

POSTER PRESENTATION

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Respiratory and hemodynamic effects of intravenous nalbuphin in anesthetized rats

T Hauffe^{1*}, P Jirkow², M Arras², D Müller³, DR Spahn¹, D Bettex¹, A Rudiger¹

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Introduction

Animal welfare mandates adequate analgesia in sepsis models (Lilley E, Shock 2015; 43: 304). However, it is unclear which regimen is best to achieve this without interfering excessively with the scientific experiments. Nalbuphin, a non-controlled kappa opioid receptor agonist, has a short half life and a wide therapeutic range and might therefore be a useful analgesic for research animals.

Objectives

We test the efficacy and safety of intravenous nalbuphin in our rat model of fecal peritonitis. Here, we report its respiratory and hemodynamic effects in short-term experiments performed in non-septic rats during anaesthesia.

Methods

In this randomized, placebo-controlled, blinded study, spontaneously breathing male Wistar rats were anesthe-

tized with isoflurane 3% (air flow 400 ml/min, FiO₂ 21%). Nalbuphin (or placebo) was injected subcutaneously at a dose of 1 mg/kg. After local anaesthesia with lidocaine, the left carotid artery and the right jugular vein were surgically cannulated. The isoflurane concentration was reduced to 2%. Intravenous nalbuphin (or placebo) was administered at two different doses (1 and 5 mg/kg/h). Nalbuphin concentration was measured in heparinised plasma by HPLC. Results are given as mean (standard error of the mean), p-values were calculated by a t-test.

Results

See table 1.

Conclusions

Our results demonstrate that high-dose nalbuphin depresses respiratory rate, heart rate and mean arterial pressure in anesthetised rats. In order to investigate if the

Table 1 Results.

	Placebo (n=6)	Nalbuphin 1 mg/kg/h (n=6)	p-value	Placebo (n=6)	Nalbuphin 5 mg/kg iv (n=6)	p-value
Nalbuphin concentration [mg/l]		22.9 (3.7)				
Respiratory parameters						
Respiration rate [1/min]	55 (3)	45 (2)	0.02	53 (4)	41 (2)	0.04
pO ₂ [kPa]	9.31 (0.41)	7.86 (0.98)	0.41	10.1 (0.66)	6.81 (0.36)	0.02
SaO ₂ [%]	92.7 (1.2)	83.9 (3.3)	0.09	93.6 (1.3)	78 (2.7)	0.02
pCO ₂ [kPa]	6.25 (0.31)	7.72 (0.52)	0.03	6.45 (0.53)	8.49 (0.39)	0.01
Hemodynamic parameters						
Heart rate (1/min)	409 (10)	336 (12)	0.00	413 (14)	332 (16)	0.01
Mean arterial pressure (mmHg)	95 (6)	78 (4)	0.04	92 (5)	70 (3)	0.01

¹University Hospital Zurich, Institute of Anesthesiology, Zurich, Switzerland
Full list of author information is available at the end of the article

continuous intravenous infusion of nalbuphin influences our long-term sepsis model, further placebo-controlled studies in awake septic and non-septic rats are ongoing.

Authors' details

¹University Hospital Zurich, Institute of Anesthesiology, Zurich, Switzerland.

²University Hospital Zurich, Division of Surgical Research, Zurich, Switzerland.

³University Hospital Zurich, Institute for Clinical Chemistry, Zurich, Switzerland.

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1. Lilley E: *Shock* 2015, **43**:304.

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