

Paramedic - Evidence Based Medicine (P-EBP) Program

Paramedic CAT (Critically Appraised Topic) Worksheet

Title: The efficacy of mechanical compression devices versus standard CPR in the pre-hospital setting

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Clinical Scenario: A 70 year old male patient collapses and suffers a cardiac arrest at his residence. His wife witnesses the event and calls 911. The patient's wife is instructed by the 911 dispatcher to begin CPR. The patient's wife continues CPR until the ambulance crew arrives. Will this patient benefit from a mechanical compression device compared to standard CPR and obtain a Return of Spontaneous Circulation (ROSC)?

PICO Question: (P) In the pre-hospital adult cardiac arrest patient, (I) does the use of mechanical compression device (C) compared to standard CPR (O) lead to an increase in return of spontaneous circulation?

Search Strategy: In PubMed:

(Pre-hospital OR Out-of-hospital OR EMS OR Emergency Medical Service OR Paramedic) AND (adult) AND (Cardiac Arrest) AND (Autopulse OR mechanical compression device (MeSH)) AND (CPR OR Cardio-Pulmonary Resuscitation (MeSH)) AND (ROSC OR Return of Spontaneous Circulation OR survival (MeSH))

Search Outcomes: 38 Articles

Relevant Papers:

Author, Date	Population: Sample Characteristics	Design LOE	Outcomes	Results	Strengths/Weaknesses
ONG, 2006	783 adult pre-hospital cardiac arrest patients. 499	retrospective cohort. Mechanical	ROSC, survival to admission,	34.5% of MCD CPR patients had ROSC compared to 20.2% with standard CPR	Strengths: Large sample, specific to pre-hospital, characteristics of both groups very similar, presenting

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	had standard CPR, 284 had MCD.	compression Device (MCD) introduced to system, these patients compared to previous OOHCA patients who had standard CPR. LOE II	survival to discharge	20.9% of MCD patients survived admission compared to 11.1% with standard CPR 9.7% MCD patients survived to discharge compared to 2.9% with standard CPR	rhythm also noted Weaknesses: retrospective, did not evaluate co morbid patient conditions, did not accurately reflect the time or ease of application of device, did not measure the quality of standard CPR. EMS response time was faster and there were more EMS-witnessed cardiac arrests in the mechanical compression device group.
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Comments: From the results of the study, in the pre-hospital environment, it appears that a mechanical compression device results in an increase in ROSC compared to standard CPR. Of great interest is the increase in the number of patients who survive to discharge in the mechanical compression device group in comparison to standard CPR particularly in patients presenting in Ventricular Fibrillation and Asystole. Although this study is retrospective and non-randomized, it does present convincing evidence that a mechanical compression device, in this case the Autopulse (ZOLL), does increase the possibility of a ROSC in the pre-hospital setting. The study does not reflect the ease of which the device is applied or how cumbersome the device is to carry.

Clinical Bottom Line: A mechanical compression device is a good intervention for paramedics to use and appears to increase the likelihood of ROSC in certain patients in the pre-hospital setting.

References:

Ong, MEH, Ornato, JP, Edwards, DP, Dhindsa, HS, Best, AM, Ines, CS, Hickey, S, Clark, B, Williams, DC, Powell, RG, Overton, JL, Peberdy, MA (2006). Use of an Automated Load-Distributing Band Chest Compression Device for Out-of-Hospital Cardiac Arrest Resuscitation. *JAMA*; 295 (22) 2629-2637.

