Pediatric Severe Sepsis Checklist Improves Timeliness of Treatment

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Clinical Significance

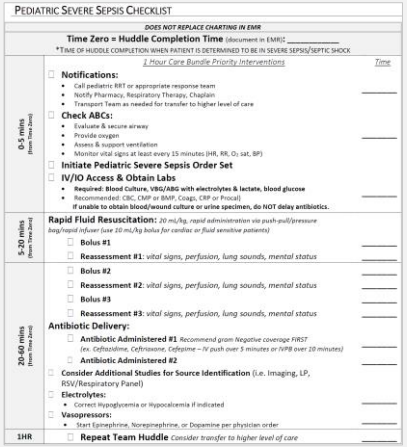
The 2017 American College of Critical Care Medicine recommends a first-hour resuscitation bundle for the treatment of pediatric severe sepsis/septic shock. Priorities of care include:

- Rapid establishment of vascular access
- Initiation of fluid resuscitation within 30 minutes
- Initiation of empiric antimicrobial therapy within 60 minutes of severe sepsis recognition

Protocolized treatment in the Emergency Department (ED) is associated with improved timeliness of care and reduced morbidity related to organ dysfunction.

Purpose

The purpose of this evidence-based practice (EBP) project is to improve timeliness to fluid resuscitation and antibiotics for children presenting to the ED with severe sepsis or septic shock through the implementation of a checklist (Fig. 1).



PEDIATRIC SEVERE SEPSIS CHECKLIST

DOES NOT REPLACE CHARTING IN EMR

Time Zero = Huddle Completion Time (document in EMR): _____

*TIME OF HUDDLE COMPLETION WHEN PATIENT IS DETERMINED TO BE IN SEVERE SEPSIS/SEPTIC SHOCK

	1 Hour Care Bundle Priority Interventions	Time
0-5 mins (from Time Zero)	**Notifications:** Call pediatric RRT or appropriate response team; Notify Pharmacy, Respiratory Therapy, Chaplain; Transport Team as needed for transfer to higher level of care	
	Check ABCs: Evaluate & secure airway; Provide oxygen; Assess & support ventilation; Monitor vital signs at least every 15 minutes (HR, RR, O2 sat, BP)	
	Initiate Pediatric Severe Sepsis Order Set	
	IV/IO Access & Obtain Labs — Required: Blood Culture, VBG/ABG with electrolytes & lactate, blood glucose; Recommended: CBC, CMP or BMP, Coags, CRP or Procal; If unable to obtain blood/wound culture or urine specimen, do NOT delay antibiotics.	
5-20 mins (from Time Zero)	**Rapid Fluid Resuscitation:** *20 mL/kg, rapid administration via push-pull/pressure bag/rapid infuser (use 10 mL/kg bolus for cardiac or fluid sensitive patients)*	
	Bolus #1	
	Reassessment #1: *vital signs, perfusion, lung sounds, mental status*	
20-60 mins (from Time Zero)	**Bolus #2**	
	Reassessment #2: *vital signs, perfusion, lung sounds, mental status*	
	Bolus #3	
	Reassessment #3: *vital signs, perfusion, lung sounds, mental status*	
	Antibiotic Delivery: Antibiotic Administered #1 *Recommend gram Negative coverage FIRST (ex. Ceftazidime, Ceftriaxone, Cefepime – IV push over 5 minutes or IVPB over 10 minutes)*; Antibiotic Administered #2	
	Consider Additional Studies for Source Identification (i.e. Imaging, LP, RSV/Respiratory Panel)	
	Electrolytes: Correct Hypoglycemia or Hypocalcemia if indicated	
	Vasopressors: Start Epinephrine, Norepinephrine, or Dopamine per physician order	
1HR	**Repeat Team Huddle** *Consider transfer to higher level of care*	

Figure 1. Pediatric Severe Sepsis Checklist

Design, Setting, and Sample

- A Plan-Do-Study-Act (PDSA) model was utilized to implement a checklist for the first-hour treatment of pediatric severe sepsis/septic shock
- Setting: Two Pediatric EDs located within adult level I trauma centers in the Chicago-land area:
  - North campus: 12 beds, 21,301 visits (2019)
  - South campus: 26 beds, 39,845 visits (2019)
- Sample: < 18 years, excluding neonates, physician concern for sepsis with subsequent treatment for suspected severe sepsis:
  - Blood culture
  - IV fluid bolus
  - Empiric antimicrobial therapy

Methods

- An interprofessional team created a 1-hour pediatric severe sepsis resuscitation checklist
- The nurse-driven checklist outlines essential treatment elements in the first hour of care for children with severe sepsis
- Prior to implementation, 148 Pediatric ED team members completed a computer-based training (CBT) module highlighting the use of the checklist in the clinical setting (Fig. 2)

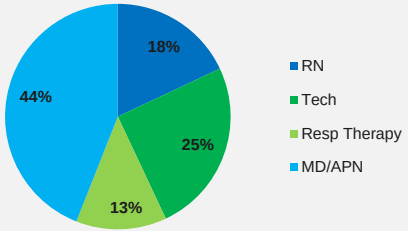


Figure 2. CBT Completion by Discipline

Results

- 72 severe sepsis events were included:
  - 48 pre-implementation
  - 24 post-implementation

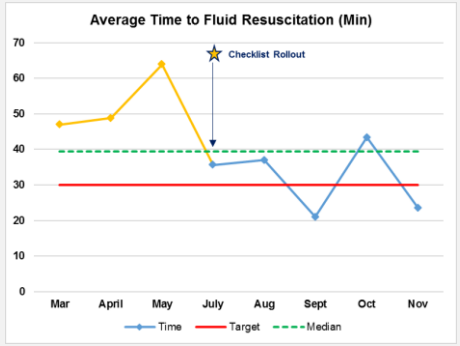


Figure 3.

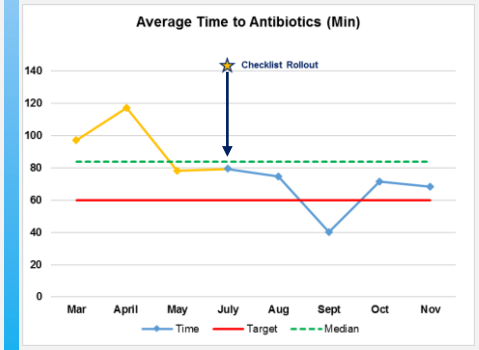


Figure 4.

Results, cont.

- Both time to fluid resuscitation and antibiotics improved, dropping below the pre-checklist median (Fig. 3 & 4)
  - Average time to fluid resuscitation decreased from 52 to 30 minutes
  - Average time to antibiotic delivery decreased from 101 to 60 minutes
- The checklist was used in 54% post-implementation severe sepsis events
- Further improvements noted when the checklist was utilized:
  - Average time to IV fluid = 20 mins
  - Average time to antibiotics = 42 mins
- Order set use increased from 25% to 58%

Conclusions

- Despite less optimal use of the checklist during severe sepsis events, education around new process led to improved process outcomes
- Future process improvement efforts will focus on increasing utilization of checklist

Implications for Practice

The use of a checklist by an interprofessional team can improve timeliness of care when resuscitating a child with severe sepsis or septic shock.

Acknowledgements

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