Intravenous literature: Boyd, J.H., Forbes, J., Nakada, T.A., Walley, K.R. and Russell, J.A. (2010) Fluid resuscitation in septic shock: A positive fluid balance and elevated central venous pressure are associated with increased mortality. Critical Care Medicine. 2010 Oct 21.

Abstract:

OBJECTIVE: To determine whether central venous pressure and fluid balance after resuscitation for septic shock are associated with mortality.

DESIGN: We conducted a retrospective review of the use of intravenous fluids during the first 4 days of care.

SETTING: Multicenter randomized controlled trial.

PATIENTS: The Vasopressin in Septic Shock Trial (VASST) study enrolled 778 patients who had septic shock and who were receiving a minimum of 5 Î¼g of norepinephrine per minute.

INTERVENTIONS: None.

MEASUREMENTS AND MAIN RESULTS: Based on net fluid balance, we determined whether one's fluid balance quartile was correlated with 28-day mortality. We also analyzed whether fluid balance was predictive of central venous pressure and furthermore whether a guideline-recommended central venous pressure of 8-12 mm Hg yielded a mortality advantage. At enrollment, which occurred on average 12 hrs after presentation, the average fluid balance was +4.2 L. By day 4, the cumulative average fluid balance was +11 L. After correcting for age and Acute Physiology and Chronic Health Evaluation II score, a more positive fluid balance at both at 12 hrs and day 4 correlated significantly with increased mortality. Central venous pressure was correlated with fluid balance at 12 hrs, whereas on days 1-4, there was no significant correlation. At 12 hrs, patients with central venous pressure <8 mm Hg had the lowest mortality rate followed by those with central venous pressure 8-12 mm Hg. The highest mortality rate was observed in those with central venous pressure >12 mm Hg. Contrary to the overall effect, patients whose central venous pressure was <8 mm Hg had improved survival with a more positive fluid balance.

CONCLUSIONS: A more positive fluid balance both early in resuscitation and cumulatively

over 4 days is associated with an increased risk of mortality in septic shock. Central venous pressure may be used to gauge fluid balance â‰¤12 hrs into septic shock but becomes an unreliable marker of fluid balance thereafter. Optimal survival in the VASST study occurred with a positive fluid balance of approximately 3 L at 12 hrs.

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