

The Efficacy of Left Ventricular Versus Traditional Chest Compressions During Selective Aortic Arch Perfusion To Treat Traumatic Cardiopulmonary Arrest in a Swine Model (*Sus scrofa*)



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Background

Survival rates from Traumatic Cardiopulmonary Arrest (TCA) are low (0% to 3.7%).

The value of traditional closed chest compressions in TCA are controversial.

Recent studies show:

- Increased survival with Selective Aortic Arch Perfusion (SAAP) catheters
- Increased survival with left ventricular (LV) compressions

Hypothesis:

A combination of SAAP and LV compressions will have an additive effect on ROSC and survival in a model of TCA.

Objectives

Primary Outcomes:

ROSC and Survival to 60 minutes

Secondary Outcomes:

Hemodynamic variables
 Laboratory variables

Methods

24 swine (22-32kg) were randomized to either SAAP + traditional aortic root (AR) compressions or SAAP + LV compressions

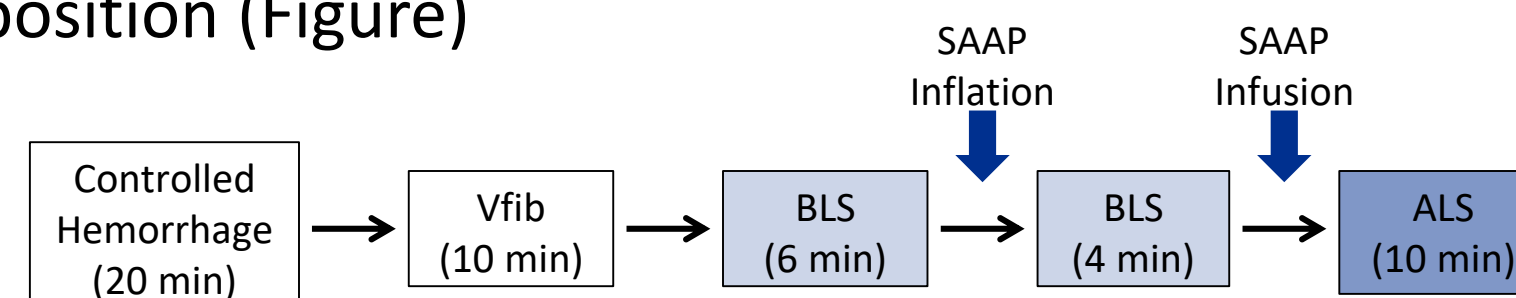
Millar catheters placed in RIJ and aorta

SAAP catheter placed in the descending thoracic aorta (Zone 1)

Each subject was secured in a V-shaped trough

The location of the AR and the middle of LV were marked using TTE (area of maximal compression was later verified with TEE during BLS)

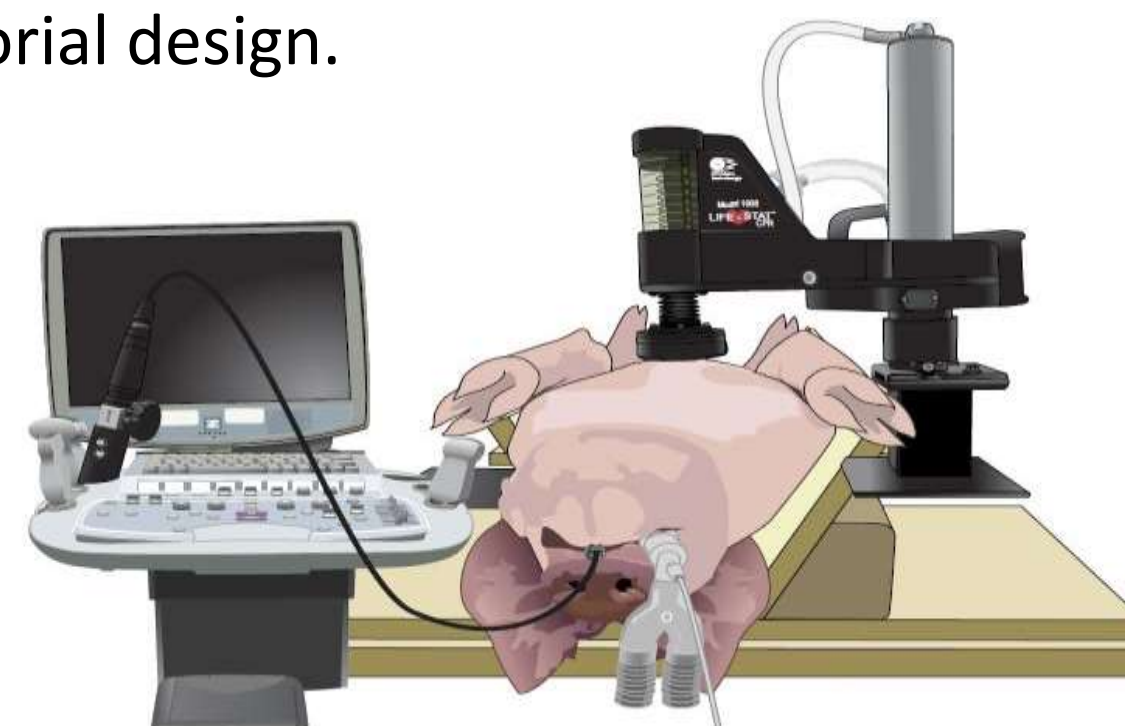
Thumper device was lowered over randomization position (Figure)



Hemodynamic variables were measured over the duration of the experiment

ROSC: regular cardiac rhythm with SBP>60 for 1min

The same model was used for historical controls (n=26). Comparisons with controls were treated as a single study with a factorial design.



Results

ROSC	AR	LV	AR+SAAP	LV+SAAP
n (%)	0 (0)	5 (38)	3 (25)	5 (42)
p-value	-	0.04	0.10	0.02

AR=reference

Survival	AR	LV	AR+SAAP	LV+SAAP
n (%)	0 (0)	5 (38)	2 (17)	4 (33)
p-value	-	0.04	0.22	0.04

AR=reference

There were no differences (p>0.05) in hemodynamic or laboratory values between AR+SAAP and LV+SAAP groups at the end of the BLS and ALS periods.

Conclusions

In our study SAAP did not show a synergistic effect with LV compressions.

SAAP + LV compressions improved both ROSC and survival when compared to traditional compressions alone.

Disclaimer

The views expressed here are those of the authors and do not reflect the official views or policy of the Department of Defense or its Components. The experiments reported herein were conducted according to the principles set forth in the National Institute of Health Publication No. 80-23, Guide for the Care and Use of Laboratory Animals and the Animal Welfare Act of 1966, as amended.