Department of Anesthesia Techniques
Title of the lecture:- Cyanosis & Pallor for Anesthetists
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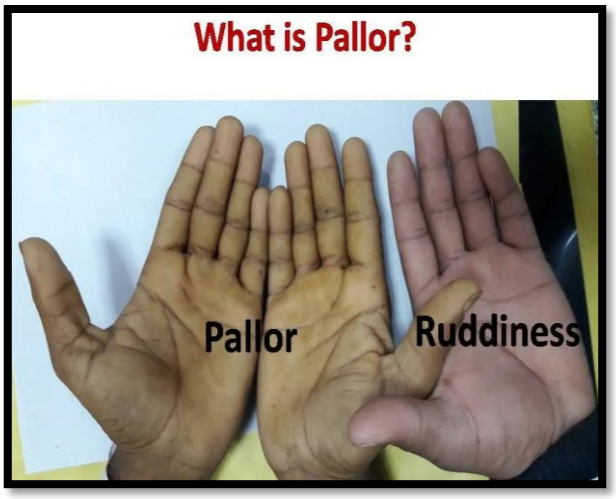
Pallor

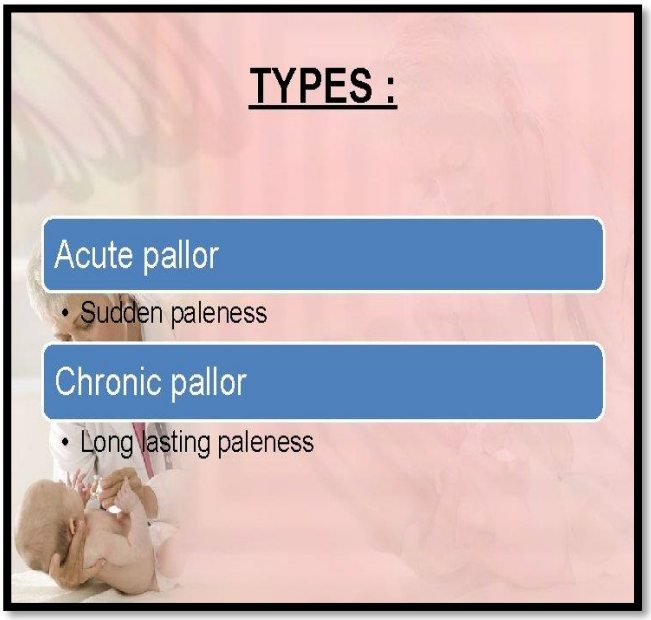
Definition:

Absence of skin coloration. It is used as a screening tool to identify illness.



Types:

1. Acute and associated with a life-threatening illness.
2. Chronic and subtle.



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The degree of pallor depends on:

1. Concentration of hemoglobin in the blood.
2. Distribution of blood in blood vessels of the skin.

Clinically, pallor caused by anemia can usually be appreciated when the hemoglobin concentration is below 8 to 9 g per dL.

Pallor Causes

❖ Pallor without anemia

- shock (hypovolemic , cardiogenic)
- thick skin (eg. scleroderma)
- myxedema
- exposure to cold
- syncope
- arterial occlusion

❖ Pallor with anemia

The concentration of hemoglobin in the blood can be lowered by three basic mechanisms:

1. Decreased erythrocyte or hemoglobin production.

- Nutritional deficiency.
- Abnormal Hemoglobin synthesis.

2. Increased erythrocyte destruction.

- Erythrocyte membrane defects.
- Erythrocyte enzyme defects.
- Hemoglobinopathies.
- Immune hemolytic anemia

3. Blood loss.

- Severe trauma.
- Anatomic lesions

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Cyanosis

Definition:

Abnormal bluish discoloration of the skin and mucous membranes.

- **Causes:**
  - High levels of deoxygenated (reduced) hemoglobin circulating within the superficial dermal capillaries.
  - Hypoxemia, is the deficient oxygenation of blood that leads to cyanosis

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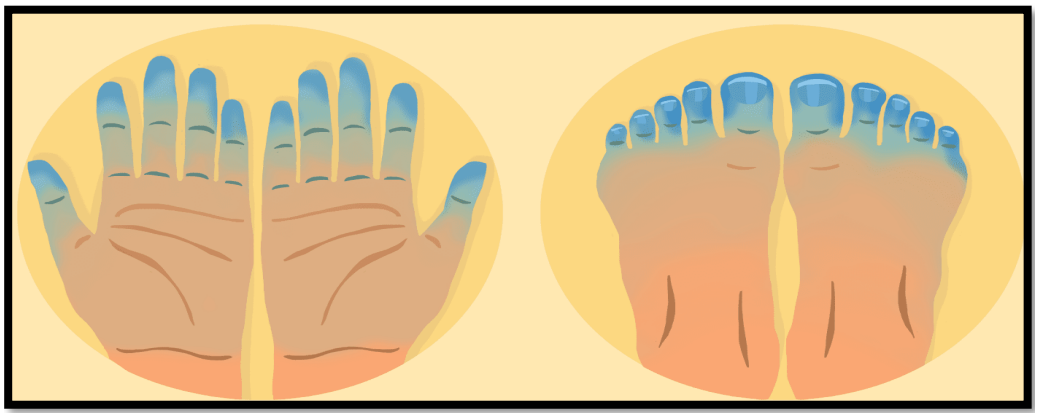
Types of Cyanosis

1. Peripheral cyanosis:

Causes bluish discoloration of the hands and feet. it is the result of vasoconstriction and diminished peripheral blood flow from various causes.



2. Central cyanosis:

In addition to the hands and feet, it is apparent at the lips, tongue, and sublingual tissues.

3. Pseudocyanosis:

Can mimic peripheral cyanosis, It is generally due to drug (amiodarone) and, metal exposure.

Comparison : Causes

Central Cyanosis	Peripheral Cyanosis
1. Decreased arterial oxygen saturation 2. Decreased atmospheric pressure (altitude) 3. Impaired pulmonary function 4. Obstructive lung disease, 5. Pulmonary edema, 6. Alveolar hypoventilation, 7. Ventilation-perfusion mismatch, 8. Impaired oxygen diffusion 9. Hemoglobin with low oxygen affinity 10. Hemoglobin abnormalities	1. All causes of central cyanosis can cause peripheral cyanosis 2. Reduced cardiac output 3. Cold exposure 4. Redistribution of blood flow from extremities Arterial or venous obstruction

PATHOPHYSIOLOGY

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- In order for circulating blood to appear blue, it requires an elevated amount of blue pigment to accumulate.
- Central cyanosis is generally of greater concern, as it requires reduced arterial oxygen saturation or abnormal hemoglobin derivatives to be present (methemoglobin or sulfhemoglobin), and is generally a relatively late finding in the course of illness.

CYANOSIS DURING ANESTHESIA

- CYANOSIS always means anoxaemia, (hypoxemia). Anoxaemia is frequent during anaesthesia, where gases are used in the production of anaesthesia.
- Cyanosis is an aid to the anesthetist in producing depth of anesthesia, and may help in determining the plan of anesthesia. But it is a cause of rigidity and acidosis.
- It is one of the most potent factors making for immediate danger to the patient

Mucous membrane (MM) color

- **Pale mucous membranes** may indicate blood loss or anemia or may result from poor perfusion.
- **Purple or blue mucous** membranes indicate cyanosis, a shortage of oxygen in the tissues.
- **Cyanosis during anesthesia** is usually the result of respiratory failure or upper airway obstruction and must be addressed immediately.

Capillary Refill Time (CRT)

- Capillary refill time is the rate of color return to a mucous membrane after the application of gentle pressure and reflects tissue perfusion.
- A prolonged CRT (> 2 sec) may indicate hypotension resulting from excessive anesthetic depth or circulatory shock.
- Other factors that may cause prolonged CRT or poor perfusion include hypothermia, vasodilation and cardiac failure