

Paramedics CAT (Critically Appraised Topic) worksheet

Title: Liberal & Restrictive Fluid Resuscitation in Suspected Septic Shock

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Clinical Scenario:

- You are dispatched code 3 (coding) for 72-year-old male decreased LOC. On scene you find the patient in bed. GCS 3-3-5=11, sinus tach 118, BP 92/45 and RR of 24. Hot to touch with temperature of 38.9C. Patient has a history of Lewy body dementia and has a foley catheter in place. Drainage bag is concentrated, cloudy and full of particulates. Family reports the patient has been more confused the past 24 hours. Now the patient is unable to get out of bed prompting the family to call 911. Urosepsis is suspected.

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

- Adults with suspected sepsis.
- Restrictive fluid administration.
- Liberal fluid administration.
- Impact recovery
- Does volume of fluid administration, a conservative versus liberal approach, in adults with suspected sepsis affect mortality.

Search Strategy:

- The key words and phrases we used to narrow our search of articles to find those that match our PICO question were;

((Sepsis or septic or septicemia or systemic inflammatory response syndrome))
AND ((fluids[tiab] OR volume[tiab] OR balanced crystalloids[tiab] OR normal saline[tiab] OR lactated ringers[tiab])) AND ((conservative OR titrated OR restricted OR liberal OR aggressive))

Search Outcome:

- When applying our search strategy to article search engines like PubMed, we were able to obtain 784 matches on key words or phrases we imputed on 23/09/06.

Relevant Papers

Author, Date	Population Sample Characteristics	Design (LOE)	Outcomes	Results	Strengths/weaknesses
Macdonald study 2018	Adult patients with sepsis and a systolic blood pressure less than 100mmHg	Quantitative prospective randomized control trial	Mortality at 28 days: Mortality at 90 days:	2% (1) in the control group vs 6% (3) in the restrictive group. 6% (3) in the control group vs 8% (4) in the restrictive group.	Strengths: Measures multiple factors Randomized study Patient centered outcomes Weakness: Sample population under set goal Protocol changes with possible bias from clinicians Minimal deviation from standard protocol less than 1L of fluid administered
Shapiro 2023	Adults >=18 with suspected sepsis or confirmed	Quantitative, prospective, randomized, unblinded	Mortality at 90 days in hospital	Restrictive Group: 14% Liberal Group:	Strengths: Randomized pt assignments to each care

	infection with SBP <100mmHg after 1000 ml of IV fluids		Mortality at 90 days at any location	14.9% Restrictive: 21.9% Liberal: 21.6%	plan Well defined population Data allows for further retrospective studies to be conducted. Weaknesses Did not meet the population target for 90% CI. Did not measure vasopressor doses Unblinded

Comments:

- MacDonald study found vasopressor duration shorter in the restricted group compared to the control, whereas Shapiro study found patients required a longer duration of vasopressors in the restricted group in comparison to the control group.
- Higher mortality in Shapiro study but with a larger population group.

Consider:

- Shapiro study had a greater deviation from conservative to liberal fluids, greater than a 2L difference in fluid between the restrict and control groups. Does this allow for more accurate and in depth representation of the effect of lower vs higher fluid volumes in sepsis management and the long term effects.

Clinical Bottom Line:

- No major clinical difference found in mortality between the two studies comparing restrictive and liberal fluid resuscitation combined with the use of vasopressors. In both studies vasopressors were used more often in the restrictive groups. This review has shown there can be two approaches to resuscitation of sepsis patients. Liberal fluid management or a restrictive treatment combined with vasopressors.

References:

- **Macdonald SPJ, Keijzers G, Taylor DM, Kinnear F, Arendts G, Fatovich DM, Bellomo R, McCutcheon D, Fraser JF, Ascencio-Lane JC, Burrows S, Litton E, Harley A, Anstey M, Mukherjee A; REFRESH trial investigators. Restricted fluid resuscitation in suspected sepsis associated hypotension (REFRESH): a pilot randomised controlled trial. *Intensive Care Med.* 2018 Dec;44(12):2070-2078. doi: 10.1007/s00134-018-5433-0. Epub 2018 Oct 31. PMID: 30382308.**

- **National Heart, Lung, and Blood Institute Prevention and Early Treatment of Acute Lung Injury Clinical Trials Network; Shapiro NI, Douglas IS, Brower RG, Brown SM, Exline MC, Ginde AA, Gong MN, Grissom CK, Hayden D, Hough CL, Huang W, Iwashyna TJ, Jones AE, Khan A, Lai P, Liu KD, Miller CD, Oldmixon K, Park PK, Rice TW, Ringwood N, Semler MW, Steingrub JS, Talmor D, Thompson BT, Yealy DM, Self WH. Early Restrictive or Liberal Fluid Management for Sepsis-Induced Hypotension. *N Engl J Med.* 2023 Feb 9;388(6):499-510. doi: 10.1056/NEJMoa2212663. Epub 2023 Jan 21. PMID: 36688507.**