

ACUTE CARDIOVASCULAR EFFECTS OF AMINOPHYLLINE IN MECONIUM-INDUCED ACUTE LUNG INJURY

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Inflammation, pulmonary edema, pulmonary vasoconstriction and bronchoconstriction play an important role in the pathogenesis of neonatal meconium aspiration syndrome (MAS). Therefore, various anti-inflammatory agents including inhibitors of phosphodiesterases are increasingly used in the treatment of the disease. However, little is known about possible side effects of anti-inflammatory treatment in the conditions of MAS. This experimental study analyzes changes of arterial blood pressure, heart rate and heart rate variability (HRV) during and after intravenous aminophylline to evaluate potential cardiovascular risks of the treatment in newborns with MAS. Oxygen-ventilated rabbits were intratracheally given meconium suspended in saline (25 mg/ml, 4 ml/kg, Mec) or saline (Sal). Thirty minutes later, animals were given intravenously aminophylline (Syntophyllin, 2 mg/kg, Amin) or saline (sham-treated controls, Sal). Second dose of the treatment was given 2 hours later. During (5 min) and immediately after (5 min) the treatment administration, as well as during 5 hours after the treatment administration, blood pressure in femoral artery and heart rate were evaluated. Additionally, heart rate oscillations - heart rate variability - were analyzed using time and frequency domain analysis. In meconium-instilled animals, increased blood pressure, trend to increase mean heart rate, and increased parameters of HRV linear analysis (MSSD, logLF, logHF, logTP) were observed already within 5 min interval after completed treatment administration. In saline-instilled animals, there was stronger trend to increase the heart rate than the blood pressure immediately after aminophylline, resulting into lower values of several HRV parameters compared to sham-treated animals. Within 5 hours after the treatment administration, slightly higher values of heart rate, but particularly of HRV parameters were observed till the end of experiment, with higher heart rate in Sal+Amin and higher HRV parameters in Mec+Amin group compared to sham-treated controls. Summarizing, intravenous administration of aminophylline was in meconium-instilled animals (Mec+Amin) associated with acute increase in arterial blood pressure and heart rate variability, and slight increase in heart rate. In animals given intratracheal saline instead of meconium (Sal+Amin), increased heart rate and decreased HRV parameters were observed after aminophylline. Concluding, intravenous administration of aminophylline may be associated with acute cardiovascular changes, and thereby should be carefully used, particularly in patients with MAS associated with cardiovascular instability.

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