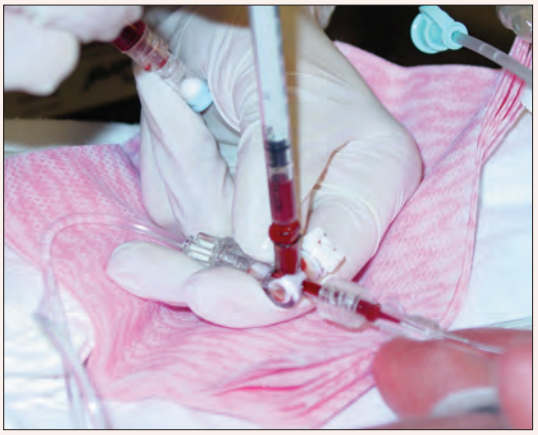
Table 4.2. Laboratory evaluation for shock.[41,43] The following laboratory tests are useful to evaluate shock, and if abnormal, help determine appropriate corrective therapy.

Blood gas



Metabolic acidosis is present if the pH and bicarbonate are low. If the infant is experiencing respiratory insufficiency, then the PCO_2 will also be elevated and the infant will have a mixed respiratory and metabolic acidosis.

- pH < 7.30 is abnormal
- pH < 7.25 is concerning especially if in combination with poor perfusion, tachycardia, and/or low blood pressure
- pH < 7.20 is significantly abnormal
- pH < 7.10 indicates the infant is in severe crisis

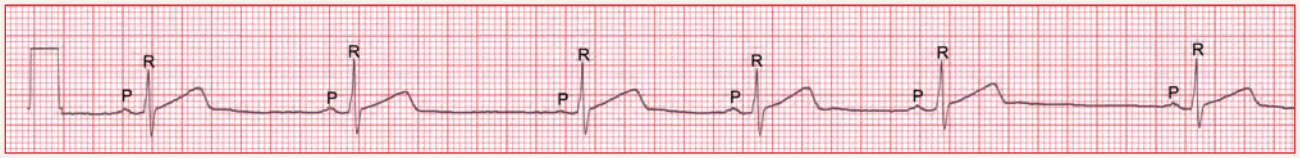
Other labs that are useful in the evaluation of shock

- Blood lactate
  - Increased lactate level signifies anaerobic metabolism is occurring in the tissues
- CBC with differential
  - Evaluate for sepsis, anemia, polycythemia, low platelet count
- Blood culture
  - Evaluate for sepsis
- Coagulation studies (prothrombin time, partial thromboplastin time, fibrinogen, D-dimer)
- Liver function tests
- Glucose
  - In response to stress, the infant may initially be hyperglycemic because of catecholamine release
  - In the presence of shock, glucose utilization may be markedly increased which raises the risk for hypoglycemia
    - Anaerobic metabolism utilizes significantly more glucose than aerobic metabolism to produce adenosine triphosphate (ATP; energy for cell function)
  - Evaluate the blood sugar frequently until a pattern of stability is demonstrated
- Electrolytes (hypo or hypernatremia, hypo or hyperkalemia)
  - If metabolic acidosis present, calculate the anion gap
  - For more information, see: **What's all the Phys about?** What is the Meaning of an Abnormal Anion Gap, low Ionized Calcium and Elevated Cardiac Enzymes

- Ionized calcium
  - Calcium is needed for myocardial contractility
  - If the calcium level is low, other inotropes will be significantly less effective
- Renal function tests (BUN, creatinine)
- Cardiac enzymes to look for myocardial tissue injury
  - B-type Natriuretic Peptide (BNP), Troponin, Creatine phosphokinase-MB (CPK-MB)

Other tests and observations

- Echocardiogram to evaluate cardiac function and to rule out structural congenital heart disease
- Electrocardiogram (ECG) to assess for arrhythmias
- Evaluate urine output for oliguria or anuria
- If concerned about an inborn error of metabolism, many of the tests listed above will be useful (blood gas, serum lactate, coagulation profile and liver function tests, glucose, electrolytes, and renal function tests), but additional metabolic screening tests are also useful (state newborn screen, ammonia level, plasma amino acids, plasma acylcarnitine profile, and urine organic acids)



ECG of sinus bradycardia; the heart rate is 42 beats per minute.