INFLUENCE OF OXIME K870 AND OBIDOXIME ON SURVIVAL AND CARDIORESPIRATORY PARAMETERS IN RATS POISONED WITH PARAOXON

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Paraoxon, an organophosphorus compound is an irreversible inhibitor of acetylcholinesterase. The aim of the study was to examine the effect of antidotes (obidoxime and oxime K870) on survival and cardiorespiratory parameters in rats poisoned with paraoxon.
Paraoxon (0.25 mg/kg subcutaneously) was administered to Wistar albino rats, then 1 minute later N-butyl scopolamine (63.36 mg/kg intramuscularly) and in 0.9% NaCl, obidoxime (22 mg/kg) or oxime K870 (35 mg/kg) were injected intramuscularly. The rat's blood pressure was measured non-invasively and the ECG was recorded. The transducer measured spontaneous contractions of the diaphragm. Arterial blood from the femoral artery was taken for gas analyses.
An average survival time for rats treated with saline (unprotected rats) was 55.8 min. Rats treated with obidoxime lived significantly longer (144.2 min) and with oxime K870 217.6 min, significantly longer compared to both saline and obidoxime. In unprotected rats heart rate increased from the average 285 bpm baseline value to average 480 bpm 10 minutes after paraoxon administration. Significantly lower increase in heart rate was noted in obidoxime and oxime K870 protected rats (420 and 395 bpm, respectively). Ventricular tachycardia was noticed in 90% of rats prior to arrest. Transitory bradycardia was noticed in 15% of oxime-protected rats during first hour after paraoxon administration. In unprotected rats, blood pressure (BP) increased 10 minutes after paraoxon administration (from mean BP: 83 mmHg up to 159 mmHg), hypertension lasted for 15 minutes, then slowly decreased to baseline values, hypotension (39 mmHg) and immeasurable values. Significantly lower increase in blood pressure was noted in obidoxime and oxime K870 protected rats (129 mmHg and 121 mmHg, respectively). Respiratory rate in unprotected rats showed bradypnoea (30-40% of baseline values) 15 minutes after paraoxon administration while rats treated with oximes showed slight oscillations in respiratory rate (10-20% of baseline values). Severe acidosis in unprotected rats occurred as early as 15 min compared to 45 min in protected rats.
Oximes significantly prolonged survival and improved cardiorespiratory parameters in rats poisoned with paraoxon, with better antidotal potential of oxime K870 compared to obidoxime.

Keywords: Acetylcholinesterase, Organophosphorus compounds, Oxime, Muscarinic effects, Nicotinic effects.