

Paramedic - Evidence Based Medicine (P-EBP) Program

Paramedic CAT (Critically Appraised Topic) Worksheet

Title: Measuring Neurological Outcomes in Mechanical CPR versus Standard CPR

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Clinical Scenario:

You arrive on scene to a 57 year old male in cardiac arrest. You and your partner arrive on scene with the help of a supervisor unit. The supervisor says that he can bring a mechanical CPR device in with you if you want.

PICO (Population – Intervention – Comparison – Outcome) Question:

In the out of hospital cardiac arrest patient would use of a mechanical CPR device in contrast to standard CPR provide better neurological outcomes for patients?

Search Strategy:

(Paramed* or ambulance or EMS or EMT) and ("Out of hospital cardiac arrest" or "ventricular tachycardia" or "ventricular fibrillation" or "cardiac arrest") and ("mechanical CPR" or "mechanical device" or "LUCAS") and (survival or "neurological outcome" or discharge or outcome)

Search Outcome: 34 articles



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Relevant Papers:

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/ WEAKNESSES
Youngquist et al. 2016.	2600 adult patients in OHCA	Observational Cohort Study	Functional Survival (Cerebral performance category 1 or 2)	Unadjusted neurologically survival was 4% among mech-CC and 11% among man-CC (p<0.0001).	Non-randomized study (weakness) There were some unmeasured cofounders(weakness) Large sample size (strength)
Jennings et al, 2012.	286 adult patients in OHCA	Retrospective study using matched case-control design	Survival to hospital and survival to hospital discharge	Survival to hospital with A-CPR was 26% versus 20% with C-CPR. (AOR (95% CI) was 1.69) Survival to discharge with A-CPR was 3% versus 7% of those with C-CPR (AOR = 1.80)	Non-randomized (weakness) Retrospective (weakness) Characteristics of cases and control very similar (strength)
Schmidbauer et al. 2017	24316 adult patients in OHCA	Retrospective analysis	30-day survival	Unadjusted 30-day survival with A-CPR was 6.3% versus 12.8% in M-CPR (AOR 0.72 (95% CI 0.62-0.84) p<0.001)	Large sample size (strength) Possible selection bias (non-randomized) Possible unmeasured cofounders
Perkins, et al. 2014	4471 adult patients in non-traumatic OHCA	Pragmatic, cluster-randomised open-	30-day survival	30-day survival with LUCAS-2 was 6% compared to 7% in	Large sample size Randomised



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		label trial		manual CPR group (AOR 95% CI 0.64-1.15)	
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Comments:

Many studies seem to be retrospective or observational in design. This can contribute to bias or unmatched cofounders between two groups.

Consider:

Studies are not showing better neurological outcomes with mechanical CPR versus manual CPR. The benefit may be in longer transport times such as a rural area if they are going to be doing CPR while on route to the hospital.

Clinical Bottom Line:

I would not recommend a change in practice due to these studies. The cost/benefit ratio, in my opinion, is not worth it, and may actually be harming patients.

References:

- 1) Mechanical chest compression devices are associated with poor neurological survival in a statewide registry: A propensity score analysis. (Youngquist, et al. 2016)
- 2) Use of automated chest compression devices after out-of-hospital cardiac arrest in Sweden. (Schmidbauer, et al. 2017)
- 3) An automated CPR device compared with standard chest compressions for out-of-hospital resuscitation. (Jennings, et al. 2012)
- 4) Mechanical versus manual chest compression for out-of-hospital cardiac arrest (PARAMEDIC): a pragmatic, cluster randomised control trial. (Perkins, et al. 2015)

