CCSV - Overview on Publications | Period of Studies 2023 - 2017

Study Centre / Location	Study Type	Title of study	Summary / Conclusion	Principle investigator / Author	Link to Publication	Published Year
University Hospital Essen, Germany	Animal Study	Influence of aortal occlusion during non-trauma resuscitation on gas exchange in a pig model.	Aortal occlusion during mechanical CPR and Chest Compression Synchronized Ventilation in a pig model improved gas exchange and kept acid-base state in normal range.	Manegold R, et al.	https://doi.org/10.1016/S0300-9572(23)00605-6	2023
MEDICO Cork, Ireland; Cork University Hospital, Ireland	Human Case Report	Fully Automated Cardiopulmonary Resuscitation - a Bridge to ECMO.	This case shows that the system of CCSV and mechanical compression can maintain adequate perfusion and ventilation over several hours. It offers potential for further studies to sustainably improve the care of resuscitation patients.	van der Velde J, et al.	https://doi.org/10.1016/S0300-9572(23)00467-7	2023
University Hospital Mainz, Germany	Animal Study	Analysis of cerebral Interleukin-6 and tumor necrosis factor alpha patterns following different ventilation strategies during cardiac arrest in pigs.	CCSV has a positive impact on cytokine expression levels post-resuscitation compared to IPPV and ultra low tital volume ventilation. By that it may be able to prevent hypoxia-induced neuroinflammation.	Renz M, et al.	https://peerj.com/articles/16062/	2023
Zhejiang University, China	Animal Study	Efficacy of Chest Compression Synchronized ventilation on brain tissue oxygenation in a porcine cardiopulmonary resuscitation model	Blood gas analysis of pigs in both groups at the three time points showed significantly lower lactate levels in the CCSV group than in the IPPV group. Carotid blood flow velocity within 1 to 8 minutes during resuscitation was considerably higher in the CCSV group than in the IPPV group. Cerebral oxygen saturation at all time points after resuscitation was also significantly higher in the CCSV group than in the IPPV group. The neurological score 24 hours after resuscitation was reduced considerably in the CCSV group. Conclusion: Using the CCSV ventilation mode during resuscitation for cardiac arrest in a porcine ventricular fibrillation model significantly improves cerebral hypoxia during and after resuscitation.	Jiefeng XU, et al.	https://www.frontiersin.org/articles/10.3389/fmed.2022.1057000/full	2022
University Hospital Essen, Germany; Cologne Fire Departement, Germany	Human Study	Mechanical positive pressure ventilation during resuscitation in out-of-hospital cardiac arrest with chest compression synchronized ventilation (CCSV)	This is the first reported case series of Chest Compression Synchronized Ventilation (CCSV) in OHCA. ROSC on admission to hospital as well as outcomes are promising high (ROSC: 61.8%, 24h survival: 35.3 %, discharged alive: 14.7 %) with a maximum CCSV ventilation time of more than 40 minutes.	Kill C, et al.	https://doi.org/10.1016/j.resuscitation.2019.06.102	2019
Philipps-University of Marburg, Germany	Simulation Study; Mannequin with a realistic lung model	Mechanical ventilation during resuscitation: How manual chest compressions affect a ventilator's function.	When compared to IPPV and BiLevel, CCSV works best with preset values, without exceeding the upper pressure preset during simulated CPR. Quality of CC is not negatively affected by any of the ventilation patterns.	Speer R, et al.	https://pubmed.ncbi.nlm.nih.gov/28983829/	2017

CCSV - Overview on Publications | Period of Studies 2015 - 2012

Study Centre / Location	Study Type	Title of study	Summary / Conclusion	Principle investigator / Author	Link to Publication	Published Year
Philipps-University of Marburg, Germany	Animal Study	Cerebral oxygenation during resuscitation: Influence of the ventilation modes Chest Compression Synchronized Ventilation (CCSV) or Intermitted Positive Pressure Ventilation (IPPV) and of vasopressors on cerebral tissue oxygen saturation	The cerebral tissue oxygen saturation does not reach baseline values during resuscitation even when ventilated with pure oxygen. Chest Compression Synchronized Ventilation (CCSV) improves tissue oxygenation compared to IPPV. Epinephrine and vasopressin raise the cerebral tissue oxgenation slightly above baseline values in both groups.	Kill C, et al.	https://www.resuscitation-journal.com/article/S0300-9572(15)00496-7/fulltext	2015
Philipps-University of Marburg, Germany	Animal Study	Chest compression synchronized ventilation versus intermitted positive pressure ventilation during cardiopulmonary resuscitation in a pig model	In this pig model of cardiac arrest mechanical ventilation with Chest Compression Synchronized Ventilation resulted in improved arterial oxygenation and better maintenance of arterial blood pressure than ventilation with volume controlled non-synchronized Intermitted Positive Pressure Ventilation. Further investigations should be undertaken to evaluate both the safety as the effectiveness of the ventilator mode CCSV on outcome in human cardiac arrest.	Kill C, et al.	https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0127759	2015
Philipps-University of Marburg, Germany	Animal Study	Mechanical ventilation during cardiopulmonary resuscitation with intermittent positive-pressure ventilation, bilevel ventilation, or chest compression synchronized ventilation in a pig model	This study compared mechanical ventilation by an automated transport ventilator using IPPV, BiLevel ventilation, and a novel ventilator mode for resuscitation called CCSV. CCSV improved oxygenation, enables a normal venous pH value, and a significantly higher mean arterial blood pressure compared to IPPV and BiLevel.	Kill C, et al.	https://journals.lww.com/ccmjournal/Abstract/2014/02000/Mechanical_Ventilation_During_Cardiopulmonary.54.aspx	2014
Philipps-University of Marburg, Germany	Animal Study	Resuscitation and mechanical ventilation with Chest Compression Synchronized Ventilation (CCSV) or Intermitted Positive Pressure Ventilation (IPPV): Influence on gas exchange and return of spontaneous circulation in a pig model	Chest Compression Synchronized Ventilation (CCSV) increases oxygenation and avoids hypercarbia during resuscitation in a pig model compared to the recommended standard IPPV.	Dersch W, et al.	http://dx.doi.org/10.1016/j.resuscitation.2012.08.010	2012