

CIRC Trial: Manual vs. integrated automatic load-distributing band CPR in out-of-hospital cardiac arrest. | Prehospital Research Support Site

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Summary

- **Randomised, unblinded, multi-centre controlled trial**
- **4753 OHCA patients enrolled**, age and gender profile similar in both groups
 - **2394 received high-quality manual CPR**
 - 32.3% had ROSC on arrival at ED
 - 24-hour survival rate was 25%
 - Survival to hospital discharge rate was 11%
 - **2359 received mechanical CPR using Autopulse** (load-distributing band device)
 - 28.6% had ROSC on arrival at ED
 - 24-hour survival rate was 21.8%
 - Survival to hospital discharge rate was 9.4%
- **Bystander CPR rates were similar** for both groups (47-49%), as were witnessed vs. unwitnessed arrests
- Mechanical CPR group had higher incidence of rib fractures and subcutaneous emphysema
- Manual CPR group had higher incidence of pulmonary oedema and sternal fractures
- CPR fraction at 5 and 10 minutes was higher in the manual CPR group
- Manual CPR group received a higher average rate of compressions/minute in the first 10 minutes than the mechanical group
- **Neurological outcome did not differ between groups**
- Compared to high-quality manual CPR, the use of the Autopulse resulted in **statistically equivalent survival to hospital discharge** (adjusted odds ratio of survival to hospital discharge for mechanical CPR compared to manual CPR, was 1.06 (95% CI 0.83–1.37), meeting the criteria for equivalence)

Limitations

- Blinding was not possible due to intervention type
- Hospital based post resuscitation care varied from site to site
- Post-enrollment exclusions were done for various reasons
- No longer-term outcomes measured except for survival to hospital discharge
- Compression depth as an indicator of compression quality was not monitored
- The trial was funded by ZOLL Medical (the manufacturer of the study device)
- All authors' institutions received funding from ZOLL for their participation in the trial.

- ZOLL developed the CIRC trial protocol

Wik L1, Olsen JA2, Persse D3, Sterz F4, Lozano M5, Brouwer MA6, Westfall M7, Souders CM3, Malzer R8, van Grunsven PM9, Travis DT10, Whitehead A11, Herken UR12, Lerner EB13. [Manual vs. integrated automatic load-distributing band CPR with equal survival after out of hospital cardiac arrest. The randomized CIRC trial.](#)



Resuscitation. 2014 Mar 15. PMID: [24642406](#). To compare integrated automated load distributing band CPR (iA-CPR) with high-quality manual CPR (M-CPR) to determine equivalence, superiority, or inferiority in survival to hospital discharge. [...]



- [http://www.resuscitationjournal.com/article/S0300-9572\(14\)00128-2/fulltext](http://www.resuscitationjournal.com/article/S0300-9572(14)00128-2/fulltext)

Abstract

Objectives

To compare integrated automated load distributing band CPR (iA-CPR) with high-quality manual CPR (M-CPR) to determine equivalence, superiority, or inferiority in survival to hospital discharge.

Methods

Between March 5, 2009 and January 11, 2011 a randomized, unblinded, controlled group sequential trial of adult out-of-hospital cardiac arrests of presumed cardiac origin was conducted at three US and two European sites. After EMS providers initiated manual compressions patients were randomized to receive either iA-CPR or M-CPR. Patient follow-up was until all patients were discharged alive or died. The primary outcome, survival to hospital discharge, was analyzed adjusting for covariates, (age, witnessed arrest, initial cardiac rhythm, enrollment site) and interim analyses. CPR quality and protocol adherence were monitored (CPR fraction) electronically throughout the trial.

Results

Of 4753 randomized patients, 522 (11.0%) met post enrollment exclusion criteria. Therefore, 2099 (49.6%) received iA-CPR and 2132 (50.4%) M-CPR. Sustained ROSC (emergency department admittance), 24hour survival and hospital discharge (unknown for 12 cases) for iA-CPR compared to M-CPR were 600 (28.6%) vs. 689 (32.3%), 456 (21.8%) vs. 532 (25.0%), 196 (9.4%) vs. 233 (11.0%) patients, respectively. The adjusted odds ratio of survival to hospital discharge for iA-CPR compared to M-CPR, was 1.06 (95% CI 0.83-1.37), meeting the criteria for equivalence. The 20minutes CPR fraction was 80.4% for iA-CPR and 80.2% for M-CPR.

Conclusions

Compared to high-quality M-CPR, iA-CPR resulted in statistically equivalent survival to hospital discharge.

References (PubMed)

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Wik L1, Olsen JA2, Persse D3, Sterz F4, Lozano M5, Brouwer MA6, Westfall M7, Souders CM3, Malzer R8, van Grunsven PM9, Travis DT10, Whitehead A11, Herken UR12, Lerner EB13. [Manual vs. integrated automatic load-distributing band CPR with equal survival after out of hospital cardiac arrest. The randomized CIRC trial.](#) Resuscitation. 2014 Mar 15. PMID: [24642406](#).

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