Introduction:

Clinical practice guidelines recommend prompt intravenous (IV) fluid resuscitation for pediatric sepsis, including an initial fluid bolus of 20 mL/kg [1]. However, recent evidence is conflicting as to the effectiveness, volume, and consequences of aggressive fluid resuscitation in septic children. Therefore, we sought to determine the epidemiology of early IV fluid resuscitation in an integrated health system, specifically at community hospital emergency departments (ED).

Methods:

We studied a retrospective cohort of pediatric patients (ages > 1 month to < 18 years) with sepsis identified in electronic health record data at 11 community EDs in southwestern Pennsylvania from 2010 to 2014. Sepsis was defined as 1) suspected infection (combination of fluid culture collection and administration of antibiotics and 2) organ dysfunction (pediatric SOFA score ≥ 1) within 24 hours of suspected infection. Fluid bolus therapy was defined as electronic documentation of administration of 0.9% normal saline IV bolus within 1 hour of the time of sepsis onset.

Results:

Among 1,247 patients with pediatric sepsis, 513 (41%) received IV fluid bolus therapy within 1 hour of time of sepsis onset. The volume of fluid administered ranged from 2 mL/kg to 67 mL/kg (Figure, Panel A), corresponding to a median volume of 20 mL/kg (IQR 17-22 mL/kg). Patients who received ≥ 20 mL/kg of fluids (n = 258, 50%) were younger (mean age 5 years, SD 5 vs. 9 years, SD 6; p<0.001), more often had blood cultures collected during evaluation (86% vs. 76%, p=0.003), and were more often transferred to another facility (48% vs. 33%, p<0.001) when compared to patients who received < 20 mL/kg of fluids (n = 255, 50%). Mean fluid bolus volume within 1 hour of time of sepsis onset by hospital ranged from 12 mL/kg to 24 mL/kg (Figure, Panel B).

Conclusion:

In a cohort of community emergency departments, 41% of septic children received intravenous fluid boluses within one hour, and of those, only one half received volumes concordant with guidelines.

Image:

Figure. Overall distribution of fluid bolus volume and mean fluid bolus volume by hospital. A) Frequency of fluid bolus therapy volumes within one hour of sepsis onset. B) Mean fluid bolus therapy volume (SD) within one hour of sepsis onset by hospital.