

POSTER PRESENTATION

Open Access

0738. Mortality is associated with early tachycardia and cardiac troponin release in a fluid-resuscitated rat model of sepsis

W Khaliq*, M Singer

From ESICM LIVES 2014

Barcelona, Spain. 27 September - 1 October 2014

Introduction

Tachycardia and high troponin levels prognosticate for poor outcomes in human sepsis [1]. Reducing cardiac stress with beta-blockade has been proposed as an important therapeutic strategy as high catecholamine levels are injurious [2]. We have characterized a 72h fluid-resuscitated rat model of faecal peritonitis where prognostication can be made with high sensitivity and specificity at 6h from heart rate and stroke volume [3].

Objectives

To determine whether non-survival is associated with early changes in troponin release and circulating catecholamine levels.

Methods

Male Wistar rats (325 ± 15 g) underwent insertion of tunneled carotid arterial and jugular venous lines under isoflurane anaesthesia, followed by immediate i.p. injection of $4\mu\text{l/g}$ faecal slurry. Control animals were treated identically but without i.p. injection of slurry. Once awake, attachment to a swivel-tether system allowed

animals to move freely and access food and water *ad libitum*. Fluid resuscitation (50:50 mixture of 5% dextrose/Hartmann's; 10ml/kg/h) was commenced at 2h. At 6h, echocardiography was used to measure heart rate and stroke volume. Animals were observed until 72h to assess survival. In a second experiment septic animals underwent echocardiography at 6h followed by sacrifice and blood and tissue sampling. We here report plasma catecholamine and troponin T levels (measured by ELISA) in predicted survivors and non-survivors, and sham-operated controls.

Results

Septic animals ($n = 16$) had a mortality rate of 56%, with death occurring between 18-36h. A heart rate cut point of 460/min measured at 6h prognosticated 3-day survival with sensitivity of 0.88 and specificity of 0.92. Clinical features of illness at this timepoint were however mild. Table 1 shows significant differences in haemodynamics and troponin levels between predicted survivors and non-survivors. Catecholamine levels, while elevated over non-septic controls, were similar.

Table 1

	Control (n=6)	Predicted survival (n=6)	Predicted non-survival (n=6)
Heart rate (bpm)	390 ± 21	442 ± 17	$488 \pm 18^*$
Stroke volume (mL)	0.40 ± 0.03	0.25 ± 0.02	$0.18 \pm 0.02^*$
Adrenaline (ng/mL)	8.56 ± 0.42	9.44 ± 0.23	10.3 ± 0.18
Noradrenaline (ng/mL)	1.60 ± 0.25	3.21 ± 0.23	2.98 ± 0.27
Troponin (pg/mL)	171 ± 24	168 ± 15	$311 \pm 47^*$

Data shown as median \pm SE; * $p < 0.05$ ANOVA

Bloomsbury Institute of Intensive Care Medicine, University College London, London, UK

Conclusions

An association was seen between eventual non-survival and tachycardia, low stroke volume and myocardial injury (denoted by high troponin) at 6h after induction of sepsis. The impact of modulating cardiac stress on outcome merits further study.

Grant acknowledgment

UK Intensive Care Foundation and NIHR

Published: 26 September 2014

References

1. Ammaan P, et al: *J Am Coll Cardiol* 2003, **41**:2004-9.
2. Morelli A, et al: *JAMA* 2013, **310**:1683-91.
3. Rudiger A, et al: *Clin Sci* 2013, **124**:391-401.

doi:10.1186/2197-425X-2-S1-P60

Cite this article as: Khaliq and Singer: 0738. Mortality is associated with early tachycardia and cardiac troponin release in a fluid-resuscitated rat model of sepsis. *Intensive Care Medicine Experimental* 2014 **2**(Suppl 1):P60.

Submit your manuscript to a SpringerOpen[®] journal and benefit from:

- Convenient online submission
- Rigorous peer review
- Immediate publication on acceptance
- Open access: articles freely available online
- High visibility within the field
- Retaining the copyright to your article

Submit your next manuscript at ► springeropen.com
