Comparison of hemodynamic effect and survival rate between the newly developed automatic CPR(X-CPR) device and LUCAS in a swine model of cardiac arrest

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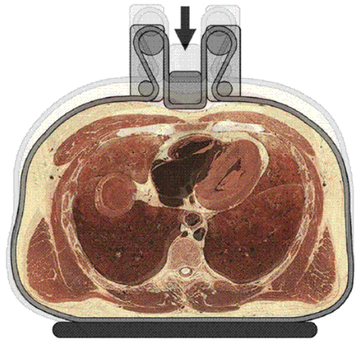
Background

A battery-powered, motor-driven automatic device performing SST-CPR was developed.



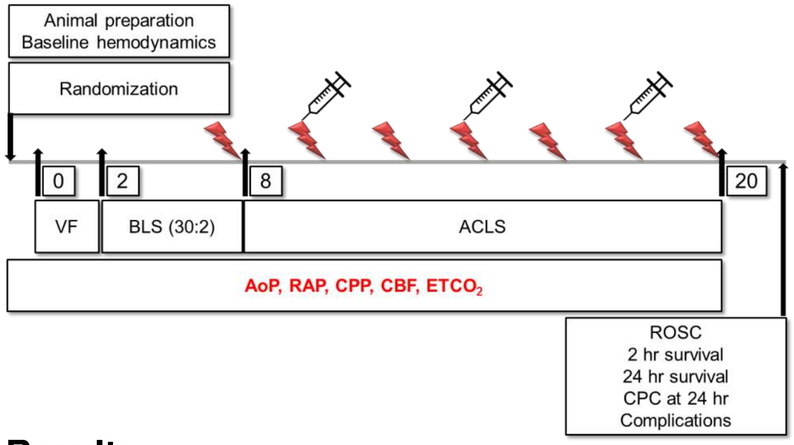
Purpose

To compare hemodynamic effect and resuscitation outcomes between motor-driven simultaneous sterno-thoracic cardiopulmonary resuscitation device (X-CPR2) and Lund University cardiac arrest system (LUCAS)

Animal preparation

- $ETCO_2$ measurement after endotracheal intubation
- Micromanometer catheters in the aorta and the right atrium
- Ultrasonic flow measurement system for cerebral blood flow (CBF)
- A pacing catheter in the right ventricle for inducing ventricular fibrillation

Study design and Experimental protocol



Results

Table 1. Baseline characteristics

	X-CPR 2 (n=13)	LUCAS 2 (n=12)	p-value
Male sex, n (%)	12 (92)	11 (92)	1.000
Weight (kg)	50 (38-52)	40 (39-46)	0.087
Epinephrine (mg)	3 (3-3)	3 (3-3)	1.000
Defibrillation frequency	7 (5-8)	7 (5-7)	0.769

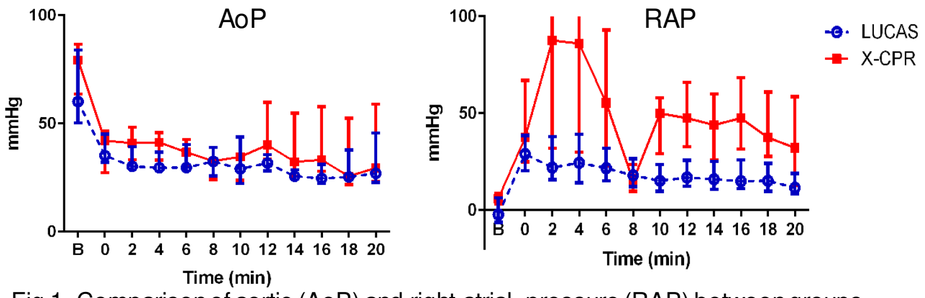


Fig 1. Comparison of aortic (AoP) and right atrial pressure (RAP) between groups

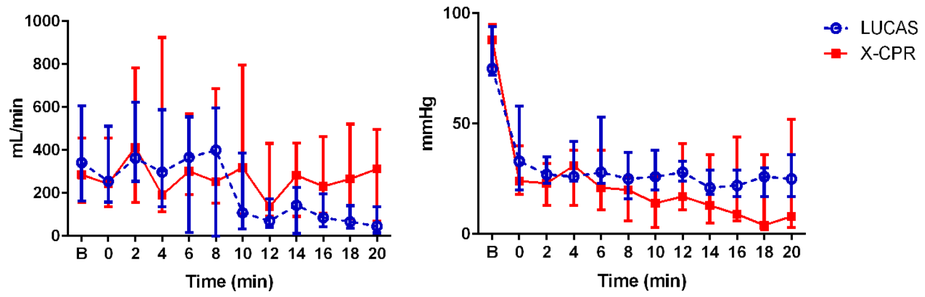


Fig 2. Comparison of CBF and coronary perfusion pressure (CPP) between groups

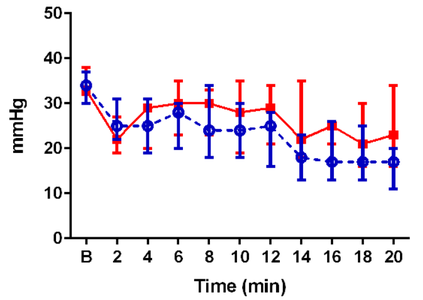


Fig 4. Comparison of end-tidal CO_2 between groups

Table 2. Outcomes and complications

	X-CPR 2 (n=13)	LUCAS 2 (n=12)	p-value
ROSC, n (%)	4 (31)	3 (25)	1.000
2 hours survival, n (%)	4 (31)	3 (25)	1.000
24 hours survival, n (%)	4 (31)	2 (17)	0.645
Good neurologic outcome, n (%)	4 (31)	2 (17)	0.645
Complications			
Rib fracture, n (%)	9 (69)	4 (33)	0.073
Lung contusion, n (%)	11 (85)	12 (100)	0.480
Hemothorax, n (%)	0 (0)	2 (17)	0.220
Hemopericardium, n (%)	1 (8)	0 (0)	1.000
Hemoperitoneum, n (%)	1 (8)	0 (0)	1.000

Conclusion

X-CPR2 has comparable hemodynamic efficacy and resuscitation outcome compared to LUCAS in an animal model of cardiac arrest.