

# PAEDIATRIC INTENSIVE CARE – CLINICAL PRACTICE GUIDELINE

## SEPSIS

### 1. Introduction:

#### 1. Paediatric Sepsis Consensus Definitions:

- **SIRS** (systemic inflammatory response syndrome) – requires either elevated WCC or abnormal temperature in addition to increasing HR and RR (appropriate for age)
- **Sepsis** = SIRS + suspected or proven infection
- **Severe sepsis** = sepsis + any of 2 (CVS dysfunction, respiratory dysfunction or 2 or more organ dysfunctions)
- **Sepsis Shock** = Sepsis + CVS dysfunction (NO requirement for systemic hypotension to make the diagnosis)

#### 2. Aim

To reduce the mortality of sepsis through:

- Early recognition
- Early antibiotics
- Early aggressive volume resuscitation
- Earlier inotropes
- Supportive critical care

#### 3. Parameters of the Guideline:

The guideline applies to all who present with sepsis and in septic shock. For severely malnourished children, refer to Malnutrition Guidelines.

#### 4. Clinical Presentation:

Septic shock can be recognized, before hypotension occurs, by a clinical triad that includes hypothermia or hyperthermia, altered mental status and peripheral vasodilation (warm shock) or cool extremities (cold shock). Children most commonly present with cold extremities when in shock.

They would present as:

- Inconsolable irritability
- Lack of interaction with parents
- Inability to be aroused
- Prolonged capillary refill >2 secs (cold shock) or flush capillary refill (warm shock)
- Diminished (cold shock) or bounding (warm shock) peripheral pulses, mottled cool extremities
- Decreased urine output of <1ml/kg/hr

## 5. Investigations:

A) Blood:

- Blood cultures (minimal 1 ml) before administering antibiotics,    If sub-acute bacterial endocarditis is suspected take 3 cultures from three different sites.
- Venous blood gas
- Coagulation
- Full blood count
- Group and hold
- Glucose
- Serum electrolytes, urea, creatinine, LFTs and calcium levels

B) Urine:

- Urinalysis, dipstick (don't forget ketones), culture

C) CSF – to be done when stable

D) Radiographic Studies – CXR, U/Scan, CT scan as appropriate

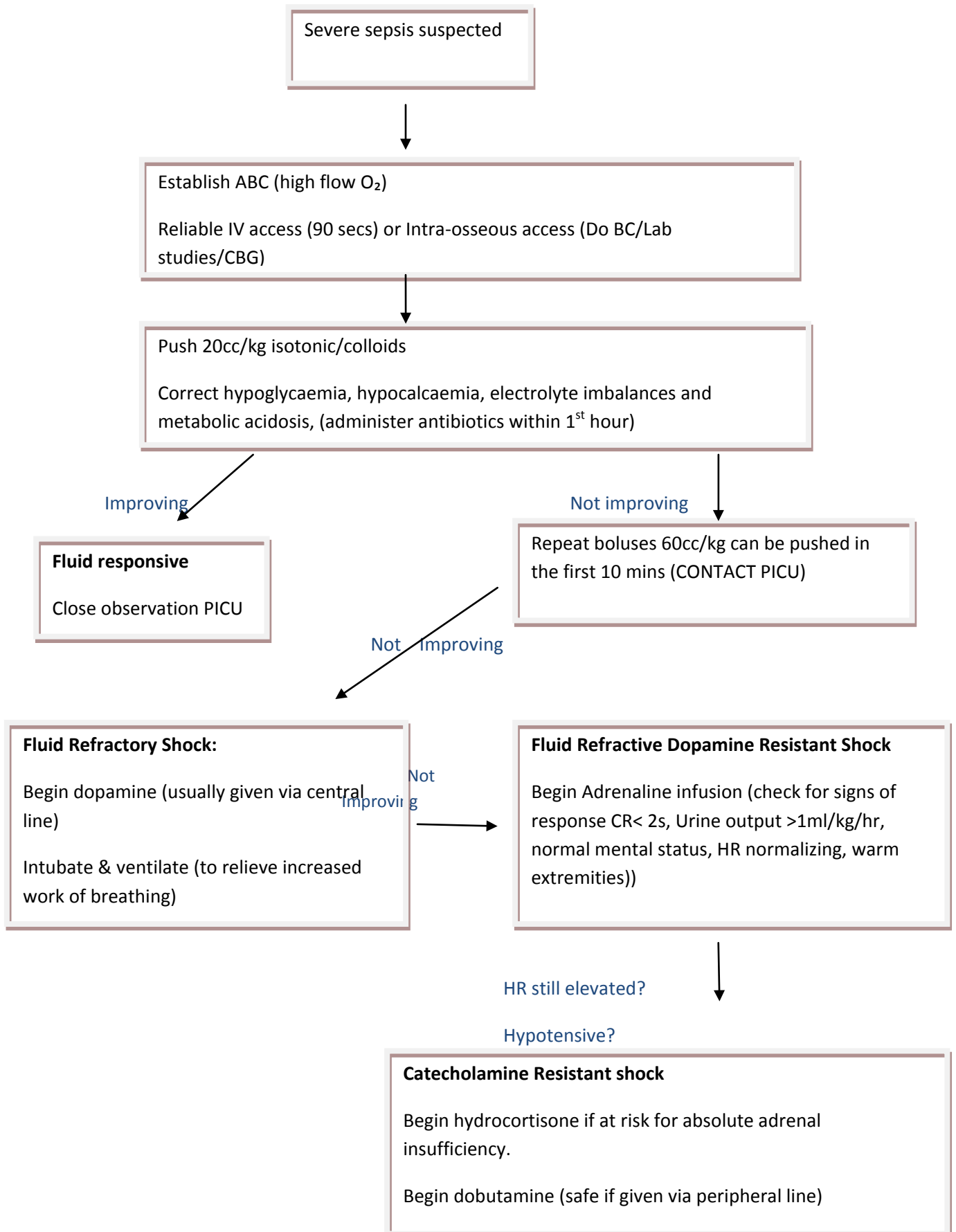
C) Obtain Echocardiography if required

D) Insert central venous line (desirable) for those with fluid-refractory shock)

E) arterial line (desirable)

F) Antibiotics – start within the first hour of recognition of severe sepsis. Use broad spectrum antibiotics e.g ceftiaxone, cloxacillin plus gentamicin ( if indicated) Reassess antibiotics after 48-72 hours on the basis of microbiological and clinical data.

Adapted from Critical Care Medicine 2007-2008 (modified version).



## Cardiovascular Support

1. Dopamine, Noradrenaline recommended as first choice vasopressors agent to correct hypotension in septic shock.
2. Adrenaline should be the first chosen alternative agent in septic shock that is poorly responsive to noradrenaline or dopamine.
3. Dobutamine infusion is administered in the presence of myocardial dysfunction as suggested by elevated cardiac filling pressures and low cardiac output.
- 4.

## Respiratory

Use minimum FiO<sub>2</sub> to maintain SpO<sub>2</sub> >90% (PEEP as needed). Ventilate to keep pH > 7.25 (but minimum pCO<sub>2</sub> 35mmHg, and max PIP 30 if <12 mo or 35 if >12 mo). If pH <7.25 and base deficit >10mmol/L, consider bicarbonate (IV over 1 hour).

⋮

## Nutrition

Use enteral feeding early. TPN as appropriate, ( refer to Nutritional guidelines)

⋮

## Blood/Blood products

- FFP not be used to correct laboratory clotting abnormalities in the absence of bleeding or planned invasive procedures. If needed should be infused not pushed
- In patients with severe sepsis, platelets should be administered when counts are <5,000/mm<sup>2</sup> regardless of apparent bleeding. Platelet transfusion may be considered when counts are 5,000 to 30,000 and there is a significant risk of bleeding. Higher platelet counts (≥50,000) are typically required for surgery or invasive procedures.
- If adequate venous saturation cannot be achieved with fluid resuscitation then transfusion of packed red blood cells to achieve a Hct of ≥30% and/or administration of dobutamine infusion (up to a maximum of 20 mcg/kg/min) be utilized to achieve this goal.

## Stress Ulcer Prophylaxis

- Use ranitidine

During the first 6 hours of resuscitation, the goals of initial resuscitation of sepsis-induced hypoperfusion should include all of the following as one part of a treatment protocol:

- Mean arterial pressure (MAP)  $\geq 65$  mmHg
- Urine output  $\geq 0.5$  ml/kg/hour
- Central venous (superior vena cava) or mixed venous oxygen saturation  $\geq 70\%$  or  $\geq 65\%$ , respectively or Hct  $\geq 30\%$

### References:

1. Surviving Sepsis Campaign guidelines for management of severe sepsis and septic shock; Society of Critical Care Medicine 2004
2. Surviving Sepsis Campaign: International guidelines for management of severe sepsis and septic shock: 2008. Intensive Care Med 2008 Jan; 34(1):17-60. [341 references]
3. Paediatric Intensive Care Guidelines, RCH, Third Edition 2008

Scope and Application	This CPG is intended for use by all health care workers in their daily care of paediatric patients
Effective Date	2010

Supercedes Policy Number	Not applicable
Review Responsibilities	The Chairperson of the Paediatric CSN will initiate the review of this guidelines every 3 years from the date of issue or as required.
Further Information	Paediatric CSN Chairperson
<p><b>RESPONSIBILITY:</b></p> <p><b>CPG Owner:</b> National Paediatric CSN</p> <p><b>CPG Writer:</b> Ministry of Health                      <b>Date:</b> 2010</p>	
<p><b>Endorsed:</b></p> <p><b>National Medicines &amp; Therapeutic Committee, MOH</b></p> <p><b>Date: 23 November 2010</b></p>	
<p><b>Endorsed:</b></p> <p><b>National Health Executive Committee, MOH</b></p> <p><b>Date: 25 November 2010</b></p>	