Paramedic CAT (Critically Appraised Topic) Worksheet

Title: Prehospital I.V. Antibiotics for Sepsis Patients

Report By: *Kerry Peters*

2nd Party Appraiser:

Clinical Scenario:
Paramedics arrive on scene to find a 70 year old male patient with in obvious distress. The patient is diaphoretic, pale, short of breath, tachycardic, and running a fever. Family states patient has been sick for several days with what sounds like a urinary tract infection. Paramedics provide O2 and initiate a large bore I.V. to provide antibiotics as well as fluids. The antibiotics are broad spectrum and the same as what will be provided to the patient upon his arrival to the Emergency Department, which is 35 minutes away. Early initiation of I.V. antibiotic therapy may improve outcome for this patient.

PICO (Population – Intervention – Comparison – Outcome) Question:
In patients with sepsis, does the administration of prehospital I.V. antibiotics improve patient outcome when compared with fluids and oxygen administration alone.

Search Strategy:
("Sepsis" or "infection" or "SIRS")) AND ("Prehospital" or "ems" or "paramed*")) AND ("IV antibiotics" or "antibiotics" or "broad spectrum") AND ("Mortality" or "survival")

Search Outcome:
14 results

Relevant Papers:

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/ WEAKNESSES
Alam et. al. 2017	2698 adult patients with varying severity of sepsis.	prospective randomised controlled open label trial -LOE 1	1* decrease in mortality 2* increase awareness of sepsis in EMS personnel leading to positive patient outcome	Within 28 days 8% of patients in intervention group had died and 8% in the usual care group had died. p= 0.78 Within 90 days 12% of patients in the intervention group had died and 12% in the usual care group had died. p= 0.87	+randomised, similar patient groups +trial overseen by independent body -does not factor in transport times -mixed level of severity
Femling et. al. 2014	485 adult patients with varying severity of sepsis.	prospective review of sepsis and septic shock cases -LOE 2	determine if there is a difference in outcome between patients arriving by EMS and walk-ins	30% of patients arriving by EMS died and 31% of walk-in patients died. Time to antibiotics for patients arriving by EMS was 87 minutes and 120 minutes for walk-ins.	-significant differences between patient groups, patients arriving by EMS were significantly sicker than those walk-ins. - larger sample size needed

| Band et. al. 2011 | 963 adult severe sepsis patients | evaluation of prospectively collected data using control group, observational LOE 2 | 1*patients arriving by EMS would receive expedited ED care thus improving outcome. 2*decreased mortality primary outcome for patients arriving by EMS | Mortality rate for patients arriving by EMS was 26% compared to 14% for non-EMS. [p < 0.001] Transport of critically ill patients to the ED by municipal EMS was not associated with adjusted differences in hospital mortality. | - age, sex, race and serum lactate score differs amongst the two groups -not clear what treatments ambulance crews provided -treatment received in ED differed |

Comments:
-it is unclear if all studies used one ambulance service or multiple services and what their protocols may entail for sepsis recognition and treatment.
-time to I.V. antibiotics and fluids are noted in each study as an important determinant of favorable outcome.
-serum lactate could be an important classification factor for septic patients in future studies.

Consider:
In reference to the initial question, there does not appear to be a significant difference in mortality between those patients who receive either in-hospital or out-of-hospital I.V. antibiotics. It is clear that sepsis that has progressed to shock has a high mortality rate regardless of treatment or time of initiation. The studies themselves could be improved to have tighter perimeters within patient groups as well as what treatments will be provided

by EMS as well as any special training given to the paramedics used in the study (ACP, PCP, special sepsis recognition training, etc.) At this time, to support the use of I.V. antibiotics pre-hospitally for sepsis may add an initial on-scene burden and scene-time to paramedic crews with limited benefit to the patient population. I would suggest further research on the use of serum lactate testing in the prehospital setting as a way of expediting triage and time to ICU. Further studies need to be made on the use of I.V. antibiotics pre-hospitally before I would recommend any change to current protocols.

Clinical Bottom Line:
Although these studies and subsequently compiled data had some interesting results, and in fact raise some useful questions, there is not enough quality evidence to support the use of pre-hospital antibiotics on suspected sepsis patients at this time.

References:
Alam, N. et al. (2017), Prehospital antibiotics in the ambulance for sepsis: a multicentre, open label, randomized trial. The Lancet Respiratory Medicine, Volume 6 , Issue 1 , 40 - 50

Band, R. A., Gaieski, D. F., Hylton, J. H., Shofer, F. S., Goyal, M. and Meisel, Z. F. (2011), Arriving by Emergency Medical Services Improves Time to Treatment Endpoints for Patients With Severe Sepsis or Septic Shock. Academic Emergency Medicine, 18: 934–940.

Femling, J. et al. (2014), EMS Patients and Walk-In Patients Presenting With Severe Sepsis: Differences in Management and Outcome. Southern Medical Journal, Volume 107, Issue 12, 751-756