

Echocardiographic comparison of cardiopulmonary resuscitation (CPR) using periodic acceleration (pGz) versus chest compression.

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Objective: This investigation compared the effects of conventional cardiopulmonary resuscitation (CPR) using an automated Thumper™ chest compression device to periodic acceleration CPR (pGz-CPR) on early post-resuscitation ventricular function assessed by echocardiography, in an adult pig model of CPR.

Background: Whole body periodic acceleration along the spinal axis (pGz) is a new method of cardiopulmonary resuscitation (CPR). Biomechanical forces and biochemical release produced by pGz impart ventilation and increase blood flow. Our laboratory has reported normal neurological and cardiovascular function 48h after return of spontaneous circulation in animals that have undergone 22min of pGz-CPR.

Methods: Ventricular fibrillation (VF) was induced in 16 animals (25-35kg). After 3min of non-interventional period, the animals were randomized to receive either pGz-CPR or Thumper-CPR for 15min. After 18min of VF, a single dose of vasopressin and bicarbonate were administered and defibrillation attempted. An echocardiogram was performed at baseline and serially for 6h. Ejection fraction (EF), fractional shortening (FS) and wall motion were assessed by 2D and M-mode echocardiography.

Results: Return of spontaneous circulation to 360min occurred in 5/8 (62%) of the animals receiving Thumper-CPR and in 7/8 (88%) receiving pGz-CPR. FS and EF were impaired after CPR, but pGz-CPR animals had less impairment than Thumper-CPR animals. Further, wall motion score index (WMSI) was more impaired after Thumper-CPR and remained as such even 6h post-CPR. Conclusion: pGz holds promise as a new method for CPR with better left ventricular (LV) function post-CPR than the more traditional chest compression method.