

CORRESPONDENCE



# Confirmation of brain death on VA-ECMO should mandate simultaneous distal arterial and post-oxygenator blood gas sampling

Joshua Ihle<sup>1,2,3\*</sup> and Aidan Burrell<sup>1,3,4</sup>

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Dear Editor,

We read with interest the article by Bein et al. [1]. We commend the authors on an excellent summary and would like to highlight an additional important consideration when performing the apnoea test for patients on ECMO.

During peripheral V–A ECMO, blood flows antero-grad from the native heart and lungs to meet retrograde ECMO flow in the aorta at the “mixing point” [2]. This mixing point is often unknown and dynamic, and is a function of the competing relative blood flows. As cardiac function recovers, it may fall in the aortic arch (Fig. 1), and different gas tensions may be measured depending on where in the arterial system blood is sampled. Gas tensions from the native circulation can supply the right cerebral hemisphere, whilst gas tensions from the ECMO circuit can supply the left cerebral hemisphere. These different gas tensions will not be recognised by just sampling blood gases from the right radial artery.

The clinical consequences of this are extremely important in brain death determination. Relying solely on the right radial blood sample may falsely suggest cerebral carbon dioxide ( $\text{CO}_2$ ) > 60 mmHg, whereas  $\text{CO}_2$  levels below 60 mmHg from the ECMO circuit could be supplying the left cerebral hemisphere. The apnoea test becomes invalidated [3].

By sampling the post-oxygenator circuit at the same time as the right radial blood gas, the clinician can have total assurance that entire cerebral  $\text{CO}_2$  levels are above

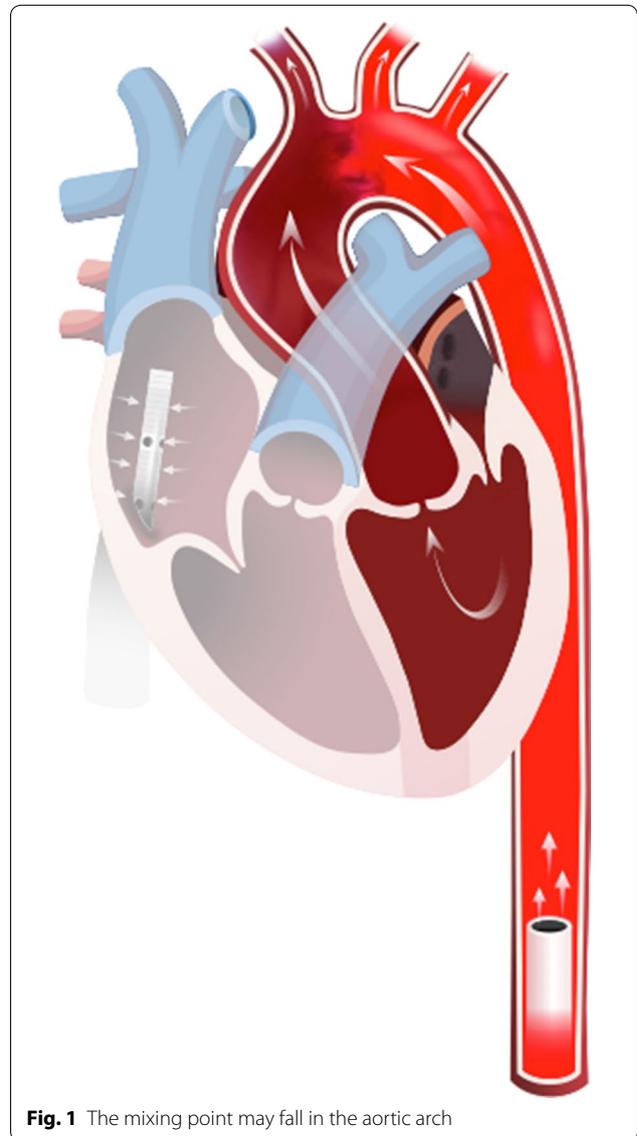


Fig. 1 The mixing point may fall in the aortic arch

\*Correspondence: j.ihle@alfred.org.au

<sup>1</sup> Department of Intensive Care, The Alfred Hospital, Melbourne, Australia  
Full author information is available at the end of the article

the specified threshold to confirm brain death. Checking these two gases simultaneously should be mandated.

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#### Author details

<sup>1</sup> Department of Intensive Care, The Alfred Hospital, Melbourne, Australia. <sup>2</sup> DonatLife, Victoria, Australia. <sup>3</sup> Department of Epidemiology and Preventative Medicine, Monash University, Melbourne, Australia. <sup>4</sup> Department of Epidemiology and Preventative Medicine, Australian and New Zealand Intensive Care Research Centre, Monash University, Melbourne, Australia.

#### Compliance with ethical standards

#### Conflicts of interest

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