Abstract

Because erythromycin (ERY) is a risk factor for cardiotoxicity through mitochondria pathway, and vitamin D deficiency can contribute to mitochondrial dysfunction. In the present study, we tested the hypothesis that erythromycin could impair mitochondrial function and oxidative stress in rat heart isolated mitochondria and that 1,25-dihydroxivitamin D3 (calcitriol) treatment could prevent such effects.

Material and method

Rat heart mitochondria were isolated with mechanical lysis and differential centrifugation. Then isolated mitochondria were first pretreated with 3 different concentrations of calcitriol (2.5, 5 and 10 µM) for 5 minutes at 37 °C, after which erythromycin (10 µM) was added to promote deleterious effects on mitochondria. During 1 hour of incubation, using by flow cytometry and biochemical evaluations, the parameters of mitochondrial toxicity including: succinate dehydrogenase (SDH) activity, mitochondrial swelling, mitochondrial membrane potential (MMP) collapse, reactive oxygen species (ROS) formation and lipid peroxidation (LP) was evaluated.

Discussion and conclusion

The results showed that erythromycin (10 µM) caused a significant change in mitochondrial function, ROS formation, mitochondrial swelling, MMP collapse, increasing lipidperoxidation and oxidative stress. Calcitriol (10 µM) reverted the effect of erythromycin on the parameters tested.
In this study, we show that erythromycin impairs mitochondrial function and induces mitochondrial toxicity in rat heart isolated mitochondria, which were reverted by calcitriol.

These findings suggest that calcitriol may be a preventive/therapeutic strategy for cardiotoxicity complications caused by erythromycin.

Key words:

Erythromycin, Calcitriol, 1,25-dihydroxivitamin D3, Mitochondria, Cardiotoxicity