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# Global Oxygenation and Heart Lung Interaction Using “corpuls cpr” in a Real-Life Porcine Model of Cardiopulmonary Resuscitation (CPR).

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## Purpose of the Study

Sufficient oxygen supply of heart and brain critically influences outcome after cardiac arrest. Optimal results depend on the interaction between systemic and pulmonary circulation. Crucial for success are generated blood pressure and macro- and microcirculatory blood flow. Considering this, we investigated the chest compression device “corpuls cpr” (GS Elektromedizinische Geräte G. Stemple GmbH, Kaufering, Germany).

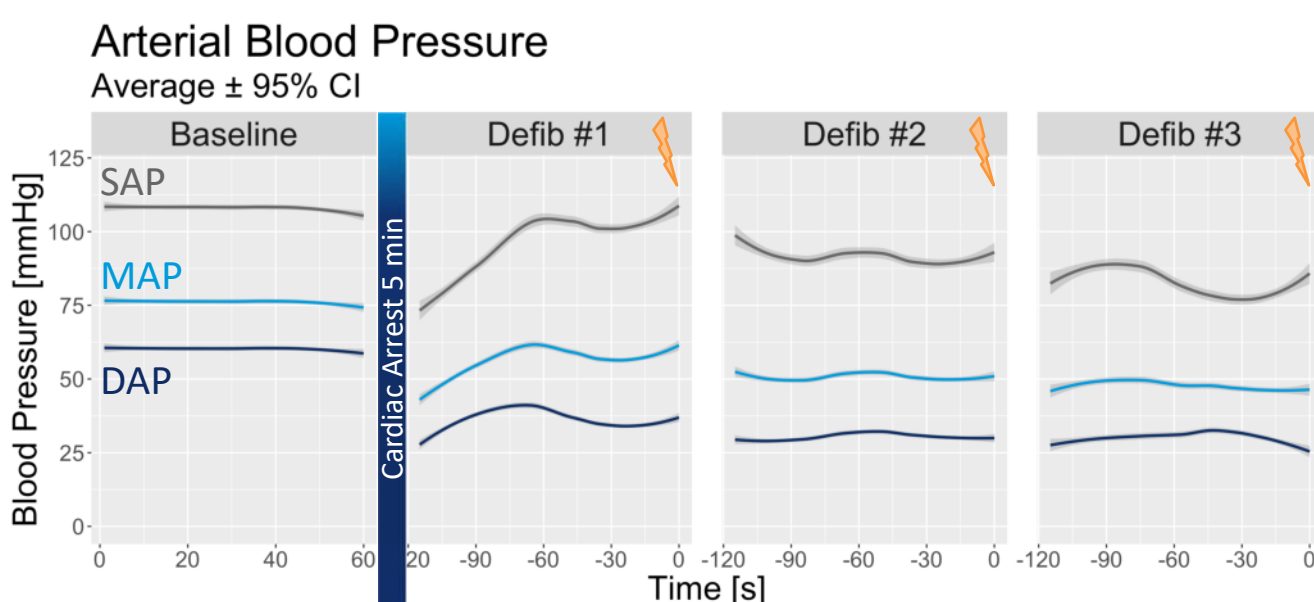
## Materials and Methods

After approval, 52 swine underwent general anaesthesia, baseline measurements and 5 minutes (min) of cardiac arrest. Afterwards, we commenced ventilation and mechanical chest compressions (depth: 6 cm, 100/min, continuous mode) and defibrillated after 2, 4 and 6 minutes CPR. In accordance with current guidelines, we did not use any vasopressor until third defibrillation.

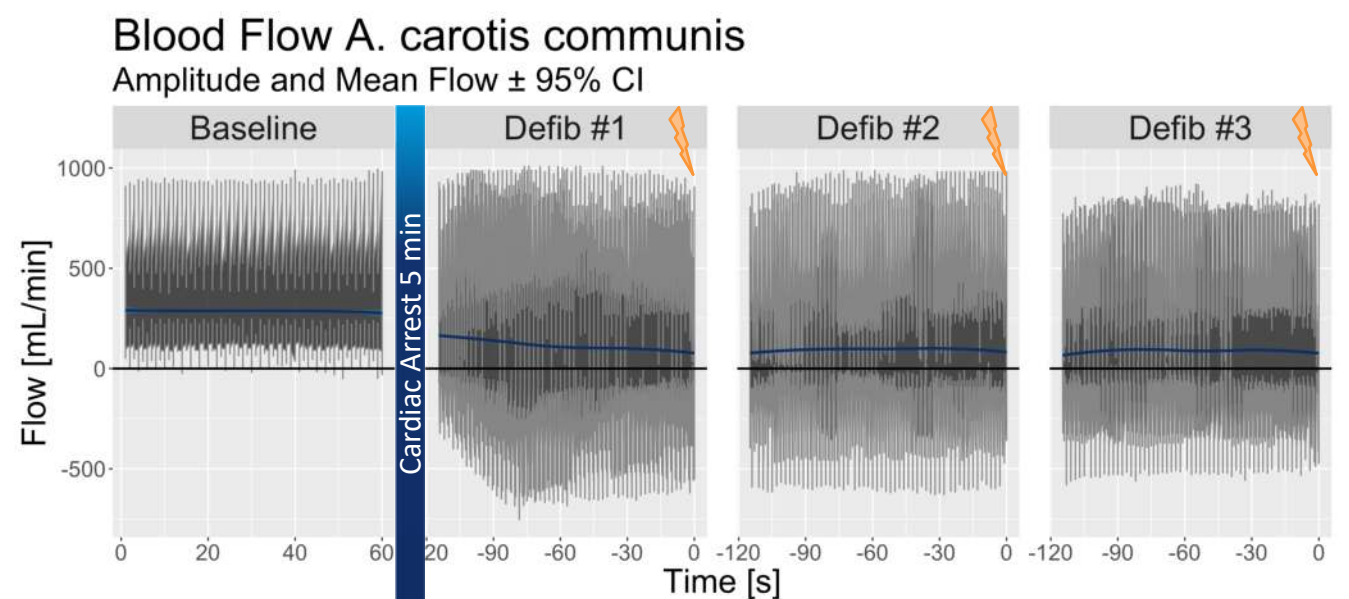
Monitoring data, including both arterial blood pressure (SAP = systolic, MAP = mean, DAP = diastolic) and flow of the left carotid artery (meanCF), are presented for 35 swine (40.2 ± 4.4 kg). Blood gas analyses were performed in these swine after 1, 3 and 5 minutes CPR. Global oxygen supply and demand were evaluated by oxygen extraction and arterial lactate concentration. Ventilation-perfusion mismatch was evaluated by the ratio of arterial to end-tidal CO<sub>2</sub> partial pressure (P<sub>a/et</sub>CO<sub>2</sub>) and the arterial oxygen content (C<sub>a</sub>O<sub>2</sub>).

In the tables we report changes as percentage of baseline.

## Results



SAP	100 %	89 ± 25 %	88 ± 32 %	77 ± 21 %
MAP	100 %	74 ± 21 %	67 ± 16 %	64 ± 18 %
DAP	100 %	61 ± 23 %	51 ± 16 %	53 ± 23 %



meanCF	100%	42 ± 28 %	34 ± 18 %	33 ± 17 %
<b>Blood Gas Analyses</b>				
C <sub>a</sub> O <sub>2</sub>	100%	104 ± 13 %	128 ± 13 %	127 ± 11 %
Lactate	100%	136 ± 26 %	211 ± 62 %	230 ± 73 %
P <sub>(a/et)</sub> CO <sub>2</sub>	100%	144 ± 29 %	153 ± 34 %	146 ± 29 %
<b>Sample Size</b>				
n	35	34	26	21

We achieved ROSC in 13 out of 35 swine. Oxygen extraction increased after one minute CPR to 243 ± 86 % of baseline.

## Conclusions

Using “corpuls cpr” in our porcine model of cardiac arrest and cardiopulmonary resuscitation, we achieved adequate macrohaemodynamics. Ventilation with pure oxygen led to increased arterial oxygen content, that may (partially) compensate ventilation-perfusion mismatch. Yet still, increasing lactate indicates anaerobic glycolysis.

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