

Paramedic CAT (Critically Appraised Topic) Worksheet

Title: *Is machine really better than man; out of hospital use of CPR device in cardiac arrest.*

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Clinical Scenario: You've been dispatched to the residence of a 57 year old male with prior chest pain that has experienced a cardiac arrest, on the way to the call, you wonder if you can provide this patient and every other patient similar to this with a better chance at a hospital discharge with a positive neurological outcome and a full return to work. You wonder if this can be accomplished with a mechanical CPR device that can provide consistent chest compressions. As you show up on scene, your partner snaps you out of this daze and you continue the call with manual CPR with this thought in mind, wondering if there is anyone out there who's had this exact thought... continue with this CAT and you shall find out the result to this question.

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

Does prehospital use of mechanical CPR device in out of hospital cardiac arrest improve ROSC and furthermore hospital discharge and improved neurological outcome.

Search Strategy:

“Out of hospital” OR “Cardiac Arrest” OR “VSA” OR “CPR” OR “Defibrillate” OR “AED” OR “Bystander” OR “Witnessed” OR “Paramedic” OR “Emergency Medical Response”)) AND (“Lucas Device” OR “High quality”)) AND (“Survival” OR “Discharge” OR “Alive” OR “Return to work” OR “Positive neurological outcome”

Search Outcome:

215

Relevant Papers:

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/WEAKNESSES
<i>Newberry ETal 18/Jan/2018</i>	<i>This study encompassed a population over an 18 month period and serviced 2999 patients that met their inclusion criteria.</i>	<i>The type of study performed was a retrospective study. The level of evidence this study produced was a level II</i>	<i>The author was looking to see if implementing mechanical CPR devices provided improved neurological outcome for patients in cardiac arrest.</i>	<i>Of the over all patient population that was enrolled in this study, 763 met the inclusion criteria and had the Lucas device implemented and 2236 met the inclusion criteria but didn't have their out of hospital cardiac arrest in an area that provided the</i>	<i>There are strengths and weaknesses of this study, of which the most notable weakness is the poor distribution of the device as it was only given to 11 of 33 fire departments in the SanAntonio area. With this smaller distribution it</i>

				<p><i>Lucas device to its service. Survival to discharge was 7% with the Lucas device and 9% without the Lucas. 44% had initial ROSC with the Lucas device and 46% without the Lucas.</i></p>	<p><i>meant that much less than half of patients could have had the device used. There was also no way to track how long it took practitioners to place the device which could have been a factor. Being that a large group of patients and the trial happened over 18 months allowed for a significant amount of data to be obtained.</i></p>
Gonzales Et al January 2018	This study observed an area with a population of approximately 1.2 million people. Of this population, 444 patients met the in-depth inclusion criteria.	The type of study is a retrospective study and had a level of evidence of level II	The author was looking for if mechanical CPR devices provided better neurological outcome compared to manual CPR with a 'pit-crew' technique.	Of the 444 patients that met the inclusion criteria, 227 patients received mechanical CPR of which 30 made it to hospital discharge and 25 had positive neurological outcome. 217 received manual CPR and 13 of these patients made it to hospital discharge with 11 having a favourable neurological outcome.	For strengths and weaknesses for this study, I feel a weakness could be the large and in-depth inclusion criteria. Even though this provides for very specific results, I feel more patients could have been included in the study. A strength would be the large population/area in which the study was able to sample
<i>3 is best</i>					

Comments: *See below.*

Consider: *With the overwhelming evidence against the use of the mechanical CPR devices, my initial interest in having them within my EMS system, I don't think I would implement the device, as we as first responders seem to be well trained and highly skilled at the skill of CPR.*

Clinical Bottom Line: *Use of mechanical CPR devices doesn't seem to provide any positive clinical evidence with regards to positive neurological outcome and hospital discharge then that of the procedure of traditional manual CPR. So in closing, I guess the machine isn't better than man after all!*

References:

Ryan Newberry, Ted Redman, Elliot Ross, Rachel Ely, Clayton Saidler, Allyson Arana, David Wampler & David Miramontes (2018) No Benefit in Neurologic Outcomes of Survivors of Out-of-Hospital Cardiac Arrest with Mechanical Compression Device, Prehospital Emergency Care, 22:3, 338-344, DOI: 10.1080/10903127.2017.1394405

Gonzales L, et al, Out-of-hospital cardiac arrest outcomes with

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pit crew

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resuscitation and scripted initiation of mechanical CPR, American Journal of Emergency Medicine (2018), <https://doi.org/10.1016/j.ajem.2018.08.031>

Paramedic – Evidence Based Medicine (P-EBP) Program

P-EBP Program

CAT Worksheet 2015

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