitoneal injection, daily) and group four treated with trastuzumab plus curcumin. Blood and heart tissue of rats were collected on day 11 and used to evaluate creatine kinase, lactate dehydrogenase, cardiac troponin, malondialdehyde, glutathione level and mitochondrial toxicity parameters. Also, heart tissue was sent for histopathological analysis.

Results:

Trastuzumab caused a significant increase in the levels of creatine kinase, lactate dehydrogenase, cardiac troponin, malondialdehyde and oxidized glutathione. Also, trastuzumab increased mitochondrial disorders and histopathological changes in rat heart. In most of the experiments, simultaneous injection of curcumin with trastuzumab brought the level of measured parameters to normal and close to the control group and restored mitochondrial disorders and histopathological changes.

Conclusion:

This study demonstrated the cardioprotective effects of curcumin against trastuzumab-induced cardiotoxicity, which could be attributed to its antioxidant and mitochondrial protective activities. This combination is suggested as a good therapeutic candidate for testing in a clinical setting.

Key words:

Cardioprotectives; antioxidants; cardiac mitochondria; trastuzumab; curcumin.