

Table 38-1 Rapid Cardiopulmonary Assessment

AIRWAY PATENCY
Able to be maintained independently
Maintainable with positioning, suctioning
Unmaintainable, requires assistance
BREATHING
Rate
Mechanics
<ul style="list-style-type: none"> • Retractions • Grunting • Use of accessory muscles • Nasal flaring
Air movement
<ul style="list-style-type: none"> • Chest expansion • Breath sounds • Stridor • Wheezing • Paradoxical chest motion
Color
CIRCULATION
Heart rate
Peripheral and central pulses
<ul style="list-style-type: none"> • Present/absent • Volume/strength
Skin perfusion
<ul style="list-style-type: none"> • Capillary refill time • Skin temperature • Color • Mottling
Blood pressure
CENTRAL NERVOUS SYSTEM PERFUSION
Responsiveness (AVPU)
Recognition of parents or caregivers
Pupil size
Posturing

AVPU, Alert, responds to voice, responds to pain, unresponsive.

therapy or further deterioration requiring additional intervention. During the initial rapid assessment, diagnostic evaluation often is limited to pulse oximetry and bedside measurement of glucose levels. The latter is important in any child with altered mental status or at risk for inadequate glycogen stores (infants, malnourished patients). After resuscitation measures, further diagnostic tests and imaging are often necessary.

Diagnostic Tests and Imaging

The choice of appropriate diagnostic tests and imaging is determined by the mechanism of disease and results of evaluation after initial resuscitation. The initial evaluation of major

Table 38-2 Warning Signs and Symptoms Suggesting the Need for Resuscitation*

SYSTEM	SIGNS AND SYMPTOMS
Central nervous system	Lethargy, agitation, delirium, obtundation, confusion
Respiratory	Apnea, grunting, nasal flaring, dyspnea, retracting, tachypnea, poor air movement, stridor, wheezing
Cardiovascular	Arrhythmia, bradycardia, tachycardia, weak pulses, poor capillary refill, hypotension
Skin and mucous membranes	Mottling, pallor, cyanosis, diaphoresis, poor membrane turgor, dry mucous membranes

*Action would seldom be taken if only one or two of these signs and symptoms were present, but the occurrence of several in concert foreshadows grave consequences. Intervention should be directed at the primary disorder.

trauma patients is focused on identifying evidence of hemorrhage and organ and tissue injury. For an acutely ill child with respiratory distress, a chest x-ray is important. Appropriate cultures should be obtained when sepsis is suspected. Children with historical or physical evidence of inadequate intravascular volume should have serum electrolyte levels obtained, including bicarbonate, blood urea nitrogen, and creatinine.

RESUSCITATION

Resuscitation is focused on correcting identified abnormalities of oxygenation and perfusion and preventing further deterioration. **Oxygen supplementation** may improve oxygen saturation but may not completely correct tissue oxygenation. When oxygen supplementation is insufficient or air exchange is inadequate, assisted ventilation must be initiated. Inadequate perfusion is usually best managed initially by providing a fluid bolus. **Isotonic crystalloids** (normal saline, lactated Ringer solution) are the initial fluid of choice. A bolus of 10 to 20 mL/kg should be delivered in monitored conditions. Improvement, but not correction, after an initial bolus should prompt repeated boluses until circulation has been re-established. Because most children with shock have noncardiac causes, fluid administration of this magnitude is well tolerated. If hemorrhage is known or highly suspected, administration of packed red blood cells is appropriate. Monitoring for deteriorating physiologic status during fluid resuscitation (increase in heart rate, decrease in blood pressure) identifies children who may have decreased cardiac function. Fluid resuscitation increases preload, which may worsen pulmonary edema and cardiac function. If deterioration occurs, fluid administration should be interrupted, and resuscitation should be aimed at improving cardiac function.

When respiratory support and fluid resuscitation are insufficient, introduction of **vasoactive substances** is the next step. The choice of which agent to use depends on the type of shock present. Hypovolemic shock (when further volume is contraindicated) and distributive shock benefit from drugs that increase systemic vascular resistance (drugs with α -agonist activity, such as epinephrine or norepinephrine). The treatment of cardiogenic shock is more complex. To improve cardiac output by increasing the heart rate, drugs with positive chronotropy are used (epinephrine, norepinephrine, and dopamine). Afterload reduction, using drugs such as