

# CLINICAL GUIDE TO MEDICAL EMERGENCIES

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# **CLINICAL GUIDE TO MEDICAL EMERGENCIES**

For Medical Students & House Officers

BY

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## Introduction to the Book

Through this book, we aim to provide an in-depth, practical resource that bridges the gap between theoretical knowledge and real-world clinical practice. Each chapter focuses on specific clinical cases that reflect common and challenging scenarios.

### Why Case-Based Learning?

Case-based learning provides context and meaning to emergency medicine knowledge. They help us connect clinical signs with real people. Stories engage the clinician's curiosity and emotional intelligence, promoting a deeper understanding of illness.

This book presents illustrative cases that reflect common and complex emergency conditions. Each chapter includes the following sections:

- **Case Vignette:** A narrative of the patient's presentation.

- **Diagnostic Reasoning:** A structured exploration of the diagnosis, including differential diagnoses and relevant criteria.
- **Clinical Discussion:** A deeper dive into contributing factors, psychosocial context, and the nuances of presentation.
- **Management:** Evidence-based therapeutic interventions, including pharmacologic and psychotherapeutic options.
- **Key Takeaways:** Summary points designed to reinforce essential clinical knowledge.

## Who Is This Book For?

This book is written for:

- Medical students beginning their EM rotations.
- EM residents refining diagnostic and therapeutic strategies.

- Primary care physicians
- Any clinician

## **Chapter 1: Introduction to Medical Emergencies**

Medical emergencies are sudden and often unexpected events that threaten a patient's health or life. These conditions require immediate intervention to prevent death or further harm. Understanding medical emergencies is essential for all healthcare professionals, as they may be the first line of response.

### **Categories of Medical Emergencies:**

- **Cardiac emergencies:** e.g., myocardial infarction, cardiac arrest
- **Respiratory emergencies:** e.g., asthma exacerbation, anaphylaxis
- **Neurological emergencies:** e.g., stroke, seizures
- **Endocrine emergencies:** e.g., diabetic ketoacidosis
- **Trauma-related emergencies:** e.g., fractures, internal bleeding

- **Infectious emergencies:** e.g., sepsis, meningitis
- **Toxicological emergencies:** e.g., overdose, poisoning

### **Goals in Emergency Medicine:**

1. Rapid assessment of patient condition
2. Stabilization of vital functions
3. Diagnosis and treatment of the underlying cause
4. Prevention of complications

### **Approach to Medical Emergencies:**

- Use the **ABCDE approach** (Airway, Breathing, Circulation, Disability, Exposure)
- Maintain clear communication and teamwork
- Employ evidence-based interventions

Medical emergencies involve sudden and unexpected situations requiring immediate

medical attention to preserve life, prevent further harm, and promote recovery. A systematic approach using the ABCDE method ensures prompt diagnosis and intervention.

### **Clinical Case:**

A 54-year-old male collapses in a shopping mall. Bystanders initiate CPR. EMS arrives and uses an AED, restoring spontaneous circulation. Rapid transport and post-arrest care in the ICU leads to full neurological recovery.

## **Chapter 2: Basic Life Support (BLS) Overview**

Basic Life Support (BLS) is a level of care used for victims of life-threatening illnesses or injuries until they can receive full medical care at a hospital. It is the foundation for saving lives in pre-hospital and in-hospital settings.

### **Core Components of BLS:**

- 1. Recognition of cardiac arrest:** Check responsiveness, breathing, and pulse.
- 2. Activation of emergency response system:** Call for help or emergency medical services (EMS).
- 3. Chest compressions:**
  - Rate: 100–120 compressions per minute
  - Depth: At least 2 inches (5 cm) in adults
  - Allow full chest recoil

4. **Airway management:** Open the airway using head-tilt–chin-lift or jaw-thrust techniques.
5. **Rescue breathing:** Provide 2 breaths after every 30 compressions (for single rescuers).
6. **Use of AED (Automated External Defibrillator):**
  - Attach and follow prompts
  - Deliver shock if advised

### **BLS in Different Populations:**

- **Adults:** Standard CPR technique with AED as soon as available
- **Children and Infants:** Use smaller compressions; emphasis on airway and breathing; manual defibrillators preferred

### **When to Stop CPR:**

- Signs of life return
- Another trained rescuer takes over

- The rescuer becomes too exhausted to continue
- Valid Do Not Resuscitate (DNR) order is present

BLS includes high-quality chest compressions, airway management, and use of an AED.

### **Clinical Case:**

A 7-year-old girl is found unresponsive in a pool. A trained lifeguard starts CPR and uses an AED. She regains a pulse before EMS arrives.

## **Chapter 3: Advanced Cardiac Life Support (ACLS)**

Advanced Cardiac Life Support (ACLS) is a set of clinical protocols for the urgent treatment of cardiac arrest, stroke, and other life-threatening cardiovascular emergencies.

### **Key Elements of ACLS:**

#### **1. Airway and Breathing Management:**

- Advanced airways:  
Endotracheal intubation,  
supraglottic airway
- Capnography to confirm tube placement

#### **2. Circulatory Support:**

- High-quality chest compressions
- IV/IO access for drug administration

#### **3. ECG Interpretation:**

- Recognize rhythms: VFib, VTach, Asystole, PEA

4. **Drug Administration:**
  - Epinephrine: 1 mg every 3–5 minutes during CPR
  - Amiodarone: For shock-refractory VF/pVT
5. **Post-Resuscitation Care:**
  - Optimize oxygenation and ventilation
  - Targeted temperature management (TTM)
  - Monitor for neurologic recovery

### **ACLS Algorithms:**

- Cardiac Arrest Algorithm
- Bradycardia and Tachycardia with Pulse Algorithms
- Acute Coronary Syndrome and Stroke Protocols

### **Team Dynamics in ACLS:**

- Clear leadership roles

- Closed-loop communication
- Mutual respect and debriefing after code events

ACLS integrates ECG interpretation, pharmacology, and advanced airway management.

### **Clinical Case:**

A 63-year-old man in the ER experiences ventricular fibrillation. Immediate CPR and defibrillation are performed. Epinephrine and amiodarone are administered, and ROSC is achieved.

## Chapter 4: Airway and Breathing Emergencies

Airway and breathing emergencies pose an immediate threat to life and demand prompt recognition and management. These emergencies can arise from obstructive, restrictive, or impaired respiratory processes. A structured approach using the ABC (Airway, Breathing, Circulation) model is critical for assessing and managing such cases.

### Common Airway Emergencies

#### 1. Upper Airway Obstruction:

- **Causes:** Foreign body aspiration, tongue obstruction, epiglottitis, anaphylaxis
- **Signs:** Stridor, difficulty speaking, cyanosis, drooling
- **Management:**
  - Perform head-tilt–chin-lift or jaw-thrust

- Use suction or Magill forceps if a visible obstruction is present
- Heimlich maneuver for conscious choking adults
- Cricothyrotomy or tracheostomy in severe cases

## 2. **Lower Airway Obstruction:**

- **Causes:** Asthma, bronchiolitis, chronic obstructive pulmonary disease (COPD)
- **Signs:** Wheezing, prolonged expiration, accessory muscle use
- **Management:**
  - Administer bronchodilators (e.g., albuterol)
  - Use corticosteroids for inflammation

- Provide oxygen therapy or mechanical ventilation if required

## **Common Breathing Emergencies**

### **1. Respiratory Distress:**

- Characterized by increased work of breathing and inadequate oxygenation
- **Assessment Tools:** Respiratory rate, pulse oximetry, ABG, lung auscultation

### **2. Respiratory Failure:**

- **Type I (Hypoxemic):** Low oxygen, normal/low CO<sub>2</sub> (e.g., pneumonia, ARDS)
- **Type II (Hypercapnic):** High CO<sub>2</sub> (e.g., COPD exacerbation, drug overdose)
- **Management:**
  - Non-invasive ventilation (CPAP/BiPAP)

- Endotracheal intubation with mechanical ventilation
- Treat underlying cause (e.g., antibiotics for pneumonia)

## Special Airway Considerations

- **Anaphylaxis:**
  - Life-threatening allergic reaction leading to airway compromise
  - **Treatment:** IM epinephrine, antihistamines, corticosteroids, airway protection
- **Trauma-Related Airway Compromise:**
  - Blunt or penetrating neck trauma, facial injuries
  - Immobilize cervical spine, prepare for surgical airway
- **Burns and Inhalation Injury:**

- Thermal burns can cause airway edema
- Early intubation is critical before swelling obstructs airway

## Tools for Airway Management

- **Basic:** Oropharyngeal airway (OPA), nasopharyngeal airway (NPA), bag-valve mask (BVM)
- **Advanced:** Endotracheal tube (ETT), laryngeal mask airway (LMA), video laryngoscopy
- **Confirm Placement:** Capnography, bilateral breath sounds, chest rise

## Clinical Case:

A 56-year-old male presents with shortness of breath, audible wheezing, and accessory muscle use. He has a history of asthma. He is tachypneic with an SpO<sub>2</sub> of 88%.

- **Initial actions:** Administer high-flow oxygen and nebulized bronchodilators
- **Further management:** IV corticosteroids, consider magnesium sulfate, prepare for intubation if condition deteriorates

## Key Points

- Early identification of airway compromise saves lives
- Always prepare for escalation from basic to advanced airway techniques
- Reassess frequently and monitor response to interventions

## Chapter 5: Cardiovascular Emergencies

Cardiovascular emergencies are critical events involving the heart and blood vessels that require immediate intervention to prevent significant morbidity or mortality. These emergencies are among the leading causes of death worldwide and often present with overlapping signs and symptoms.

### Common Cardiovascular Emergencies

#### 1. **Acute Coronary Syndrome (ACS):**

- **Includes:** ST-elevation myocardial infarction (STEMI), non-ST elevation MI (NSTEMI), and unstable angina
- **Signs and Symptoms:** Chest pain or pressure radiating to the jaw or arm, diaphoresis, dyspnea, nausea
- **Diagnosis:** ECG changes (ST elevation/depression, T-wave

inversion), cardiac biomarkers (troponins)

- **Management:**
  - MONA protocol: Morphine, Oxygen, Nitroglycerin, Aspirin
  - Antiplatelet agents (e.g., clopidogrel)
  - Beta-blockers, statins
  - Percutaneous coronary intervention (PCI) or thrombolysis

## 2. Congestive Heart Failure (CHF):

- **Signs and Symptoms:**  
Dyspnea on exertion, orthopnea, peripheral edema, pulmonary crackles
- **Types:** Left-sided, right-sided, or biventricular failure
- **Management:**
  - Diuretics (e.g., furosemide)
  - ACE inhibitors/ARBs
  - Beta-blockers

- Oxygen supplementation and non-invasive ventilation if needed

### 3. **Cardiac Arrest:**

- **Causes:** Ventricular fibrillation, asystole, pulseless electrical activity (PEA)
- **Immediate Action:** Initiate high-quality CPR and defibrillation as indicated
- **Advanced Measures:** Epinephrine, antiarrhythmic drugs, airway management

### 4. **Hypertensive Emergencies:**

- **Definition:** Severe elevation in blood pressure with evidence of target organ damage (e.g., encephalopathy, renal failure)
- **Symptoms:** Headache, vision changes, chest pain, altered mental status
- **Treatment:**

- Controlled BP reduction using IV agents (e.g., nitroprusside, labetalol)
- Continuous monitoring of BP and end-organ function

## 5. Cardiac Tamponade:

- **Etiology:** Accumulation of fluid in the pericardial sac restricting cardiac output
- **Beck's Triad:** Hypotension, muffled heart sounds, jugular venous distension
- **Diagnosis:** Echocardiography
- **Management:**  
Pericardiocentesis

## 6. Aortic Dissection:

- **Presentation:** Sudden tearing chest or back pain, unequal blood pressures in limbs
- **Diagnosis:** CT angiography, transesophageal echocardiogram (TEE)
- **Management:**

- Blood pressure control (beta-blockers)
- Surgical intervention (especially for Type A dissections)

## Diagnostic Tools

- **Electrocardiogram (ECG):** Essential for diagnosing MI, arrhythmias
- **Chest X-ray:** To assess heart size, pulmonary edema
- **Echocardiogram:** Evaluates cardiac function, detects tamponade, valve disorders
- **Cardiac Enzymes:** Troponins, CK-MB for myocardial injury
- **BNP (B-type natriuretic peptide):** Useful in CHF diagnosis

## Case Example

A 62-year-old male presents with crushing substernal chest pain radiating to his left arm,

associated with diaphoresis and nausea. His ECG shows ST-segment elevation in leads II, III, and aVF.

- **Immediate actions:** Administer aspirin, nitroglycerin, and oxygen. Prepare for cardiac catheterization.
- **Diagnosis:** Inferior wall myocardial infarction
- **Outcome:** Undergoes PCI with stent placement and is started on dual antiplatelet therapy

## Key Points

- Prompt recognition and treatment of cardiovascular emergencies significantly reduce mortality
- ECG and cardiac biomarkers are frontline diagnostic tools
- Collaborative, protocol-based care improves outcomes

## **Cardiovascular Emergencies**

These include myocardial infarction, hypertensive crisis, and arrhythmias.

### **Clinical Case:**

A 59-year-old female presents with chest pain and diaphoresis. ECG shows STEMI. She receives aspirin, nitroglycerin, and is rushed to cath lab.

## Chapter 6: Neurological Emergencies

Neurological emergencies involve sudden disorders of the brain, spinal cord, or peripheral nerves that pose an immediate threat to life or neurological function. Prompt recognition and early treatment are critical to minimize permanent damage.

### Common Neurological Emergencies

#### 1. Stroke (Cerebrovascular Accident):

- **Types:** Ischemic (blockage) and hemorrhagic (bleeding)
- **Symptoms:** Sudden weakness, facial droop, slurred speech, vision loss, imbalance
- **Assessment Tool:** FAST (Face, Arms, Speech, Time)
- **Diagnosis:** Non-contrast CT scan, MRI
- **Management:**
  - Ischemic: IV thrombolysis with tPA

within 4.5 hours,  
mechanical  
thrombectomy in  
selected cases

- Hemorrhagic: BP control, neurosurgical intervention

## 2. Seizures and Status Epilepticus:

- **Definition:** Continuous seizure activity >5 minutes or recurrent seizures without recovery
- **Causes:** Epilepsy, infections, metabolic disorders, trauma
- **Management:**
  - First-line:  
Benzodiazepines  
(lorazepam, diazepam)
  - Second-line:  
Anticonvulsants  
(phenytoin,  
levetiracetam)
  - Monitor airway and oxygenation

## 3. Meningitis and Encephalitis:

- **Etiology:** Bacterial, viral, fungal infections
  - **Symptoms:** Fever, neck stiffness, photophobia, altered mental status
  - **Diagnosis:** Lumbar puncture, CSF analysis
  - **Treatment:** Empirical antibiotics/antivirals immediately after blood cultures
4. **Traumatic Brain Injury (TBI):**
- **Causes:** Falls, motor vehicle accidents, assaults
  - **Symptoms:** Loss of consciousness, confusion, vomiting, unequal pupils
  - **Management:**
    - Stabilize cervical spine
    - CT imaging
    - Control intracranial pressure (head elevation, mannitol)

- Neurosurgical consultation if hematoma present

## 5. Spinal Cord Compression:

- **Causes:** Trauma, tumor, infection
- **Symptoms:** Back pain, motor weakness, sensory loss, bowel/bladder dysfunction
- **Diagnosis:** MRI spine
- **Management:**
  - High-dose steroids (e.g., dexamethasone)
  - Urgent neurosurgical evaluation

## Diagnostic Tools

- **CT Head:** First-line imaging for suspected stroke or trauma
- **MRI Brain/Spine:** Detailed evaluation of soft tissue and spinal pathology
- **EEG (Electroencephalogram):** For seizure activity

- **Lumbar Puncture:** Identifies infections and subarachnoid hemorrhage

## Case Example

A 70-year-old woman presents with right-sided weakness and slurred speech noticed one hour ago. Her past medical history includes hypertension and atrial fibrillation. A CT scan shows no hemorrhage.

- **Diagnosis:** Acute ischemic stroke
- **Treatment:** IV tPA administered within the therapeutic window
- **Outcome:** Transferred to stroke unit, showed improvement within 24 hours

## Key Points

- Time is critical: "Time is brain" in stroke care
- Early imaging and rapid intervention reduce long-term disability

- Multidisciplinary approach involving neurology, radiology, and emergency medicine

## **Neurological Emergencies**

Includes stroke, seizures, and altered mental status.

### **Clinical Case:**

A 72-year-old woman develops slurred speech and unilateral weakness. A stroke alert is activated, CT shows ischemic stroke, and she receives thrombolysis within the golden hour.

## Chapter 7: Endocrine Emergencies

Endocrine emergencies are life-threatening conditions caused by severe imbalances in hormone production or regulation. These conditions often present with non-specific symptoms, making early diagnosis and treatment essential to prevent serious complications.

### Common Endocrine Emergencies

#### 1. Diabetic Ketoacidosis (DKA):

- **Etiology:** Insulin deficiency, often in type 1 diabetes
- **Symptoms:** Polyuria, polydipsia, abdominal pain, vomiting, fruity breath odor, altered mental status
- **Diagnosis:** Blood glucose >250 mg/dL, pH <7.3, bicarbonate <18 mEq/L, positive ketones
- **Management:**

- Fluid resuscitation with IV normal saline
- IV insulin infusion
- Electrolyte monitoring and replacement, especially potassium
- Identify and treat the underlying cause (e.g., infection)

## 2. **Hyperosmolar Hyperglycemic State (HHS):**

- **Etiology:** Type 2 diabetes, elderly patients, infections, non-compliance with medications
- **Symptoms:** Severe dehydration, altered mental status, extremely high blood glucose (>600 mg/dL), no significant ketosis
- **Management:**
  - Aggressive fluid resuscitation
  - IV insulin

- Electrolyte correction
- Monitor for complications like thrombosis

### 3. **Thyroid Storm:**

- **Etiology:** Exacerbation of hyperthyroidism due to infection, surgery, or trauma
- **Symptoms:** Fever, tachycardia, agitation, delirium, vomiting, diarrhea
- **Diagnosis:** Clinical diagnosis supported by suppressed TSH and elevated T3/T4 levels
- **Management:**
  - Beta-blockers (e.g., propranolol)
  - Antithyroid drugs (e.g., propylthiouracil or methimazole)
  - Iodine solution (administered after antithyroid drug)
  - Corticosteroids

- Supportive care and ICU monitoring

#### 4. **Myxedema Coma:**

- **Etiology:** Severe hypothyroidism, often precipitated by infection, cold exposure, or drugs
- **Symptoms:** Hypothermia, bradycardia, hypotension, altered mental status, hypoventilation
- **Management:**
  - IV levothyroxine and liothyronine
  - Supportive care (warming, respiratory support)
  - Treat precipitating causes

#### 5. **Adrenal Crisis (Addisonian Crisis):**

- **Etiology:** Sudden withdrawal of steroids, stress in adrenal insufficiency

- **Symptoms:** Hypotension, shock, abdominal pain, vomiting, fever, confusion
- **Management:**
  - IV hydrocortisone
  - Aggressive fluid and electrolyte replacement
  - Dextrose for hypoglycemia
  - Identify and treat underlying cause

## **Diagnostic Tools**

- **Serum glucose and Ketones**
- **Arterial blood gases (ABG)**
- **Electrolyte panel**
- **Thyroid function tests (TSH, Free T4, T3)**
- **Cortisol levels and ACTH stimulation test**

## Case Example

A 28-year-old woman with type 1 diabetes presents with vomiting, abdominal pain, and confusion. Vitals show tachycardia and low BP. Labs reveal blood glucose of 540 mg/dL, pH of 7.15, and serum ketones.

- **Diagnosis:** Diabetic ketoacidosis
- **Treatment:** IV fluids, insulin drip, potassium monitoring
- **Outcome:** Stabilized in ICU and discharged after diabetes education

## Key Points

- Always consider endocrine causes in patients with unexplained metabolic derangements
- Hormone replacement and supportive care are the cornerstones of treatment
- Monitor electrolytes and glucose levels closely during therapy

## **Endocrine Emergencies**

Common conditions are diabetic ketoacidosis (DKA), thyroid storm, and adrenal crisis.

### **Clinical Case:**

A 22-year-old male with type 1 diabetes is found confused and vomiting. Labs confirm DKA. He is managed with insulin drip and IV fluids.

## Chapter 8: Gastrointestinal Emergencies

Gastrointestinal (GI) emergencies encompass a wide range of potentially life-threatening disorders involving the digestive tract and associated organs. They require prompt evaluation and management to prevent complications such as hemorrhage, perforation, sepsis, or organ failure.

### Common Gastrointestinal Emergencies

#### 1. Acute Gastrointestinal Bleeding:

- **Upper GI Bleed:** Causes include peptic ulcer disease, esophageal varices, gastritis
- **Lower GI Bleed:** Causes include diverticulosis, angiodysplasia, colorectal cancer
- **Symptoms:** Hematemesis (vomiting blood), melena (black stools), hematochezia

(bright red blood per rectum),  
syncope

- **Diagnosis:** CBC, coagulation profile, endoscopy, colonoscopy
- **Management:**
  - Stabilize with IV fluids and blood transfusions if needed
  - Proton pump inhibitors (PPIs) for ulcers
  - Endoscopic intervention or surgery for ongoing bleeding

## 2. **Bowel Obstruction:**

- **Etiology:** Adhesions, hernias, tumors, volvulus
- **Symptoms:** Abdominal distension, vomiting, constipation, colicky pain
- **Diagnosis:** Abdominal X-ray, CT scan
- **Management:**

- NPO (nothing by mouth), IV fluids, nasogastric decompression
- Surgical intervention if signs of ischemia, strangulation, or perforation

### 3. **Acute Pancreatitis:**

- **Etiology:** Gallstones, alcohol abuse, hypertriglyceridemia
- **Symptoms:** Severe epigastric pain radiating to the back, nausea, vomiting
- **Diagnosis:** Elevated lipase/amylase, CT abdomen
- **Management:**
  - Supportive care: IV fluids, pain control, NPO
  - Monitor for complications: pseudocyst, necrosis,

systemic inflammatory response

#### 4. **Peritonitis:**

- **Etiology:** Perforated ulcer, appendicitis, diverticulitis, peritoneal dialysis infection
- **Symptoms:** Severe abdominal pain with rebound tenderness, guarding, fever
- **Diagnosis:** CBC, imaging (CT scan), peritoneal fluid analysis
- **Management:**
  - Broad-spectrum IV antibiotics
  - Surgical consultation for source control

#### 5. **Esophageal Foreign**

##### **Body/Obstruction:**

- **Etiology:** Food bolus, coins, dentures, caustic ingestion
- **Symptoms:** Dysphagia, drooling, chest discomfort
- **Diagnosis:** X-ray, endoscopy
- **Management:**

- Emergent endoscopic removal if complete obstruction or high-risk item

## Diagnostic Tools

- **Endoscopy and colonoscopy**
- **Abdominal X-rays, Ultrasound and CT scans**
- **Serum amylase/lipase, liver enzymes, bilirubin**

## Case Example

A 58-year-old man presents with vomiting of blood and dizziness. Vitals show hypotension and tachycardia. He has a history of cirrhosis. Labs reveal low hemoglobin.

- **Diagnosis:** Upper GI bleeding due to esophageal varices

- **Treatment:** Resuscitation with IV fluids and blood, IV octreotide, endoscopic band ligation
- **Outcome:** Stabilized and scheduled for elective variceal banding

## Key Points

- Rapid identification and stabilization are critical in GI emergencies
- Maintain a high index of suspicion for perforation and ischemia
- Early surgical and gastroenterology consultation improves outcomes

## Gastrointestinal Emergencies

Includes GI bleeding, pancreatitis, and bowel obstruction.

### Clinical Case:

A 68-year-old with a history of NSAID use presents with melena and hypotension.

## Chapter 9: Renal and Electrolyte Emergencies

Renal and electrolyte emergencies involve acute disturbances in kidney function or critical imbalances in serum electrolytes. These conditions can rapidly become life-threatening and often require urgent intervention in emergency or intensive care settings.

### Common Renal and Electrolyte Emergencies

1. **Acute Kidney Injury (AKI):**
  - **Etiology:** Prerenal (e.g., hypovolemia), intrinsic (e.g., acute tubular necrosis), postrenal (e.g., obstruction)
  - **Symptoms:** Decreased urine output, fluid overload, fatigue, nausea
  - **Diagnosis:** Rising serum creatinine, decreased

glomerular filtration rate (GFR), abnormal urine output

- **Management:**
  - Identify and treat underlying cause
  - Optimize fluid balance (hydration or diuretics)
  - Avoid nephrotoxic drugs
  - Dialysis if necessary (volume overload, severe acidosis, hyperkalemia, uremia)

## 2. Hyperkalemia:

- **Causes:** Renal failure, medications (e.g., ACE inhibitors, potassium-sparing diuretics), hemolysis
- **Symptoms:** Muscle weakness, paresthesia, arrhythmias, cardiac arrest
- **Diagnosis:** Serum potassium >5.0 mmol/L, ECG changes

(peaked T waves, widened QRS)

- **Management:**
  - Calcium gluconate IV to stabilize cardiac membranes
  - Insulin with glucose, beta-agonists to shift potassium intracellularly
  - Sodium polystyrene sulfonate, diuretics, dialysis for elimination

### 3. Hyponatremia:

- **Causes:** SIADH, heart failure, liver cirrhosis, diuretics
- **Symptoms:** Nausea, headache, confusion, seizures, coma
- **Diagnosis:** Serum sodium <135 mmol/L, assess serum osmolality and volume status
- **Management:**
  - Fluid restriction for euvolemic patients

- Hypertonic saline for severe symptomatic cases
- Correct slowly to avoid central pontine myelinolysis

#### 4. **Hypernatremia:**

- **Causes:** Water loss (e.g., diabetes insipidus), salt overload
- **Symptoms:** Lethargy, irritability, seizures, coma
- **Diagnosis:** Serum sodium >145 mmol/L
- **Management:**
  - Correct underlying cause
  - Administer hypotonic fluids slowly to avoid cerebral edema

#### 5. **Metabolic Acidosis:**

- **Etiology:** DKA, lactic acidosis, renal failure, ingestion (e.g., methanol)

- **Symptoms:** Rapid breathing, confusion, hypotension
- **Diagnosis:** Arterial blood gas (low pH and bicarbonate), anion gap
- **Management:**
  - Treat underlying cause
  - Bicarbonate therapy in select cases
  - Dialysis for severe cases

## 6. Hypocalcemia and Hypercalcemia:

- **Hypocalcemia Symptoms:** Muscle cramps, tetany, Chvostek and Trousseau signs
- **Hypercalcemia Symptoms:** Polyuria, abdominal pain, altered mental status
- **Management:**
  - Hypocalcemia: IV calcium gluconate
  - Hypercalcemia: IV hydration,

bisphosphonates,  
calcitonin

## Diagnostic Tools

- **Basic metabolic panel (BMP)**
- **Arterial blood gases (ABG)**
- **Urinalysis and urine electrolytes**
- **ECG** for potassium and calcium abnormalities
- **Imaging (e.g., renal ultrasound)**

## Case Example

A 68-year-old man with known CKD presents with generalized weakness. ECG shows peaked T waves. Labs reveal a serum potassium of 6.8 mmol/L.

- **Diagnosis:** Severe hyperkalemia
- **Treatment:** IV calcium gluconate, insulin with dextrose, furosemide, dialysis

- **Outcome:** Potassium normalized and patient admitted for further nephrology care

## **Key Points**

- Electrolyte imbalances often present subtly but can deteriorate rapidly
- Immediate correction is essential for high-risk abnormalities like hyperkalemia and hyponatremia
- Monitor electrolytes and renal function closely during treatment

## **Renal and Electrolyte Emergencies**

Hyperkalemia, hyponatremia, and acute kidney injury are key issues.

### **Clinical Case:**

A dialysis patient misses a session and presents with ECG showing peaked T-waves. Treated with calcium gluconate, insulin/glucose

## Chapter 10: Hematologic and Oncologic Emergencies

Hematologic and oncologic emergencies involve sudden complications related to blood disorders or cancer. These emergencies can lead to rapid clinical deterioration and require immediate recognition and intervention.

### Common Hematologic Emergencies

#### 1. Disseminated Intravascular Coagulation (DIC):

- **Etiology:** Sepsis, trauma, malignancy, obstetric complications
- **Symptoms:** Bleeding, bruising, hypotension, multi-organ dysfunction
- **Diagnosis:** Prolonged PT, aPTT, low fibrinogen, elevated D-dimer, thrombocytopenia
- **Management:**
  - Treat underlying cause

- Supportive care with transfusions (platelets, FFP, cryoprecipitate)
- Heparin in select chronic DIC cases

## 2. **Thrombotic Thrombocytopenic Purpura (TTP):**

- **Symptoms:** Pentad of thrombocytopenia, hemolytic anemia, neurologic changes, fever, renal dysfunction
- **Diagnosis:** Schistocytes on peripheral smear, low ADAMTS13 activity
- **Management:**
  - Emergent plasma exchange (plasmapheresis)
  - Steroids, rituximab if refractory

## 3. **Sickle Cell Crisis:**

- **Triggers:** Infection, dehydration, hypoxia

- **Symptoms:** Severe pain, fever, respiratory distress, splenic sequestration
- **Management:**
  - Pain control (e.g., opioids)
  - Hydration and oxygen
  - Antibiotics if infection suspected
  - Blood transfusion in severe cases

## Common Oncologic Emergencies

### 1. Tumor Lysis Syndrome (TLS):

- **Etiology:** Rapid cell lysis following chemotherapy for high-grade malignancies
- **Symptoms:** Nausea, vomiting, muscle cramps, seizures, arrhythmias
- **Diagnosis:** Elevated uric acid, potassium, phosphate; low calcium

- **Management:**
  - Aggressive IV hydration
  - Allopurinol or rasburicase
  - Correct electrolyte abnormalities
- 2. **Febrile Neutropenia:**
  - **Etiology:** Chemotherapy-induced neutropenia
  - **Symptoms:** Fever without obvious source
  - **Diagnosis:** ANC  $<500/\mu\text{L}$ , positive cultures may or may not be present
  - **Management:**
    - Empiric broad-spectrum antibiotics within 1 hour (e.g., cefepime, piperacillin-tazobactam)
    - Hospitalization and isolation precautions
- 3. **Spinal Cord Compression (from tumor):**

- **Symptoms:** Back pain, motor weakness, bowel/bladder dysfunction
  - **Diagnosis:** MRI spine
  - **Management:**
    - High-dose steroids (dexamethasone)
    - Urgent radiation or surgical decompression
4. **Superior Vena Cava (SVC) Syndrome:**
- **Etiology:** Compression by tumors (e.g., lung cancer, lymphoma)
  - **Symptoms:** Facial swelling, dyspnea, dilated chest veins
  - **Diagnosis:** Chest CT with contrast
  - **Management:**
    - Elevate head, oxygen
    - Radiation or chemotherapy
    - Stenting in severe cases

## Diagnostic Tools

- **Complete blood count** with **peripheral smear**
- **Coagulation profile (PT, aPTT, INR)**
- **Serum chemistry including uric acid, calcium, phosphate**
- **Bone marrow biopsy**
- **CT/MRI** for tumor-related complications

## Case Example

A 45-year-old man undergoing chemotherapy for lymphoma presents with fever and malaise. His ANC is 400/ $\mu$ L.

- **Diagnosis:** Febrile neutropenia
- **Treatment:** IV cefepime started within 30 minutes of arrival, blood cultures drawn
- **Outcome:** Defervesced within 48 hours and completed antibiotics in hospital

## **Key Points**

- Timely recognition and aggressive management are vital in hematologic and oncologic emergencies
- Rapid treatment of neutropenic fever significantly reduces mortality
- Close collaboration with hematology/oncology specialists is essential

## **Hematologic and Oncologic Emergencies**

Includes neutropenic fever and tumor lysis syndrome.

### **Clinical Case:**

A leukemia patient post-chemo has fever and hypotension. Treated empirically with IV antibiotics and fluids.

## Chapter 11: Infectious Disease Emergencies

Infectious disease emergencies involve severe infections that can rapidly progress to systemic involvement, multi-organ failure, or death. Early identification, timely antibiotic administration, and supportive care are essential for improving outcomes.

### Common Infectious Disease Emergencies

#### 1. Sepsis and Septic Shock:

- **Etiology:** Bacterial, viral, fungal infections (e.g., pneumonia, urinary tract infections, abdominal infections)
- **Symptoms:** Fever or hypothermia, tachycardia, hypotension, confusion, oliguria
- **Diagnosis:** Elevated lactate, abnormal WBC count, positive

blood cultures, SOFA/qSOFA criteria

- **Management:**
  - Early goal-directed therapy
  - Broad-spectrum IV antibiotics within 1 hour
  - IV fluids (30 mL/kg crystalloid for hypotension or lactate  $\geq 4$  mmol/L)
  - Vasopressors (e.g., norepinephrine) if hypotension persists
  - Source control (e.g., drainage, surgery)

## 2. Meningitis:

- **Etiology:** Bacterial (e.g., *Neisseria meningitidis*, *Streptococcus pneumoniae*), viral, fungal

- **Symptoms:** Headache, neck stiffness, photophobia, fever, altered mental status
  - **Diagnosis:** Lumbar puncture (elevated opening pressure, neutrophilic pleocytosis, low glucose, high protein)
  - **Management:**
    - Empiric antibiotics (e.g., ceftriaxone + vancomycin ± ampicillin for Listeria)
    - Dexamethasone to reduce neurologic complications
    - Antiviral or antifungal therapy as needed
3. **Necrotizing Fasciitis:**
- **Etiology:** Group A Streptococcus, polymicrobial infections
  - **Symptoms:** Severe pain out of proportion, swelling, erythema,

bullae, crepitus, systemic toxicity

- **Diagnosis:** Clinical suspicion, imaging (CT/MRI), surgical exploration
- **Management:**
  - Immediate broad-spectrum IV antibiotics
  - Emergency surgical debridement
  - Supportive care in ICU

#### 4. Toxic Shock Syndrome (TSS):

- **Etiology:** Toxins from *Staphylococcus aureus* or *Streptococcus pyogenes*
- **Symptoms:** High fever, rash, hypotension, desquamation, multi-organ involvement
- **Management:**
  - Remove source (e.g., tampon, wound packing)
  - Broad-spectrum antibiotics with

clindamycin to inhibit toxin production

- IV fluids and vasopressors

## 5. **COVID-19 and Other Viral Emergencies:**

- **Symptoms:** Fever, cough, dyspnea, hypoxia, coagulopathy
- **Management:**
  - Supportive care including oxygen and mechanical ventilation
  - Antivirals, corticosteroids (e.g., dexamethasone), monoclonal antibodies
  - Infection control and isolation protocols

## **Diagnostic Tools**

- **Blood cultures, urine cultures, sputum cultures**

- **Complete blood count (CBC), serum lactate, CRP, procalcitonin**
- **Chest X-ray or CT scan** for pneumonia or abscesses
- **Lumbar puncture** for suspected CNS infections

### Case Example

A 72-year-old woman is brought to the ED with fever, confusion, and low blood pressure. Her lactate is 5.2 mmol/L and WBC count is 18,000/ $\mu$ L.

- **Diagnosis:** Septic shock due to urinary tract infection
- **Treatment:** Immediate IV fluids, empiric antibiotics, vasopressors
- **Outcome:** Admitted to ICU, improved over 3 days with source control and supportive care

## **Key Points**

- Administer antibiotics early; delays increase mortality
- Sepsis bundles and protocols improve survival rates
- Always consider infection as a cause of acute deterioration

## **Infectious Disease Emergencies**

Sepsis, meningitis, and pneumonia are critical conditions.

### **Clinical Case:**

A 29-year-old with high fever, headache, and neck stiffness is diagnosed with bacterial meningitis. Rapid antibiotics are given after lumbar puncture.

## Chapter 12: Toxicological and Overdose Emergencies

Toxicological and overdose emergencies involve the ingestion, inhalation, injection, or absorption of harmful substances, whether intentional or accidental. Prompt recognition and the initiation of appropriate antidotal and supportive therapies are crucial.

### Common Toxicological Emergencies

#### 1. Opioid Overdose:

- **Etiology:** Prescription opioids, heroin, fentanyl
- **Symptoms:** Respiratory depression, miosis (pinpoint pupils), altered mental status
- **Diagnosis:** Clinical, may use toxicology screen
- **Management:**
  - Airway and breathing support

- Naloxone (Narcan)  
IM/IV/IN  
administration
- Continuous monitoring  
for recurrent respiratory  
depression

## 2. Acetaminophen (Paracetamol)

### Toxicity:

- **Symptoms:** Initially asymptomatic or mild GI symptoms; later liver failure (elevated AST/ALT, jaundice)
- **Diagnosis:** Serum acetaminophen level (Rumack-Matthew nomogram)
- **Management:**
  - N-acetylcysteine (NAC) as antidote
  - Best if given within 8 hours of ingestion
  - Liver function monitoring

## 3. Salicylate (Aspirin) Toxicity:

- **Symptoms:** Tinnitus, hyperventilation, metabolic acidosis, confusion
  - **Diagnosis:** Serum salicylate level, ABG, anion gap
  - **Management:**
    - Activated charcoal if early presentation
    - Sodium bicarbonate for urinary alkalinization
    - Hemodialysis in severe cases
4. **Benzodiazepine Overdose:**
- **Symptoms:** Sedation, respiratory depression (less severe than opioids), hypotonia
  - **Management:**
    - Supportive care, airway protection
    - Flumazenil (rarely used due to risk of seizures, especially with chronic use)
5. **Carbon Monoxide (CO) Poisoning:**

- **Symptoms:** Headache, dizziness, confusion, cherry red skin (rare), nausea
  - **Diagnosis:** Elevated carboxyhemoglobin level, history of exposure
  - **Management:**
    - 100% oxygen via non-rebreather mask
    - Hyperbaric oxygen therapy in severe cases
6. **Organophosphate Poisoning (Pesticides):**
- **Symptoms:** SLUDGE (Salivation, Lacrimation, Urination, Defecation, GI upset, Emesis), bradycardia, miosis
  - **Management:**
    - Atropine and pralidoxime (2-PAM)
    - Decontamination (remove clothing, wash skin)

- Supportive care

## **General Management Principles**

- **ABC stabilization first (Airway, Breathing, Circulation)**
- **Decontamination:** Activated charcoal, gastric lavage (rarely)
- **Enhanced elimination:** Dialysis, urinary alkalinization
- **Antidotes when available**
- **Toxicology consultation and poison control center assistance**

## **Diagnostic Tools**

- **Toxicology screens (urine, blood)**
- **Arterial blood gases and electrolytes**
- **Liver and kidney function tests**
- **ECG and cardiac monitoring**

## Case Example

A 32-year-old man is brought in unresponsive with shallow breathing and pinpoint pupils. A friend reports he used heroin.

- **Diagnosis:** Suspected opioid overdose
- **Treatment:** Naloxone administered intranasally with rapid improvement in breathing
- **Outcome:** Admitted for observation and started on substance use counseling

## Key Points

- Early antidote administration saves lives
- Always secure the airway and support vital functions first
- Involve poison control early and tailor treatment to specific toxins

## **Toxicological and Overdose Emergencies**

Includes opioid overdose, poisoning, and envenomation.

### **Clinical Case:**

A patient found with pinpoint pupils and shallow breathing after heroin use. Naloxone is administered with immediate improvement.

## Chapter 13: Environmental Emergencies

Environmental emergencies are conditions caused or worsened by exposure to extreme external physical elements such as heat, cold, altitude, or water. These emergencies require prompt recognition and environment-specific treatment strategies.

### Common Environmental Emergencies

#### 1. Hypothermia:

- **Etiology:** Prolonged exposure to cold environments, immersion in cold water
- **Symptoms:** Shivering, confusion, bradycardia, hypotension, coma in severe cases
- **Classification:**
  - Mild (32–35°C): Shivering, confusion
  - Moderate (28–32°C): Decreased

consciousness,  
arrhythmias

- Severe (<28°C): Coma, asystole

- **Management:**

- Remove wet clothing and insulate
- Active rewarming (external or internal) based on severity
- Monitor for arrhythmias during rewarming

## 2. Frostbite:

- **Etiology:** Localized tissue injury due to freezing
- **Symptoms:** Numbness, pallor, blisters, hard/waxy skin
- **Management:**
  - Rapid rewarming in warm water (37–39°C)
  - Pain control and wound care
  - Avoid rubbing or refreezing

### 3. Heat Stroke:

- **Etiology:** Prolonged heat exposure, strenuous activity in hot environments
- **Symptoms:** Core temperature  $>40^{\circ}\text{C}$ , altered mental status, hot/dry skin
- **Types:** Exertional vs. Classic (non-exertional)
- **Management:**
  - Rapid cooling (ice packs, immersion, evaporative methods)
  - IV fluids and supportive care
  - Monitor for rhabdomyolysis, DIC

### 4. Heat Exhaustion:

- **Symptoms:** Dizziness, fatigue, nausea, profuse sweating
- **Management:**
  - Rest, shade, oral/IV rehydration

- Monitor and prevent progression to heat stroke

## 5. **Drowning and Near Drowning:**

- **Etiology:** Submersion in water leading to hypoxia
- **Symptoms:** Respiratory distress, altered consciousness, cyanosis
- **Management:**
  - Airway management and oxygenation
  - Treat hypothermia if present
  - Monitor for pulmonary edema or ARDS

## 6. **Altitude Sickness:**

- **Types:** Acute Mountain Sickness (AMS), High Altitude Pulmonary Edema (HAPE), High Altitude Cerebral Edema (HACE)
- **Symptoms:** Headache, nausea, dyspnea, confusion, ataxia

- **Management:**
  - Descent to lower altitude
  - Oxygen therapy, acetazolamide for AMS, dexamethasone for HACE
  - Nifedipine for HAPE

## **Diagnostic Tools**

- **Core temperature monitoring**
- **Serum electrolytes, creatinine kinase for rhabdomyolysis**
- **Chest X-ray or ABG for pulmonary complications**

## **Case Example**

A 24-year-old hiker is brought in confused and shivering after being stranded overnight in the mountains. His temperature is 30°C.

- **Diagnosis:** Moderate hypothermia

- **Treatment:** Passive and active external rewarming, cardiac monitoring
- **Outcome:** Recovered fully after 24 hours of supportive care

## Key Points

- Environmental exposure can lead to life-threatening systemic conditions
- Temperature regulation and early supportive measures are critical
- Always consider environmental history in patients with unexplained symptoms

## Environmental Emergencies

Heat stroke, hypothermia, and drowning are common.

### Clinical Case:

A marathon runner collapses with confusion and high body temp. Diagnosed with heat stroke and rapidly cooled with ice packs and IV fluids.

## Chapter 14: Obstetric and Gynecological Emergencies

Obstetric and gynecological emergencies involve acute conditions affecting the female reproductive system, including complications during pregnancy, labor, and delivery. Timely diagnosis and intervention are essential to safeguard both maternal and fetal well-being.

### Common Obstetric Emergencies

#### 1. Ectopic Pregnancy:

- **Etiology:** Implantation of a fertilized egg outside the uterus, commonly in the fallopian tube
- **Symptoms:** Lower abdominal pain, vaginal bleeding, amenorrhea, shoulder tip pain (from peritoneal irritation)
- **Diagnosis:** Positive pregnancy test, transvaginal ultrasound showing empty uterus

- **Management:**
  - Medical: Methotrexate for stable patients without rupture
  - Surgical: Laparoscopy/laparotomy for ruptured ectopic or unstable patients
- 2. **Placental Abruption:**
  - **Etiology:** Premature separation of the placenta from the uterus
  - **Symptoms:** Painful vaginal bleeding, uterine tenderness, fetal distress
  - **Diagnosis:** Clinical diagnosis; ultrasound may aid
  - **Management:**
    - Continuous fetal monitoring
    - Emergency delivery if mother or fetus is unstable

### 3. **Placenta Previa:**

- **Etiology:** Placenta partially or completely covering the cervical os
- **Symptoms:** Painless vaginal bleeding in the second or third trimester
- **Diagnosis:** Transvaginal ultrasound
- **Management:**
  - Avoid digital vaginal exams
  - Hospitalization for bleeding
  - Cesarean delivery at term

### 4. **Preeclampsia and Eclampsia:**

- **Symptoms:** Hypertension, proteinuria, headache, visual changes, edema
- **Eclampsia:** Onset of seizures in a woman with preeclampsia
- **Management:**

- Magnesium sulfate for seizure prevention/treatment
- Antihypertensives (e.g., labetalol, hydralazine)
- Delivery is definitive treatment

## 5. Postpartum Hemorrhage (PPH):

- **Etiology:** Uterine atony, retained placenta, lacerations, coagulopathy
- **Symptoms:** Heavy vaginal bleeding after delivery, signs of hypovolemia
- **Management:**
  - Uterine massage, IV oxytocin
  - Misoprostol, carboprost, or tranexamic acid
  - Surgical interventions if bleeding persists

## Common Gynecological Emergencies

### 1. **Ovarian Torsion:**

- **Symptoms:** Sudden onset unilateral pelvic pain, nausea, vomiting
- **Diagnosis:** Pelvic ultrasound with Doppler (reduced blood flow)
- **Management:** Surgical detorsion via laparoscopy

### 2. **Pelvic Inflammatory Disease (PID):**

- **Etiology:** Ascending infection from sexually transmitted pathogens
- **Symptoms:** Lower abdominal pain, fever, cervical motion tenderness, vaginal discharge
- **Management:**
  - Empiric antibiotics (ceftriaxone + doxycycline ± metronidazole)
  - Hospitalization for severe cases

### 3. **Ruptured Ovarian Cyst:**

- **Symptoms:** Sudden pelvic pain, light vaginal bleeding
- **Diagnosis:** Pelvic ultrasound
- **Management:** Pain control, observation unless hemodynamic instability

## Diagnostic Tools

- **Pelvic ultrasound (transvaginal preferred)**
- **Beta-hCG test**
- **CBC, coagulation profile**
- **Urinalysis and STI screening**

## Case Example

A 28-year-old woman with amenorrhea presents with severe left lower quadrant pain and light vaginal spotting. Her beta-hCG is 1,800 mIU/mL, and ultrasound shows no intrauterine pregnancy.

- **Diagnosis:** Ectopic pregnancy

- **Treatment:** Methotrexate administered with close follow-up
- **Outcome:** Beta-hCG trended down appropriately; patient recovered without surgery

## Key Points

- Obstetric emergencies can threaten both maternal and fetal lives—time is critical
- Always consider pregnancy status in reproductive-aged women with abdominal pain
- Prompt OB/GYN consultation is crucial for surgical or delivery decisions

## Obstetric and Gynecological Emergencies

Includes eclampsia, ectopic pregnancy, and postpartum hemorrhage.

## **Clinical Case:**

A pregnant woman in third trimester has seizures. BP is 180/110. Magnesium sulfate is administered, and she is prepared for delivery.

## Chapter 15: Pediatric Emergencies

Pediatric emergencies require specialized knowledge due to anatomical, physiological, and developmental differences between children and adults. Prompt recognition and age-appropriate management can significantly impact outcomes in critically ill or injured children.

### Common Pediatric Emergencies

#### 1. Respiratory Distress and Failure:

- **Etiology:** Bronchiolitis, croup, asthma, foreign body aspiration
- **Symptoms:** Tachypnea, nasal flaring, grunting, retractions, cyanosis
- **Management:**
  - Oxygen therapy and nebulized bronchodilators
  - Steroids for croup or asthma

- Airway support (BVM ventilation, intubation if necessary)

## 2. Febrile Seizures:

- **Etiology:** Fever, typically between 6 months and 5 years of age
- **Symptoms:** Generalized tonic-clonic seizure lasting <15 minutes (simple); >15 minutes or recurrent (complex)
- **Management:**
  - Reassurance and antipyretics for simple seizures
  - Benzodiazepines if prolonged
  - Investigate for serious infection (e.g., meningitis) in complex cases

## 3. Dehydration and Gastroenteritis:

- **Symptoms:** Lethargy, sunken eyes, dry mucous membranes, decreased urine output
  - **Management:**
    - Oral rehydration for mild cases
    - IV fluids for moderate to severe dehydration
    - Monitor electrolytes and correct imbalances
4. **Anaphylaxis:**
- **Etiology:** Allergies (foods, insect stings, medications)
  - **Symptoms:** Urticaria, swelling, wheezing, hypotension
  - **Management:**
    - IM epinephrine immediately
    - Antihistamines and corticosteroids
    - Airway management and fluid resuscitation
5. **Sepsis:**

- **Etiology:** Bacterial or viral infections
  - **Symptoms:** Fever or hypothermia, lethargy, poor feeding, mottled skin
  - **Management:**
    - Early antibiotics, IV fluids
    - Monitor for signs of shock
    - Admit to ICU if unstable
- 6. Foreign Body Aspiration/Ingestion:**
- **Symptoms:** Sudden cough, choking, wheezing, stridor, drooling
  - **Management:**
    - Heimlich maneuver for choking
    - Bronchoscopy or endoscopy for retrieval

## Pediatric Considerations

- **Airway anatomy:** Smaller and more anterior airway, larger tongue
- **Breathing:** Higher baseline respiratory rate, diaphragmatic breathers
- **Circulation:** Compensate well until sudden decompensation
- **Medication dosing:** Weight-based (mg/kg)

## Diagnostic Tools

- **Pulse oximetry and capnography**
- **Rapid glucose testing**
- **CBC, electrolytes, cultures**
- **Chest X-ray or ultrasound** for suspected pneumonia or appendicitis

## Case Example

A 2-year-old child presents with stridor and barking cough, worsening at night. He is afebrile but has mild retractions.

- **Diagnosis:** Croup (viral laryngotracheitis)
- **Treatment:** Dexamethasone and nebulized epinephrine
- **Outcome:** Symptoms improved and discharged after observation

## Key Points

- Pediatric patients require specialized approaches and careful assessment
- Airway, breathing, and circulation must be assessed and supported immediately
- Family-centered care and communication are crucial in pediatric emergencies

## Pediatric Emergencies

Includes febrile seizures, dehydration, and respiratory distress.

## Clinical Case:

A toddler with vomiting and diarrhea presents with lethargy. IV rehydration resolves symptoms.

## Chapter 16: Geriatric Emergencies

Geriatric emergencies involve older adults who often present with atypical symptoms and have multiple comorbidities, polypharmacy issues, and altered physiological reserves. These factors complicate diagnosis and management, increasing the risk of adverse outcomes.

### Common Geriatric Emergencies

#### 1. Falls and Fractures:

- **Etiology:** Poor balance, muscle weakness, vision problems, medications
- **Complications:** Hip fractures, head trauma, vertebral compression fractures
- **Management:**
  - Immobilization and pain control
  - Imaging (X-ray, CT)

- Early mobilization and fall prevention strategies

## 2. **Delirium:**

- **Etiology:** Infections, metabolic imbalances, medications, dehydration
- **Symptoms:** Acute onset confusion, agitation, altered consciousness
- **Management:**
  - Identify and treat underlying cause
  - Supportive care and reorientation
  - Avoid restraints and sedatives unless necessary

## 3. **Acute Coronary Syndrome (ACS):**

- **Atypical Presentation:** Dyspnea, fatigue, syncope without chest pain
- **Management:**
  - ECG, cardiac enzymes

- MONA protocol, consider age-related drug dose adjustments

#### 4. **Stroke:**

- **Symptoms:** Sudden weakness, confusion, slurred speech, imbalance
- **Management:**
  - Rapid neuroimaging
  - Consider thrombolysis/mechanical thrombectomy based on eligibility

#### 5. **Sepsis and Infections:**

- **Atypical Presentation:** Falls, confusion, anorexia instead of fever or tachycardia
- **Common Sources:** Urinary tract infections, pneumonia, skin infections
- **Management:**
  - Early antibiotics, fluids

- Monitor for acute kidney injury and hypotension

## 6. Medication-Related Emergencies:

- **Etiology:** Polypharmacy, drug interactions, renal/hepatic impairment
- **Common Issues:** Bleeding from anticoagulants, digoxin toxicity, hypoglycemia
- **Management:**
  - Medication reconciliation
  - Adjust doses, manage adverse effects

## Geriatric Considerations

- **Physiological Changes:** Decreased renal/hepatic function, altered drug metabolism
- **Communication Barriers:** Hearing loss, dementia, sensory impairments

- **Functional Baseline:** Assess for decline in ADLs and mobility
- **End-of-Life Care:** Consider goals of care and advanced directives

## Diagnostic Tools

- **ECG, imaging studies (CT, X-ray)**
- **Laboratory panels: CBC, CMP, troponin, cultures**
- **Mental status evaluation tools: CAM, MMSE**

## Case Example

An 84-year-old woman is brought to the ED for sudden confusion and a fall. She is afebrile but hypotensive. Labs show elevated WBCs and a positive urine culture.

- **Diagnosis:** Urosepsis with delirium
- **Treatment:** IV fluids, empiric antibiotics, fall prevention measures

- **Outcome:** Mental status improved, discharged with home care services

## Key Points

- Older adults often have nonspecific symptoms—maintain a broad differential
- Focus on functional status and medication review
- Multidisciplinary approach improves care outcomes in geriatric emergencies

## Geriatric Emergencies

Common issues include falls, delirium, and polypharmacy complications.

### **Clinical Case:**

An 82-year-old falls at home and is found confused. CT shows subdural hematoma. Neurosurgery consult is initiated.

## Chapter 17: Psychiatric and Behavioral Emergencies

Psychiatric and behavioral emergencies involve acute disturbances in thought, mood, or behavior that may pose a risk to the patient or others. These situations require prompt assessment, de-escalation, and coordination with mental health services.

### Common Psychiatric and Behavioral Emergencies

1. **Suicidal Ideation or Attempt:**
  - **Risk Factors:** Depression, substance abuse, prior attempts, recent loss or trauma
  - **Assessment:** Direct questioning about intent, plan, means
  - **Management:**
    - Ensure immediate safety (remove harmful objects)

- Continuous monitoring
- Involuntary hold or psychiatric referral for high-risk individuals

## 2. **Homicidal Ideation or Aggressive Behavior:**

- **Etiology:** Psychosis, mania, intoxication, personality disorders
- **Symptoms:** Threats, agitation, pacing, verbal/physical aggression
- **Management:**
  - Verbal de-escalation
  - Physical restraint only if necessary
  - Sedation with antipsychotics or benzodiazepines
  - Psychiatric evaluation

## 3. **Acute Psychosis:**

- **Etiology:** Schizophrenia, drug-induced, bipolar disorder, delirium

- **Symptoms:** Delusions, hallucinations, disorganized speech, paranoia
  - **Management:**
    - Ensure safety
    - Rule out medical causes (labs, imaging)
    - Antipsychotic medication (e.g., haloperidol, olanzapine)
    - Inpatient psychiatric care
4. **Substance Intoxication or Withdrawal:**
- **Common Substances:** Alcohol, benzodiazepines, opioids, stimulants
  - **Symptoms:** Vary by substance—may include agitation, seizures, hallucinations, autonomic instability
  - **Management:**

- Supportive care and stabilization
- Specific treatments: benzodiazepines for alcohol withdrawal, naloxone for opioid overdose
- Referral for addiction treatment

## 5. **Delirium in Medically Ill Patients:**

- **Etiology:** Infections, metabolic disturbances, drug effects
- **Symptoms:** Acute confusion, inattention, altered awareness
- **Management:**
  - Treat underlying cause
  - Reorienting environment, avoid restraints
  - Use antipsychotics cautiously (e.g., haloperidol)

## **Safety and Legal Considerations**

- **Involuntary Holds:** May be necessary for patients who pose a risk to themselves or others
- **Patient Rights:** Maintain dignity, ensure informed consent when possible
- **Documentation:** Clearly record behavior, assessments, interventions

## Diagnostic Tools

- **Mental status exam and psychiatric screening tools**
- **Toxicology screening**
- **Basic labs and imaging to rule out medical causes**

## Case Example

A 35-year-old man is brought to the ED by police for erratic behavior and threatening speech. He reports hearing voices commanding him to harm others.

- **Diagnosis:** Acute psychosis with homicidal ideation
- **Treatment:** Verbal de-escalation, IM haloperidol administered, admitted under involuntary hold for psychiatric evaluation
- **Outcome:** Stabilized with antipsychotics and transferred to inpatient psychiatry

## Key Points

- Ensure safety first—for the patient, staff, and others
- Psychiatric emergencies require both medical and mental health evaluations
- Early involvement of psychiatry and social services improves outcomes

## Psychiatric and Behavioral Emergencies

Includes acute psychosis, suicidal ideation, and aggression.

## **Clinical Case:**

A young man threatens self-harm. He is safely restrained and admitted for psychiatric evaluation after medical clearance.

## Chapter 18: Trauma and Disaster Management

Trauma and disaster management encompasses the emergency response to physical injuries and mass casualty events. These situations require rapid triage, resuscitation, coordination, and often involve multidisciplinary care teams.

### Common Trauma Emergencies

1. **Blunt and Penetrating Trauma:**
  - **Etiology:** Motor vehicle collisions, falls, assaults, gunshot or stab wounds
  - **Assessment:** ABCDE approach (Airway, Breathing, Circulation, Disability, Exposure)
  - **Management:**
    - Ensure airway patency and oxygenation

- Control hemorrhage with pressure or tourniquets
- IV fluid resuscitation and blood products
- Imaging (X-rays, CT) to evaluate internal injuries
- Surgical intervention when indicated

## 2. **Traumatic Brain Injury (TBI):**

- **Symptoms:** Altered mental status, headache, vomiting, loss of consciousness
- **Management:**
  - Stabilize airway and prevent hypoxia/hypotension
  - CT head for diagnosis
  - Neurosurgical consultation
  - Elevate head, manage intracranial pressure (ICP)

### 3. Spinal Cord Injury:

- **Etiology:** Falls, accidents, violence
- **Symptoms:** Paralysis, sensory loss, urinary retention
- **Management:**
  - Cervical spine immobilization
  - High-dose corticosteroids in select cases
  - MRI and neurosurgical evaluation

### 4. Thoracic and Abdominal Trauma:

- **Examples:** Hemothorax, pneumothorax, liver/spleen laceration
- **Management:**
  - Needle decompression or chest tube for pneumothorax
  - FAST (Focused Assessment with

Sonography in Trauma)  
for internal bleeding

- Laparotomy if unstable with intra-abdominal injury

## **Disaster Management**

### **1. Mass Casualty Incidents (MCI):**

- Involve more patients than available resources
- **Triage Systems:** START (Simple Triage and Rapid Treatment) or SALT
- **Color Codes:**
  - Red: Immediate
  - Yellow: Delayed
  - Green: Minor
  - Black: Deceased/expectant

### **2. Incident Command System (ICS):**

- Structured system for emergency response coordination

- Roles include incident commander, safety officer, logistics, operations, and planning
3. **Pre-Hospital and Hospital Coordination:**
- EMS triage and communication with receiving hospitals
  - Surge capacity planning and disaster drills
  - Stockpiling critical supplies (e.g., trauma kits, PPE)
4. **Natural and Man-made Disasters:**
- Earthquakes, floods, hurricanes, terrorist attacks
  - Psychological first aid for affected populations
  - Decontamination in chemical or biological incidents

## **Diagnostic Tools in Trauma**

- **FAST ultrasound**
- **Portable X-rays**

- **CT scans for head, neck, chest, abdomen**
- **Laboratory studies: CBC, coagulation, blood type, lactate**

## Case Example

A 30-year-old male is brought in after a motor vehicle collision. He is hypotensive with decreased breath sounds on the right.

- **Diagnosis:** Tension pneumothorax
- **Treatment:** Needle decompression followed by chest tube placement
- **Outcome:** Stabilized and admitted for monitoring and imaging

## Key Points

- Initial trauma care follows the ABCDE priorities
- Disaster response requires planning, triage, and inter-agency coordination

- Regular drills and training enhance preparedness for mass casualty events

## **Trauma and Disaster Management**

Covers major trauma, triage, and mass casualty events.

### **Clinical Case:**

A car crash victim is brought in with hypotension and abdominal distention. FAST scan shows internal bleeding. Taken for emergency laparotomy.

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