Paramedic – Evidence Based Medicine (P-EBP) Program

Paramedic CAT (Critically Appraised Topic) Worksheet

Title: *Prehospital Point of Care (POC) testing in ischemic chest pain*

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Clinical Scenario: *"You arrive on scene with a patient complaining of chest point of suspected ischemic origin. Patient is experiencing nausea, vomiting, and pain that radiates into their left arm and jaw. Patient has a history of hypertension and high cholesterol. The 12Lead does not show any ST changes. You include POC testing for cardiac markers as part of your work up. You relay this information to the receiving medical staff. The first troponin the patient receives in hospital will be their second and a decision can be made on the patient's direction of care sooner. This could reduce time in hospital, decrease time to definitive care, and save resources by ruling our NSTEMIs earlier."*

PICO (Population – Intervention – Comparison – Outcome) Question:
In prehospital patient's with ischemic chest pain does point of care (POC) testing of cardiac markers improve patient outcomes.

Search Strategy:
((((((("Emergency Medical Services"[mh] OR "Emergency Medical Technicians"[mh] OR paramedic*[tiab] OR "emergency medical technician*"[tiab] OR prehospital[tiab] OR pre- hospital[tiab] OR "out of hospital"[tiab] OR responder*[tiab] OR ambulance[tiab]))) AND (POC OR point of care OR "bedside testing" OR "handheld blood analyzer" OR iSTAT)) AND (troponin OR "cardiac markers")) AND ("chest pain" OR "cardiac")
Search Outcome:
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Relevant Papers:

Ezekowits JA. Providing Rapid Out of Hospital Acute Cardiovascular Treatment 4 (PROACT-4) 2015.
https://www.ncbi.nlm.nih.gov/pubmed/26627881

Alghamdi A. BET 1: Prehospital cardiac troponin testing to 'rule out' acute coronary syndromes using point of care assays. 2018.
https://www.ncbi.nlm.nih.gov/pubmed/30115777

Rasmussen MB. Predictive value of routine point-of-care cardiac troponin T measurement for prehospital diagnosis and risk-stratification in patients with suspected acute myocardial infarction.2017.
https://www.ncbi.nlm.nih.gov/pubmed/29199427

Sardi AR. Point-of-Care Testing of Troponin Levels Compared With Automated Laboratory Evaluation: A Reliability Study. 2016.
https://www.ncbi.nlm.nih.gov/pubmed/27575797

Vafaie M. Addition of copeptin improves diagnostic performance of point-of-care testing (POCT) for cardiac troponin T in early rule-out of myocardial infarction - A pilot study. 2015.
https://www.ncbi.nlm.nih.gov/pubmed/26149334

Ezekowits JA. Providing Rapid Out of Hospital Acute Cardiovascular Treatment 3 (PROACT-3). 2014
https://www.ncbi.nlm.nih.gov/pubmed/25129333

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/ WEAKNESSES
Ezekowits JA. 2015	*601adult patients over 30yrs of age presenting with acute chest pain prehospitally in the EMS system*	*Randomized trial. Level 1*	*Does prehospital point-of-care (POC) troponin further accelerate the time to diagnosis in patients with chest pain (CP)*	*The median time spent from first medical contact to final disposition was 9.1hrs with usual care and 8.8hrs with POC Troponins. P=0.05*	***Weakness*** *Receiving ED physicians were encouraged to use the troponin results obtained by EMS for their care but it was*

| | | | | *Paramedics were on scene for a medium time of 31minutes in the POC arm and 27minutes in the usual care arm (P=<0.001)*

In the troponin arm the 1st Troponin was available in a median time of 38minutes and in the usual care are the first troponin was obtained in a median time of 138minutes. (p=<0.001)

There was no difference in repeat ED visits, hospitalizations, or death in the next 30 days | *not required.*

Strengths
Randomization was a strength but it was not blind leaving room for bias.

The assays used and the device were health Canada approved.

The follow up care was a strong component of this study even though it was not the primary outcome

Really good p values |
| Vafaie M. | 131 patient's with suspected acute coronary syndrome (ACS) | Pilot Study Level 3 | Does the addition of Copeptin to troponin assays in POC increase the sensitivity of ruling out NSTEMIs | **Sensitivity**
hsTnT 85.7% (24/28, CI: 0.728;0.987)

Cobas POCT 67.9% (19/28, CI: 0.506;0.852)

Radiometer POCT 71.4% (20/28, CI: 0.547;0.882)

hsTnT & Copeptin 96.4% | **Weaknesses**
Sample size not big enough

confidence intervals aren't great

No P values

Strengths
Compared multiple |

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| | | | | (27/28. CI: 0.896; 1.033)

Cobas POCT & Copeptin 89.3% (25/28. CI: 0.778;1.007)

Radiometer & Copeptin 85.7% (24/28, CI:0.728;0.987)

Specificity
hsTnT 67.0% (69/103, CI: 0.579;0.761)

Cobas POCT 92.2% (95/103, CI: 0.871;0.974)

Radiometer POCT 82.5% (85/103, CI: 0.752; 0.899)

hsTnT & Copeptin 57.3% (59/103, CI: 0.477;0.668)

Cobas POCT & Copeptin 68.0% (70/103, CI: 0.589;0.770)

Radiometer POCT & Copeptin
(66.0% (68/103 CI: 0.569;0.752) | troponin devices and assays |

				*No P Values provided	

Comments: *Any additional information about your search results.*

Consider: *More studies have to be looked at or conducted to determine which biomarkers to use, cut off of biomarker values, and the most sensitive and specific devices and assays. Further, more research needs to be done on patient outcomes. Also of note if this is found to be beneficial it would be imperative that hospital's also see value in this and use the data collected from the paramedics in order for it to have any impact on patient care.*

Clinical Bottom Line: *Prehospital POC may be beneficial in decreasing time from first medical contact to final disposition but more research needs to be done on which biomarkers should be used, what cut offs we should be using, and what POC devises and assays are the most sensitive and specific.*

References:
Ezekowits JA. et al. "Providing Rapid Out of Hospital Acute Cardiovascular Treatment 4 (PROACT-4)" *J Am Heart Assoc. 4(12).* (2015) Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/26627881.

Vafaie M. et al. "Addition of copeptin improves diagnostic performance of point-of-care testing (POCT) for

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cardiac troponin T in early rule-out of myocardial infarction - A pilot study." *International Journal of Cardiology*. (2015) Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/26149334

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