



AMLS

Advanced Medical Life Support

AN ASSESSMENT-BASED APPROACH



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**AMLS Patient
Assessment
Pathway**

**Contiguous
Leads**

**Common
Laboratory
Values**

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Common
Toxidromes**

AMLS Patient Assessment Pathway

INITIAL OBSERVATIONS

Scene/Situation

Safety threats
Situational clues

Patient

Cardinal presentation/Chief complaint
Primary survey

FIRST IMPRESSION

Identify and treat life threats immediately
Sick/Not sick?
Generate initial differential diagnosis

DETAILED ASSESSMENT

History

OPQRST, SAMPLER

Secondary survey

Vital signs, full-body or
focused physical exam

Diagnostics

Glucose, ECG, O₂ saturation,
ETCO₂

REFINE THE DIFFERENTIAL DIAGNOSIS

(BASED ON ASSESSMENT AND CLINICAL REASONING)

Life threatening

Critical

Nonemergent

ONGOING MANAGEMENT

Reassess, further refine the diagnosis,
modify treatment

Patient disposition

Continually
reassess



Contiguous Leads



I Lateral	aVR	V1 Septal	V4 Anterior
II Inferior	aVL Lateral	V2 Septal	V5 Lateral
III Inferior	aVF Inferior	V3 Anterior	V6 Lateral

Common Laboratory Values



Lab Values	Normal Range	SI Units	Causes of Decreased Levels	Causes of Increased Levels
Anion Gap	12 ± 4 mEq/L	12 ± 4 mmol/L	Alkali ingestion Chronic vomiting Chronic gastric suctioning Multiple myeloma	Diabetic ketoacidosis Renal failure GI bicarbonate loss (diarrhea) Sepsis
Bicarbonate (HCO ₃)	21–28 mEq/L Critical: ↑ 40 mEq/L ↓ 15 mEq/L	21–28 mmol/L	Chronic diarrhea Starvation Diabetic ketoacidosis Acute renal failure	Chronic vomiting COPD Mercurial diuretics Chronic gastric suctioning
Blood Glucose *(P-Glucose)	70–110 mg/dL Critical: ↑ 400 mg/dL ↓ 50 mg/dL	3.8–6.1 mmol/L	Adrenal insufficiency Cirrhosis Starvation Insulin overdose	Diabetic mellitus Cushing disease Corticosteroids Renal failure
Blood (or Serum) Urea Nitrogen (BUN)	10–20 mg/dL Critical: ↑ 100 mg/dL	3.6–7.1 mmol/L	Liver failure Overhydration Malnutrition Malabsorption	Dehydration, GI bleed CHF Acute myocardial infarction Sepsis Renal Failure
Chloride (CL ⁻)	98–106 mEq/L Critical: ↑ 115 mEq/L ↓ 80 mEq/L	98–106 mmol/L	Overhydration Respiratory acidosis, metabolic alkalosis CHF Hypokalemia	Dehydration Eclampsia Respiratory acidosis, metabolic alkalosis Kidney disease
Creatinine (Cr)	W: 0.5–1.1 mg/dL M: 0.6–1.2 mg/dL Critical: ↑ 4 mg/dL	W: 45–90 mmol/L M: 60–105 mmol/L	Debilitation ↓ Muscle mass (muscular dystrophy, myasthenia gravis)	Renal failure
Hemoglobin (Hb, Hgb)	12–18 g/dL Critical: ↑ 20 g/dL ↓ 8.0 g/dL	7.4–11.2 mmol/L	Anemia Kidney disease Lymphoma Hemorrhage	CHF COPD High altitudes Severe burns, dehydration
Hematocrit (Hct)	37–52% Critical: ↑ 60% ↓ 15%	0.37–0.52 volume fraction	Anemia Pregnancy Cirrhosis Hemorrhage	COPD Severe dehydration Eclampsia Burns
Magnesium (Mg)	1.3–2.1 mEq/L Critical: ↑ 3 mEq/L ↓ 0.5 mEq/L	0.65–1.05 mmol/L	Malnutrition Malabsorption Alcoholism Hypokalemia	Addison disease Hypothyroidism Antacid ingestion Uncontrolled diabetes Renal failure
pH	7.34–7.45	7.35–7.45	Acidosis: respiratory failure Severe diarrhea Renal failure Ketoacidosis Sepsis	Alkalosis: CHF Pulmonary emboli Carbon dioxide poisoning Chronic vomiting Gastric suctioning Mercurial diuretics

Continued...

Common Laboratory Values (continued)



Lab Values	Normal Range	SI Units	Causes of Decreased Levels	Causes of Increased Levels
Partial Pressure of Carbon Dioxide (PCO ₂)	35–45 mmHg Critical: ↑ 60 mm Hg ↓ 20 mm Hg	4,5–6,1 kPa	Pulmonary emboli Anxiety, pain Pregnancy Hypoxemia	COPD Oversedation Pickwickian syndrome Respiratory failure
Partial Pressure of Oxygen (PO ₂)	80–100 mm Hg Critical: ↓ 40 mm Hg	10,0–13,0 kPa	Acute respiratory distress syndrome Pneumonia Pneumothorax Pulmonary edema Restrictive lung disease COPD	Hyperventilation Increased inspired oxygen
Platelet Count (P)	150,000– 400,000/mm ³ Critical: ↑ 1 million/mm ³ ↓ 50,000/mm ³	*W: 165–390 *M: 145–350	Hemorrhage Thrombocytopenia Disseminated intravascular coagulation Pernicious anemia	Malignant disorder Rheumatoid arthritis Polycythemia Iron deficiency anemia
Potassium (K ⁺)	3.5–5.0 mEq/L Critical: ↑ 6.5 mEq/L ↓ 2.5 mEq/L	3.5–5.0 mmol/L	Infection Cirrhosis Malnutrition, protein loss Overhydration	Dehydration
Sodium (Na ⁺)	135–145 mEq/L Critical: ↑ >160 mEq/L ↓ <120 mEq/L	135–145 mmol/L Critical: ↑ >160 mmol/L ↓ <120 mmol/L	Burns that affect a large area of the body Diarrhea Diuretics Heart failure Kidney diseases Liver cirrhosis Syndrome of inappropriate antidiuretic hormone secretion (SIADH) Sweating Vomiting	Uncontrolled diabetes Underlying polyuria disorders Diuretics Tube feeding Hypertonic infusions Osmotic diuresis Lactulose Mechanical ventilation
Albumin	3.5–5.0 g/dL	35–50 g/L	Infection Cirrhosis Malnutrition, protein loss Overhydration	Dehydration

*Designates International Value/Identification

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; GI = gastrointestinal;

M = man; W = woman.

Data from Pagana KD, Pagana TJ. 2009. *Mosby's Diagnostic and Laboratory Test Reference*. 9th ed. St: Elsevier.

Selected Common Toxidromes



	Findings	Examples of Responsible Agents	Prehospital Treatment Strategies
Sympathomimetic	Tachycardia Hypertension Mydriasis Diaphoresis Agitation Tremor Delirium	Cocaine Amphetamine/methamphetamine Ephedrine Monoamine oxidase inhibitors (MAOIs) Withdrawal (eg, ethyl alcohol, benzodiazepines)	Benzodiazepines IV fluids
Anticholinergic	Tachycardia Mydriasis Agitation Delirium Mumbling speech Dry axillae/membranes	Antihistamines Tricyclic antidepressants GI antispasmodics Over-the-counter sleep aids Some muscle relaxants (eg, Flexeril)	Benzodiazepines IV fluids
Cholinergic	DUMBELS Diarrhea Urination Miosis Bronchorrhea/bradycardia Emesis Lacrimation Salivation/seizures	Organophosphates Carbamates Nicotine Pilocarpine Mestinon (pyridostigmine)	Atropine Airway management
Opioid	CPR Coma Pinpoint pupils Respiratory depression	Heroin Hydromorphone (Dilaudid) Fentanyl Oxycodone Hydrocodone Diphenoxylate/atropine (Lomotil) Tramadol	Supplemental oxygen Naloxone (0.4 mg IV/IM per dose)
Sedative-Hypnotic	Depressed mental status Normal vitals	Benzodiazepines Barbiturates Alcohols Some muscle relaxants (eg, carisoprodol [Soma]) Gamma hydroxybutyrate (GHB)	Elevation of head of bed Nasal or oral airway Supplemental oxygen

GI = gastrointestinal; IM = intramuscular; IV = intravenous.