- Case (1): a 2 month old infant presented to the emergency with seizure.

- **What is your differential diagnosis:**
  - Infection: meningitis or viral encephalitis (which is most commonly caused by Herpes virus).
  - Metabolic disorders: hypoglycemia, hyperammonemia, hyper/hypo natremia, hypocalcemia and hypomagnesemia.
  - Structural anomalies of the brain.
  - Trauma: cerebral palsy and anoxia, intraventricular hemorrhage or subarachnoid hemorrhage (shaken baby syndrome).

- **What investigations would you request?**
  - Blood to check for:
    - Blood glucose level (ruling out hypoglycemia which is very common).
    - Ammonia (ruling out hyperammonemia).
    - Calculating anion gap (to rule out metabolic acidosis which is might be associated with metabolic diseases).
    - Check levels of electrolytes (sodium, calcium and magnesium).
  - CT-scan: to rule out increased intracranial pressure before doing lumbar puncture and to identify any structural anomalies or lesions due to trauma.
  - Obtain CSF sample through lumbar puncture: checking for meningitis.
  - EEG: to know the type of seizure and its characteristics.

- Case (2): a 1 month old infant presented to the hospital with fever (39 C).

- **What is your differential diagnosis:**
  - Upper respiratory tract infections (croup, epiglottitis).
  - Pneumonia.
  - Meningitis or encephalitis.
  - Septicemia (especially if high-grade fever is present).

- **What investigations would you request?**
  - CBC and differential: to rule out infection.
  - Chest X-ray.
  - C-Reactive Protein (CRP) and ESR: acute phase reactants (indicating the presence of inflammation).
  - Blood culture: when septicemia is suspected.
  - Urinalysis and urine culture: to rule out UTI.
  - Lumbar puncture: when meningitis is suspected.

- **What is your first line of management?**
  - Start with rehydration and broad-spectrum antibiotics which is changed when the diagnosis is confirmed.

- Case (3): a child (known case of sickle cell disease) presenting to emergency with pain in lower limbs (vasoocclusive crisis).

- **What are the types of SCD crisis?**

<table>
<thead>
<tr>
<th>Vasoocclusive crisis (most common)</th>
<th>• Ischemia/infarction of bone. infarction in other organs can produce: stroke (brain), acute abdomen or autosplenectomy. • Managed by analgesics and hydration</th>
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<tbody>
<tr>
<td>Sequestration crisis</td>
<td>• Rapid accumulation of blood in spleen • Spleen is acutely enlarged and tender • ↓Hb, ↑reticulocytes • Managed by supportive care and transfusion → eventually splenectomy</td>
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Acute chest syndrome
- Pulmonary infiltrate associated with respiratory symptoms (e.g. cough, dyspnea and chest pain).
- Most commonly caused by S.pneumoniae infection
- Management: hydration, analgesics, oxygen and antibiotics

Aplastic crisis
- Temporary cessation of RBC production often caused by parvovirus 19 virus.
- ↓Hb, ↓reticulocytes
- Management: blood transfusion

Hyperhemolytic crisis
- Rapid hemolysis. often occurs in patients with other hemolytic diseases (e.g. G6PD deficiency)
- Management: blood transfusion

- **Case (4):** an 8 years old (known case of DM type-I) presents to the emergency with diabetic ketoacidosis.
  - **What are the signs and symptoms?**
    - Flushed, hot, dry skin.
    - Polyuria and polydypsia.
    - Drowsiness and confusion.
    - Kussmaul breathing (rapid deep breathing).
    - Fruity breath odor.
    - Abdominal pain, nausea and vomiting and loss of appetite.
  - **What investigations would you request?**
    - Blood: to look for glucose level, ketones/acetone.
    - Urinalysis: for ketones.
    - Anion gap: you will find metabolic acidosis and the value will be > 16
  - **How would you manage this case?**
    - Rehydration: by calculating fluid maintenance and deficit depending on the degree of dehydration (mild 5%, moderate 10% or severe 15%).
    - Electrolytes correction:
      - You will correct hyponatremia by calculating the deficit.
      - Potassium: before correcting its level you have to make sure that the kidney is functioning (wait until the patient passes urine) then administer a high dose of potassium.

- **Case (5):** a 2 years old child presented to hospital with fever and cough.
  - **What is your differential diagnosis?**
    - Bronchiolitis: there will be wheezing.
    - Croup: inspiratory stridor and barking cough.
    - Epiglottitis: the course is severe and acute. Stridor is also present.
    - Pneumonia.
    - Cystic fibrosis: it is a chronic disease with multi-system involvement.
    - Tuberculosis.
    - Congestive heart failure: which is characterized by
      - History of underlying heart disease.
      - Murmurs might be present.
      - Gallop rhythm.
      - Peripheral edema.
  - **What investigations would you request?**
    - CBC and differential: to rule out infection.
    - Chest X-ray.
    - Neck X-ray: for (thumb sign) in epiglottitis and (steeple sign) in croup.
    - Nasopharyngeal aspiration: for bronchiolitis.
    - Sweat electrolytes: to diagnose cystic fibrosis.
    - ECG: when a cardiac cause is suspected.