



ANZCA  
FPM

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Dear Tim

### **Adrenaline dosing in cardiac arrest associated with LAST in the AA Quick Reference Handbook (QRH)**

This letter is on behalf of the ANZCA Safety and Quality Committee. We have come across the updated recommendations from the AAGBI, and previously ASRA, regarding recommended adrenaline dosing and cardiac arrest associated with Local Anaesthetic Systemic Toxicity (LAST). You may be aware that AAGBI now recommends, as per 3-10.6 of its Quick Reference Handbook: "If circulatory arrest: Use smaller adrenaline dose ( $\leq 1$  mcg/kg instead of 1 mg)."

The ANZCA representatives on the Australian and New Zealand Committee on Resuscitation (ANZCOR) raised concerns about this departure from standard ALS recommendations. Upon review of the limited evidence supporting such a reduced dose, ANZCA agrees with ANZCOR and does not support your recently updated dose recommendation for *cardiac arrest* associated with LAST. The ANZCOR dosing guidelines for adrenaline use in cardiac arrest remain as they are, as described for cardiac arrest in other circumstances (i.e. 1 mg doses for adults).

From our assessment, the AA(GBI) change to the adrenaline dose relates to a review paper published, in January 2021, in the journal, *Anaesthesia, Updates in our understanding of local anaesthetic systemic toxicity: a narrative review* (Macfarlane et al).

The following excerpt explains the rationale for the change:

*In LAST, smaller-than-usual doses of intravenous adrenaline (e.g.  $< 1 \mu\text{kg}^{-1}$ ) should be administered because the standard 1 mg advanced life support dose is arrhythmogenic, impairs pulmonary gas exchange, increases afterload and plasma lactate and can interfere directly with lipid-based resuscitation [46, 47].*

ANZCA's comments regarding the Macfarlane 2021 references [ 46, 47]:

- Reference 46 is: Wang QG, Wu C, Xia Y, et al. Epinephrine deteriorates pulmonary gas exchange in a rat model of bupivacaine-induced cardiotoxicity: a threshold dose of epinephrine. *Regional Anesthesia and Pain Medicine* 2017; 42: 342–50.

Comment: Wang et al did not have adrenaline in arrested patients but in rats with “cardiac depression” (not arrest) and found higher adrenaline increases CO<sub>2</sub> and decreases pH and pO<sub>2</sub>.

- Reference 47 is: Weinberg GL, Di Gregorio G, Ripper R, et al. Resuscitation with lipid versus epinephrine in a rat model of bupivacaine overdose. *Anesthesiology* 2008; 108: 907–13.

Comment: Weinberg et al compared lipid to saline and to adrenaline in asystolic rats after bupivacaine bolus. Unsurprisingly, lipid resuscitation was found to be better than adrenaline or saline, but no evidence was presented that low dose adrenaline in addition to lipids is of any benefit compared to high dose adrenaline.

Thus, unless we have missed other relevant (but uncited) sources, the evidence supporting the AAGBI’s recommended revised change to the adrenaline dose for cardiac arrest in LAST has been derived from only two studies in rats. While non-clinical data is an important first step in research, and although it is conceivable that 50–70 mcg adrenaline is as efficacious / non-efficacious as 1mg, the current evidence available to ANZCOR and ANZCA seems insufficient to recommend the initial lower dose in clinical practice.

It is important that guidelines and practice recommendations are supported by the best possible evidence and are consistent, where possible, across organisations. We would value your further consideration of your recommendations and, of course, be pleased to consider any further evidence that might help support a change in our clinical resuscitation guidelines from what is currently considered best practice.

Sincerely,



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Committee



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CC:

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