Intensive Care Medicine Experimental
a SpringerOpen Journal

POSTER PRESENTATION Open Access

0592. Metabolic acidosis induced by haemorrhage and hydrochloric acid generates different cardiorespiratory responses

G Sabbatini*, A Dyson, M Singer

From ESICM LIVES 2014
Barcelona, Spain. 27 September - 1 October 2014

Introduction

Metabolic acidosis is classically thought to induce an enhanced ventilatory pattern, irrespective of the underlying aetiology.

Objectives

To induce a similar level of acidaemia in a rat model, by either infusion of an acidic solution or by blood withdrawal, and to assess the physiological responses to these insults.

Methods

Isoflurane-anaesthetised, tracheotomized rats were instrumented with left common carotid arterial and right jugular venous lines for blood sampling/BP monitoring and fluid/blood administration, respectively. Oxylite^{TM} probes

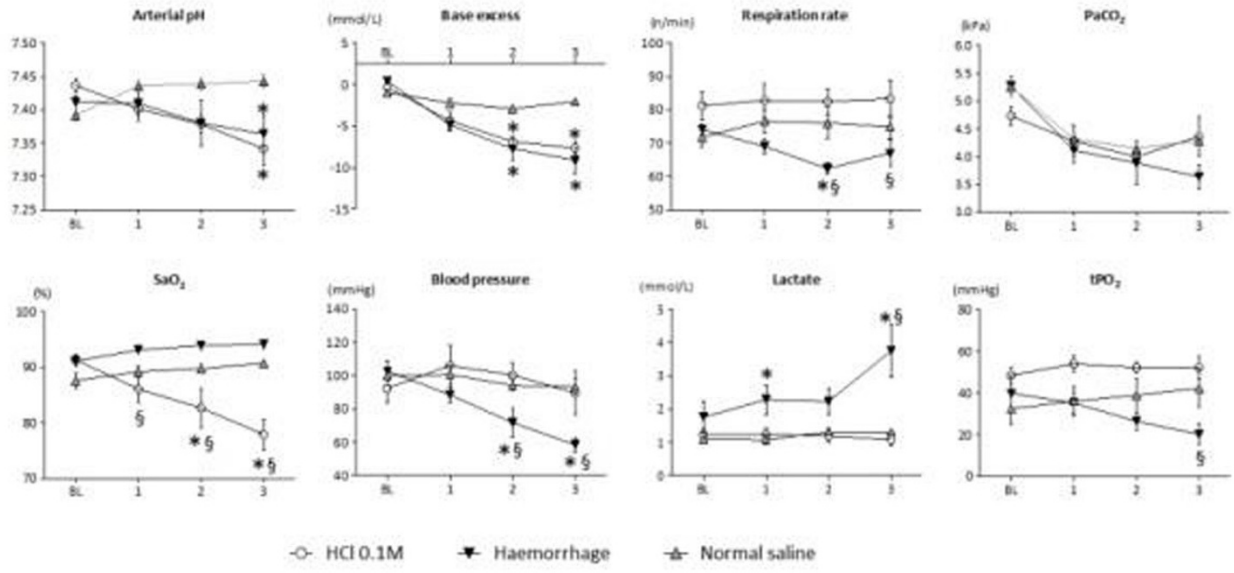

Figure 1 Results. BL= baseline, SaO_2= arterial oxygen saturation. Data shown as mean (SEM). Hydrochloric acid (HCl) n=6, Haemorrhage n=8, Controls n=10/group, *p< 0.05 comparing treated to controls, §p< 0.05 comparing haemorrhage to HCl. Statistics: repeated measures two-way ANOVA and Bonferroni's test for multiple comparisons.

University College London, Bloomsbury Institute of Intensive Care Medicine, London, United Kingdom

(Oxford Optronix, UK) placed in thigh muscle were used to monitor tissue oxygen tension (tPO_2). Animals were subjected to either continuous 0.1 M hydrochloric acid (HCl) infusion or 60% withdrawal of estimated blood volume in six 10% steps over three hours to induce an equivalent fall in arterial base excess (BE). All animals (including a control group) received n-saline throughout. Hourly measurements were made of haemodynamics, tPO_2 and arterial blood gas analysis.

Results

See figure 1.

HCl induced a metabolic acidosis with arterial hypoxaemia yet a preserved muscle tPO_2, no tachypnoea nor fall in $PaCO_2$. By contrast, haemorrhage to achieve a similar acidaemia, resulted in significant falls in blood pressure and tPO_2, hyperlactataemia, a small rise in SaO_2 and a decrease in respiration rate with a concomitant fall in $PaCO_2$ probably related to higher tidal volumes.

Conclusions

Tissue hypoperfusion (and not just acidaemia per se) is an important component that triggers an enhanced ventilatory drive.

Published: 26 September 2014

doi:10.1186/2197-425X-2-S1-P36
Cite this article as: Sabbatini *et al.*: 0592. Metabolic acidosis induced by haemorrhage and hydrochloric acid generates different cardiorespiratory responses. *Intensive Care Medicine Experimental* 2014 **2**(Suppl 1):P36.