

## **APPROACH TO CYANOSIS**

**BLUE OR PURPLE APPEARANCE OF THE SKIN OR MUCOUS MEMBRANES → SECONDARY TO INADEQUATELY OXYGENATED BLOOD PERFUSING PERIPHERAL TISSUES OR INDICATES THE PRESENCE OF ABNORMAL HAEMOGLOBIN FORMS THAT ARE UNABLE TO BIND OXYGEN**

**MOST COMMONLY SEEN IN PATIENTS WITH HYPOPERFUSED STATES OR KNOWN CARDIOPULMONARY DISEASE**

### **PATHOPHYSIOLOGY:**

- Becomes evident when amount of desaturated haemoglobin is elevated (4-5g/dL in whole blood) → occurs at a much lower PaO<sub>2</sub> in the anaemic patient
- Cyanosis is an insensitive indicator of tissue oxygenation
- Also, abnormal haemoglobin can contribute to cyanosis
  - Iron molecule may be oxidized to the ferric state to produce methaemoglobin, which impairs the ability to transport oxygen
  - The oxygen/haemoglobin dissociation curve is SHIFTED TO THE LEFT → tissue hypoxia and lactic acid production
  - Cyanosis appears when greater than 10-15% of total haemoglobin is methaemoglobin
  - The metabolism of methaemoglobin back to haemoglobin is accelerated by METHYLENE BLUE
  - Most commonly methaemoglobinaemia is ACQUIRED → usually from certain drugs
- COMMON CAUSES OF METHAEMOGLOBINAEMIA:
  - HEREDITARY → haemoglobin M
  - ACQUIRED → drugs (chemotherapeutic agents, celecoxib, dapsone, local anaesthetics such as benzocaine, prilocaine, lignocaine, GTN, nitroprusside, sulphonamides, quinones such as chloroquine/primaquine). Other chemical agents

### **DIAGNOSTIC APPROACH:**

#### **PERIPHERAL CYANOSIS:**

- LOW CARDIAC OUTPUT STATES:
  - Shock
  - LV failure
  - Hypovolaemia
- ENVIRONMENTAL → COLD
- ARTERIAL OCCLUSION → including vasospasm
- VENOUS OBSTRUCTION

#### **CENTRAL CYANOSIS:**

- DECREASED ARTERIAL OXYGEN SATURATION:
  - HIGH ALTITUDE (>8000 FT)
  - IMPAIRED PULMONARY FUNCTION → hypoventilation, impaired O<sub>2</sub> diffusion, V/Q mismatch (PE, ARDS, pulm HT), respiratory

compromise (pneumonia, airway obstruction, tension pneumothorax, polycythaemia)

- ANATOMIC SHUNTS → cyanotic congenital heart disease
- ABNORMAL HAEMOGLOBIN → methaemoglobinaemia, sulfhaemoglobinaemia

### CRITICAL DIAGNOSES NOT TO MISS:

- Acute cardiovascular and respiratory compromise, especially when accompanied by shock
  - Acute CHF/cardiogenic shock
  - ACS
  - Hypovolaemic/cardiogenic shock
  - Acute respiratory/ventilatory failure
  - Massive PE
  - Exacerbation/decompensation of known congenital heart disease

### MANAGEMENT ALGORITHM:

