Hypothyroidism & Myxedema Coma

1. Definition

- **Hypothyroidism**: A condition where the thyroid gland fails to produce adequate thyroid hormones, leading to a slowed metabolism.
- **Myxedema Coma**: A life-threatening severe form of hypothyroidism characterized by **hypothermia, bradycardia, altered mental status, and multi-organ dysfunction**.

2. Classification (If Needed)

- **Primary Hypothyroidism** (Most common) – Due to thyroid gland dysfunction (e.g., Hashimoto's thyroiditis, iodine deficiency).
- **Secondary Hypothyroidism** – Due to pituitary failure (low TSH).
- **Tertiary Hypothyroidism** – Due to hypothalamic dysfunction (low TRH).

3. Presenting Clinical Features

A. Symptoms of Hypothyroidism

- Fatigue, lethargy
- Cold intolerance
- Weight gain despite poor appetite
- Dry skin, coarse hair, hair thinning
- Constipation
- Depression, slow speech
- Bradycardia

B. Features of Myxedema Coma (Severe Hypothyroidism)

- **Hypothermia (<35°C) → Hallmark feature**
- **Bradycardia, hypotension**
- **Altered mental status (confusion, coma, seizures)**
- **Respiratory failure (hypoventilation, CO2 retention)**

4. Initial Evaluation

- **Serum TSH** (Elevated in primary hypothyroidism, low in secondary)
- **Free T4** (Low in all forms)
- **Serum cortisol** (To rule out adrenal insufficiency)
- **ABG** (To check for hypoventilation in Myxedema Coma)
- **Electrolytes** (Hyponatremia common due to SIADH)

5. Management

A. Primary Hypothyroidism

- **Levothyroxine (LT4) 1.6 mcg/kg/day orally** (Adjust per TSH levels)
- Start with **lower doses (12.5–25 mcg/day) in elderly or cardiac patients** to avoid precipitating angina.

B. Myxedema Coma (Emergency Management)

1. **Thyroid Hormone Replacement**
    - **IV Levothyroxine (LT4) 200-400 mcg bolus**, then **50-100 mcg IV daily**.
    - If severe, add **Liothyronine (LT3) 5-20 mcg IV, then 2.5-10 mcg every 8 hours**.
2. **Supportive Care**
    - **Passive warming** (avoid rapid warming to prevent vasodilation and shock).
    - **IV Hydrocortisone 100 mg every 8 hours** (until adrenal insufficiency is ruled out).
    - **Mechanical ventilation if CO2 retention is present**.
    - **Correct hyponatremia slowly** (risk of osmotic demyelination).

6. Monitoring & Follow-Up

- **TSH every 6 weeks** after starting Levothyroxine, adjust dose accordingly. If TSH is high then +12.5mcg and if low then -12.5mcg
- Monitor **cardiac function** in elderly patients on thyroid hormone replacement.
- **ICU monitoring** in Myxedema Coma until stabilized.

7. Red Flags – When to Refer

- **Altered mental status, respiratory failure (risk of Myxedema Coma)**
- **Severe bradycardia/hypotension requiring vasopressors**
- **Non-improving hypothyroidism despite treatment**

💡 Additional Notes & Insights

💡 Levothyroxine absorption is affected by food!

- Take on an **empty stomach** (30-60 mins before breakfast) for best absorption.
- **Avoid calcium, iron, and PPIs**, as they reduce absorption.

💡 Do NOT rapidly warm Myxedema Coma patients!

- Sudden vasodilation can cause **cardiovascular collapse**.
- Use **passive rewarming (blankets, room temp adjustment)** instead.

💡 **Hypothyroidism can mimic depression**

- Always **check TSH** in patients with **unexplained depression, fatigue, or weight gain**.

💡 **Elderly patients require lower Levothyroxine doses**

- Starting too high can cause **atrial fibrillation and cardiac ischemia**.
