# DVT Prophylaxis and GI Prophylaxis

Medical Practice Improvement Lectures

Paul Wisniewski, DO
Trauma Director
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Surgical Medical Group

# Disclosures

- No Disclosures

# Learning Objectives

1. Why is DVT Prophylaxis important?
2. Why is GI Prophylaxis important?
3. How needs prophylaxis?
4. What is the dosage of GI and DVT prophylaxis?

# Why is DVT Prophylaxis Important?

- **Deep vein thrombosis (DVT) prophylaxis** is crucial in preventing the development of blood clots in the veins, particularly in patients who are at higher risk due to surgery, immobility, or other medical conditions.

# Why is DVT Prophylaxis Important?

- **Prevention of Clot Formation**
- DVT occurs when a blood clot forms in a deep vein, typically in the legs. If not treated, this clot can break off and travel to the lungs, causing a **pulmonary embolism (PE)**, a life-threatening condition.
- Prophylaxis with medications (like anticoagulants) or mechanical devices (like compression stockings) helps reduce the risk of clot formation by promoting blood flow and inhibiting clotting mechanisms.

# Why is DVT Prophylaxis Important?

- **Reduction in Pulmonary Embolism (PE) Risk**
- Pulmonary embolism is one of the most serious complications of DVT. PE occurs when a blood clot travels to the lungs, blocking blood flow, and can lead to respiratory failure, cardiac arrest, or death.
- Prophylactic measures significantly lower the chances of a clot becoming dislodged and causing a PE, thus reducing mortality and morbidity.

# Why is DVT Prophylaxis Important?

- **Improvement in Patient Outcomes Post-Surgery or Hospitalization**
- Surgical patients, particularly those undergoing orthopedic surgeries like hip or knee replacement, are at heightened risk for DVT due to immobility and vessel damage during the procedure.
- DVT prophylaxis reduces the incidence of postoperative complications, accelerates recovery, and decreases the likelihood of long-term disability, such as chronic venous insufficiency or post-thrombotic syndrome (PTS).

# Why is DVT Prophylaxis Important?

- **Cost-Effectiveness**
- Preventing DVT and its complications through prophylaxis reduces the overall healthcare burden.
- Treating DVT and PE is costly, requiring prolonged hospital stays, intensive care, and long-term treatments.
- By implementing preventive measures, the incidence of these conditions can be lowered, thus saving healthcare costs.

# Why is DVT Prophylaxis Important?

- **Actual Mortality from Pulmonary Embolism (PE)**
- **Overall Mortality**: The **mortality rate** for patients with **acute pulmonary embolism** is generally around **10-30%** for those who are **not treated promptly** or for those with **massive PE** (the most severe form of PE).
  - **Massive PE**, which causes hemodynamic instability (e.g., shock), has a **mortality rate of 30-60%** if not treated rapidly.
  - **Submassive PE** (PE with right ventricular dysfunction but without shock) has a mortality rate of around **5-10%**.
  - **Low-risk PE**, where the patient remains hemodynamically stable, has a significantly lower mortality rate, often less than **5%** (Siam et al., 2020).

# Why is DVT Prophylaxis Important?

- **Post-PE Mortality**: The **long-term mortality** risk remains elevated even after the acute event, especially due to the risk of **recurrence** or **chronic pulmonary hypertension**. The **one-year mortality rate** after a PE can be around **15-20%**, particularly in high-risk patients.

# Why is DVT Prophylaxis Important?

- **Percentage Reduction in Mortality and Morbidity with DVT Prophylaxis**
- DVT prophylaxis, through the use of **anticoagulants** like **heparin** or **enoxaparin (Lovenox)**, or **mechanical devices** like **compression stockings**, has been shown to significantly **reduce the incidence of DVT** and, by extension, **pulmonary embolism (PE)**, which is a leading cause of mortality in hospitalized patients.

# Why is DVT Prophylaxis Important?

**Clinical studies have shown that appropriate prophylaxis reduces the incidence of DVT by approximately 50-60% in surgical and high-risk medical patients** (Geerts et al., 2008; Bates et al., 2008).

In terms of **mortality**, the **risk of death from PE** can be **reduced by up to 70-80%** with the appropriate use of prophylaxis (Kakkar et al., 2012). This reduction in mortality occurs because prophylactic measures prevent the formation of clots that could otherwise dislodge and travel to the lungs, causing a fatal PE.

# What is the Dosage for DVT Prophylaxis?

- **Evidence on Mortality Reduction:**

1. **Heparin Prophylaxis**: A systematic review showed that the use of **heparin** in hospitalized patients, including those undergoing surgeries, led to a **significant reduction in PE-related mortality**, cutting the **overall risk of death** from PE by about **70%** compared to untreated patients (Bates et al., 2008).
2. **Enoxaparin Prophylaxis**: In orthopedic surgery patients, prophylactic treatment with **enoxaparin (Lovenox)** has also been associated with a **50% reduction** in the incidence of **symptomatic venous thromboembolism (VTE)**, including PE (Geerts et al., 2008). While the direct mortality benefit from enoxaparin isn't always quantified in all studies, its reduction in symptomatic VTE helps indirectly reduce PE-related deaths.

# What is the Dosage for DVT Prophylaxis?

- **Dosage for Heparin and Lovenox (Enoxaparin)**

**1. Heparin**

1. **Standard dosing for DVT prophylaxis** in adults:
    1. **Subcutaneous (SC)** injection: 5,000 units every 8–12 hours.
    2. In patients undergoing **major surgeries**, like abdominal or orthopedic surgery, the dose may be adjusted to a **lower dose (5,000 units) every 8–12 hours** (Geerts et al., 2008).
2. **Monitoring**: APTT (Activated Partial Thromboplastin Time) may need to be monitored in certain high-risk patients receiving heparin to ensure effective anticoagulation.

# What is the Dosage for DVT Prophylaxis?

- **Lovenox (Enoxaparin)**
- **Standard dosing for DVT prophylaxis**:
  - **Subcutaneous (SC)** injection: 40 mg once daily, typically administered 2 hours before surgery and continued for 7-10 days post-operatively.
  - For **patients with renal insufficiency**, the dose should be reduced (20–30 mg once daily) (Bates et al., 2008).
- **Alternative dosing**: For **hip or knee replacement surgeries**, enoxaparin may be administered as 30 mg twice daily (Kakkar et al., 2012).

# Why is GI Prophylaxis Important?

- **Introduction to GI Prophylaxis**
  - GI prophylaxis is crucial for preventing **gastric stress ulcers** and **upper gastrointestinal bleeding (UGIB)** in critically ill or high-risk patients.
  - **Stress ulcers** can occur in patients with critical illness or trauma, leading to potentially fatal **bleeding**, which complicates patient recovery.
  - Prevention strategies significantly reduce the incidence of stress ulcers, improve patient outcomes, and reduce healthcare costs.
  - Common risk factors:
    - Mechanical ventilation >48 hours
    - Coagulopathy or history of GI bleeding
    - Sepsis, trauma, or burn patients

# Mortality and Morbidity Reduction

- **Impact of GI Prophylaxis on Mortality and Morbidity**
  - GI prophylaxis significantly reduces the **incidence of gastrointestinal bleeding**, especially in critically ill patients with high-risk factors (Alhazzani et al., 2013).
  - **Reduction in GI bleeding**: Prophylactic use of PPIs can decrease the risk of **stress ulcer-related bleeding by 50-70%** (Cook et al., 2016).
  - **Mortality Reduction**: Prophylaxis can indirectly reduce mortality by minimizing GI bleeding-related complications and promoting faster recovery.
  - Studies suggest that **PPIs** have a **higher efficacy** than **H2RAs** in preventing stress ulcers in critically ill patients (Alhazzani et al., 2013; Cook et al., 2016).

# Risk Factors and Indications for GI Prophylaxis

- **Risk Factors for GI Bleeding in Critically Ill Patients**
  - **Mechanical ventilation >48 hours**
  - **Coagulopathy (INR >1.5, platelets <50,000)**
  - **History of GI bleeding or peptic ulcer disease**
  - **Severe burns** or **trauma**
  - **Sepsis** or **shock**
- **Indications for Prophylaxis**:
  - Prophylaxis should be used in critically ill patients who meet one or more of the above risk criteria.
  - Most guidelines recommend PPIs for critically ill patients at high risk for GI bleeding.

# Medications for GI Prophylaxis

- **Proton Pump Inhibitors (PPIs)**
  - **Dosage for PPIs (e.g., Omeprazole, Pantoprazole):**
    - **Omeprazole**: 20–40 mg once daily (oral or IV)
    - **Pantoprazole**: 40 mg once daily (oral or IV)
    - **Indication**: Critically ill patients at high risk for GI bleeding.
  - **Mechanism**: PPIs inhibit gastric acid secretion by blocking the proton pump in parietal cells, reducing acid production and thereby minimizing the risk of stress ulcers.
- **H2-Receptor Antagonists (H2RAs)**
  - **Dosage for H2RAs (e.g., Ranitidine, Famotidine):**
    - **Ranitidine**: 50 mg every 8 hours (IV) or 150 mg twice daily (oral)
    - **Famotidine**: 20 mg twice daily (oral or IV)
    - **Indication**: For patients who cannot tolerate PPIs or in combination therapy.
  - **Mechanism**: H2RAs work by blocking histamine receptors, which reduces stomach acid secretion, but are less effective than PPIs in preventing GI bleeding.

# Mortality Rate for Stress Ulcer Bleeding

1. **General Mortality Rate**:
    1. In critically ill patients with **stress ulcer bleeding**, the **mortality rate** is typically reported to range from **10% to 30%** (Cook et al., 2016).
    2. This rate can be **higher in certain high-risk groups**, including those with **shock**, **coagulopathy**, **severe burns**, or **multiple organ failure**.

# Increased Mortality in Severe Cases:

- For massive gastrointestinal bleeding (i.e., when the bleeding is rapid and significant), mortality rates can rise to 50% or higher if not managed appropriately (Mowery et al., 2012).
- Patients who experience recurrent bleeding or complications like aspiration pneumonia or sepsis following stress ulcer bleeding face increased mortality.

# Mortality in ICU Settings

In ICU patients, mortality is often related to the **underlying condition** that made them vulnerable to stress ulcers (e.g., trauma, burns, sepsis).

**ICU mortality** in patients with stress ulcer bleeding can range from **20% to 50%** depending on factors such as **timely treatment**, **hemodynamic instability**, and **age** (Miller et al., 2015).

# Impact of Prophylaxis on Mortality

- **GI prophylaxis** (e.g., using **PPIs** or **H2-blockers**) has been shown to significantly reduce the incidence of **stress ulcer bleeding**. Studies suggest that effective prophylaxis can **reduce the mortality** associated with stress ulcer bleeding by up to **50%** (Cook et al., 2016). This is especially true for patients in high-risk categories (e.g., mechanical ventilation, coagulopathy).

# Impact of Prophylaxis on Mortality

**Cook et al. (2016)** in their study found that stress ulcer prophylaxis reduced the incidence of **upper gastrointestinal bleeding** by **50-70%** in ICU patients. This reduction in bleeding, in turn, contributes to a significant reduction in **mortality**.

**Mowery et al. (2012)** reported that **stress ulcer-related bleeding** is a leading cause of **gastrointestinal bleeding** in the ICU, with mortality being substantially higher in those who experience **massive bleeding** and in **older patients**.

# Summary

- **Summary: Importance of GI Prophylaxis**
  - **GI prophylaxis** is critical in preventing GI bleeding, improving patient outcomes, and reducing hospital mortality.
  - The choice of medication (PPI vs. H2RA) should be tailored to the patient's condition, with **PPIs being preferred** for critically ill patients at high risk for GI bleeding.
  - Effective prophylaxis can reduce **stress ulcer-related complications** by 50-70%, improving recovery and reducing overall healthcare costs.

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- **References for DVT Prophylaxis:**


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