Systemic Hypotension

Are there signs of shock?

No

Define type of hypotension

Systolic BP < 3rd centile

Diastolic BP < 3rd centile

Systolic < 3rd centile AND Diastolic < 3rd centile

Pathophysiology:

↓ LV stroke output

Pathophysiology:

↓ SVR

Pathophysiology:

± cardiac systolic dysfunction

Possible causes

Therapeutic Approach (mechanism)

PPHN
1. Reduce PVR e.g.INO, milrinone (may have positive inotropy)
2. Improve atrial filling pressure (preload) e.g. fluid bolus, vasopressin (may ↓ PVR)
3. Enhance myocardial systolic performance e.g. dobutamine, epinephrine
4. Consider PGE, infusion if RV dysfunction and PDA closed

Septic (Cold) shock
1. Improve myocardial systolic performance e.g. dobutamine, epinephrine (may ↑ preload)
2. Optimize treatment of sepsis

Cardiogenic shock
1. Check heart rhythm (r/arrhythmia)
2. Improve myocardial systolic performance e.g. dobutamine, epinephrine

Possible causes

Therapeutic Approach (mechanism)

Systemic hypovolemia
1. Optimize filling pressures (preload) - fluid boluses (max 2 of 10mls/kg each) ± colloid
2. Increase SVR once adequate volume given e.g. vasopressin, dopamine

Warm shock
1. Optimize filling pressures (preload) - fluid boluses (max 2 of 10mls/kg each) + increase SVR e.g. dopamine, norepinephrine, vasopressin (may increase atrial filling pressure)

PDA
1. Ductal closure strategies e.g. NSAID, aromatophen, surgery
2. Flow limitation strategies e.g. permissive hypercapnea, ↑ PEEP
3. Enhance LV systolic function e.g. dobutamine

Cause

Physiology

Therapeutic algorithm

A. Progression of severity after an initial period of low systolic BP

PPHN
LV dysfunction &/or Loss of vascular tone
1. Improve atrial filling pressure (preload) e.g. fluid bolus, vasopressin (unless LV dysfunction on TNE)
2. Enhance myocardial systolic performance e.g. dobutamine, epinephrine

Cardiogenic shock
Worsening LV function (? impending arrest)
Enhance myocardial systolic performance e.g. dobutamine, epinephrine

B. Progression of severity after an initial period of low diastolic BP

Hypovolemia or warm shock
Myocardium unable to compensate or progression to cardiac dysfunction
1. Optimize filling pressures (preload) – fluid boluses (max 2 of 10mls/kg each)
2. Increase SVR e.g. dopamine, norepinephrine, vasopressin (if no LV dysfunction)

PDA
Large volume shunt + myocardium unable to compensate
1. Flow limitation strategies e.g. permissive hypercapnea, ↑ PEEP
2. Enhance LV systolic function e.g. dobutamine, dopamine (if critical DAP)

C. Both systolic & diastolic low at presentation (profound hypotension)

Manage as severe warm shock with LV dysfunction if no echo available
(see above + early corticosteroids)

Signs of shock

• Prolonged CRT (>3-4 seconds)
• Poor peripheral pulses
• Arterial lactate > 2
• Significant metabolic acidosis (base deficit > 8)
• Oliguria/anuria

On behalf of Targeted Neonatal Echocardiography and Neonatal Hemodynamics Program:

Reference:

On Om