Impedance Cardiogram Directed Chest Compression Feedback in a Porcine Model of Paediatric Sudden Cardiac Arrest is Associated with High Levels of End-Tidal Carbon Dioxide, Shock Success and ROSC

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Background and Objective

- Previous research has demonstrated that chest compressions (CCs) applied according to guideline depth feedback produced potentially fatal intrathoracic damage[1].
- There are no CPR feedback enabled automated external defibrillators (AEDs) available for paediatric patients.
- HeartSine SAM 500P currently provides CPR feedback for adult patients using impedance cardiogram (ICG).
- Objective: To assess if CPR feedback from an AED using ICG can guide compressions to achieve high levels of EtCO₂, shock success and return of spontaneous circulation (ROSC) without significant intrathoracic damage in a paediatric model.**

Materials and Methods

- Twelve piglets (10.5–25.0kg Mean: 20.5kg)
- 30 seconds untreated VF.
- CPR applied - 5 x two-minute episodes at 110CPM.
- Targeted “Good Compressions” voice prompt.
- Piglets defibrillated - 150J. Sternal-apical pad placement.
- Surviving animals euthanised after 5 minute rest period and post-mortem conducted.
- ICG: HeartSine SAM 500P, CPR depth: Philips MRx, Physiological parameters: Datex Ohmeda S/5 monitor.

Results

Upon Defibrillation	
Shock success (%)	100.00
ROSC (%)	91.67
After 5-Minute Rest Period	
Median(IQR) EtCO ₂ (mmHg)	45(42,47)
Median(IQR) mean arterial pressure (mmHg)	78(54,79)
Re-fibrillation (%)	8.33

* 1 animal re-fibrillated: provided 150J shock – fail, 200J shock – success and sustained ROSC.

Conclusion

- CPR administered according to **feedback from an AED using ICG provided high levels of EtCO₂, shock success and ROSC** in a porcine model of paediatric sudden cardiac arrest.
- Significant intrathoracic damage was not observed** as seen in previous research using a depth feedback device targeting guideline depth - paediatric guideline CPR depth may be excessive.