

DVT Prophylaxis in the Hospitalized Patient

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DVT/PE

A Major Public Health Crisis

- Up to 2 million Americans suffer from DVT annually²
- Approximately 600,000 experience PE²
- Almost 300,000 die from PE,³ the majority of which result from DVT⁴
- Complications from DVT kill more Americans than AIDS and breast cancer combined²

American Public Health Association. Presented at: Public Health Leadership Conference: February 26, 2003; Washington, DC.

Gerotziapas and Samama. *Curr Opin Pulm Med.* 2004;10:356-365.

Heit et al., on behalf of the VTE impact assessment group. Poster #68. Presented at: 47th Annual American Society of Hematology; December 10-13, 2005; Atlanta, Ga.

Murin et al. *Thromb Haemost.* 2002;88:407-414.

DVT/PE

A Leading Cause of Death in the US

- 10% of hospital deaths may be due to PE (proven by necropsy)^{5,6}
- The elderly are at particular risk⁷
 - The rate of fatal PE increases >4-fold between ages 50 and 80 years

5. Geerts et al. *Chest*. 2004;126(suppl):338S-400S.

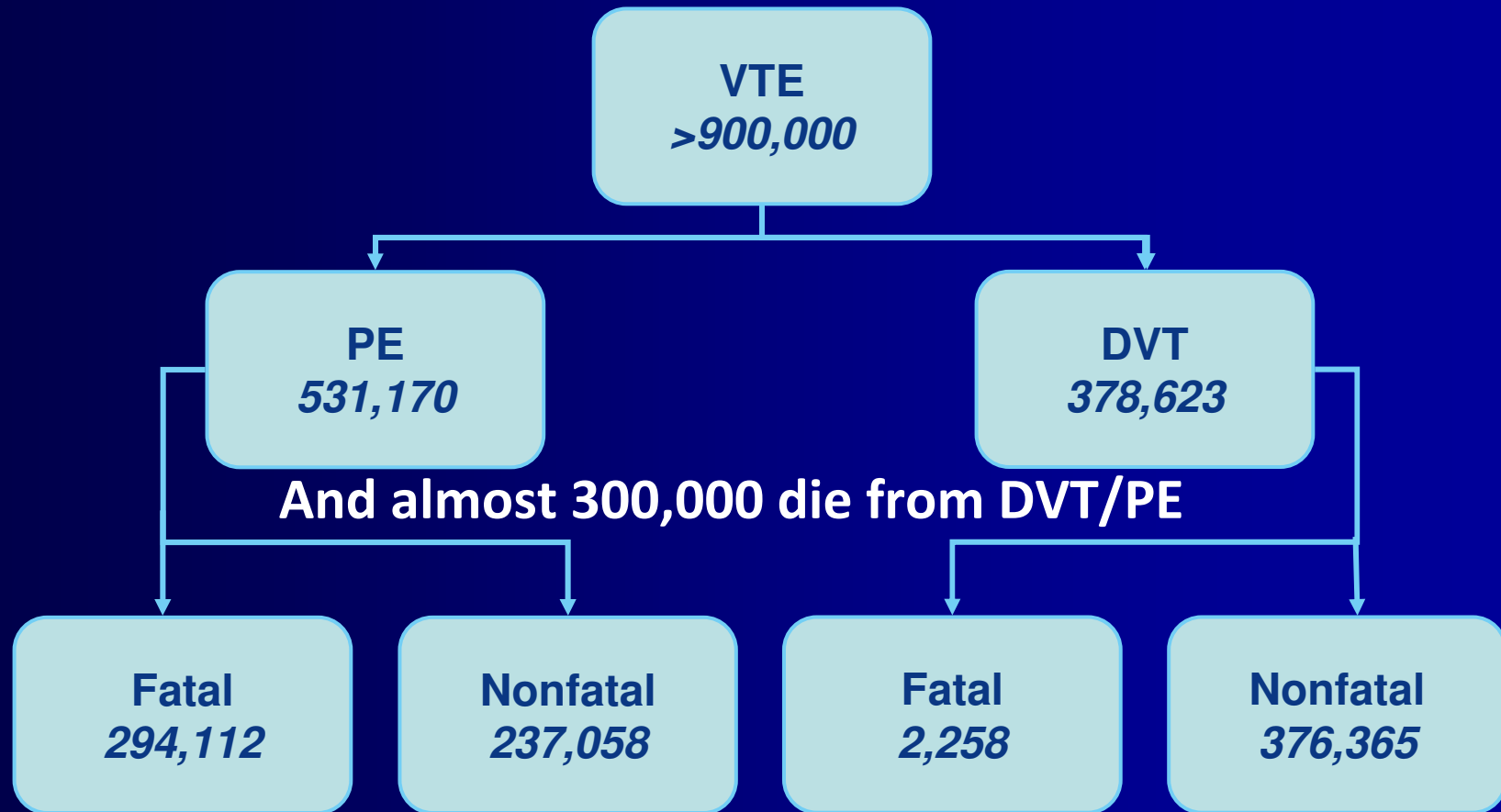
6. Sandler and Martin. *J R Soc Med*. 1989;82:203-205.

7. Hansson et al. *Arch Intern Med*. 1997;157:1665-1670.

DVT/PE Complications

- Post-thrombotic syndrome (PTS) may result in:
 - Chronic pain⁵
 - Swelling⁵
 - Skin ulceration secondary to post-phlebitis syndrome⁵
- The first manifestation of DVT/PE may be fatal PE⁵

More Than 900,000 Americans Suffer From VTE Annually³



DVT/PE

The Economic Burden

- The total cost for an episode of DVT in a managed care setting is approximately \$10,000
- The estimated annual cost of care for DVT/PE is \$1.5 billion¹⁰
- The incremental cost-effectiveness of DVT/PE prophylaxis versus no prophylaxis ranges from \$1,249 to \$3,088 per VTE event avoided¹⁰

DVT Is Not Managed Appropriately in At-risk Patients

DVT incidence and prophylaxis rates compared to other major CV events and their management plans

Event	Annual incidence	Chance of recurrence	Managed with secondary risk reduction strategy*
AMI [†]	865,000	18% within 6 years	80%–94%
Stroke [†]	700,000	14% within 1 year	<60%
DVT	2,000,000	17.5% after 2 years	29%

DVT/PE in the Hospitalized Patient

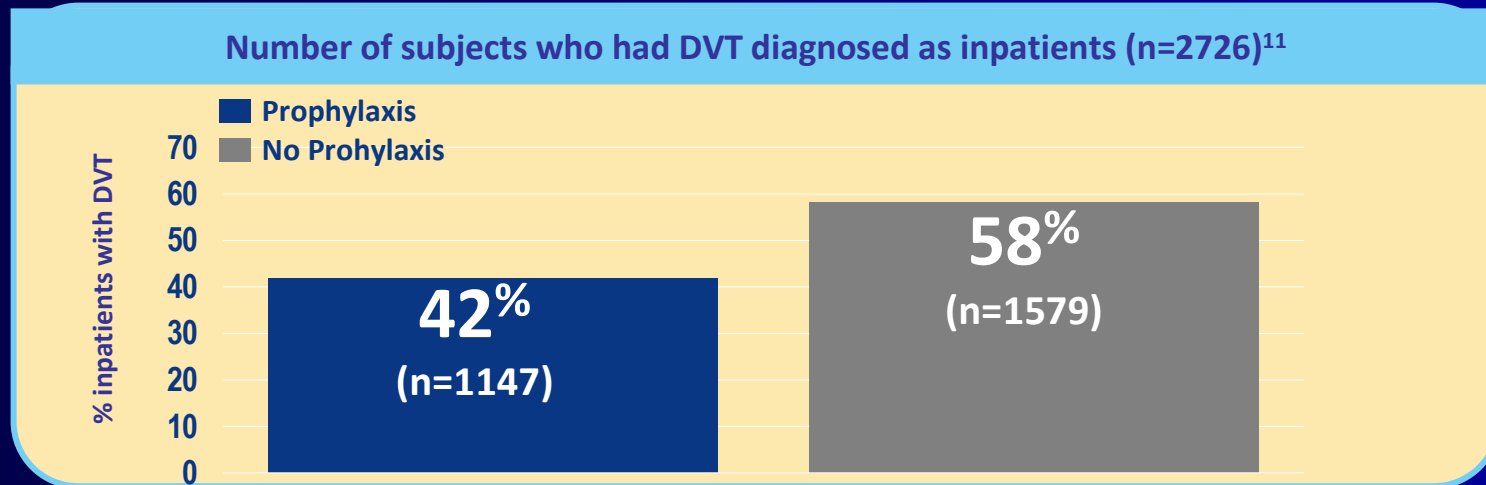
- DVT/PE is common and often clinically silent in nature⁵
 - Diagnosis may be difficult
 - The first manifestation of DVT/PE may be fatal PE
- Surgical patients
 - Benefit and cost-effectiveness of prophylaxis is well established
- Medical patients
 - Risk not well defined until recently
 - Certain issues persist, resulting in underutilization

DVT-FREE Study

- **A prospective registry of 5451 patients with ultrasound-confirmed DVT enrolled over 6 months**
- **Included 2892 women and 2559 men from 183 participating hospitals in the United States**
- **2725 were outpatients and 2726 were inpatients**

DVT-FREE Study

- This prospective multicenter registry looked at 5451 patients who had confirmed DVT
- 71% of patients (n=3894) in DVT-FREE received no prophylaxis within 30 days prior to the diagnosis of DVT¹¹
- 16% of patients had no comorbidities; the most common comorbidities were hypertension, surgery within 3 months before diagnosis, immobility, cancer, and obesity¹¹



DVT-related PE Is Among the Most Frequent and Unexpected Causes of Death in the ICU²²

- Up to 33% of patients without prophylaxis in the medical ICU develop DVT
- Up to 30% of medical and surgical ICU patients develop DVT within the first week of ICU admission
- At least 63% of DVT cases and 70% of fatal PEs detected postmortem were neither suspected nor diagnosed

Sandler and Martin. *J R Soc Med.* 1989;82:203-205.

Tapson. *J Crit Illn.* 2000;15(suppl)S18-S23.

Cade. *Crit Care Med.* 1982;10:448-450.

Hirsh et al. *JAMA.* 1995;274:335-337.

Attia et al. *Arch Intern Med.* 2001;161:1268-1279.

Stein and Henry. *Chest.* 1995;108:978-981.

DVT Recommendations and Guidelines: Medical Patients with Restricted Mobility

2004 American College of Chest Physicians (ACCP) guidelines^{5}*

- Prophylaxis with LMWH (Grade 1A) or low-dose UFH (Grade 1A) is recommended for acutely ill medical patients who are:
 - Admitted to the hospital with congestive heart failure or severe respiratory disease
 - Confined to bed and have one or more additional risk factors, including active cancer, previous VTE, sepsis, acute neurologic disease, or inflammatory bowel disease
- Upon admission to a critical care unit, all patients should be assessed for their risk of VTE
 - Accordingly, most should receive thromboprophylaxis (Grade 1A)
- Mechanical methods of prophylaxis should be used primarily in patients who are at high risk of bleeding (Grade 1C+) or as an adjunct to anticoagulant-based prophylaxis (Grade 2A)

DVT Recommendations and Guidelines: ICU Patients at Thrombotic Risk

2004 ACCP guidelines

- On admission to a critical care unit, all patients should be assessed for their risk of VTE — accordingly, most should receive thromboprophylaxis (Grade 1A)
- For ICU patients who are at moderate risk for VTE (eg, medically ill or postoperative patients), LMWH or LDUH prophylaxis is recommended (Grade 1A)
- For patients who are at higher risk, such as that following major trauma or orthopedic surgery, LMWH prophylaxis is recommended (Grade 1A)
- For patients who are at high risk for bleeding, mechanical prophylaxis with GCS and/or IPC is recommended until the bleeding risk decreases (Grade 1C+)

Prophylaxis Modalities

Mechanical

Graduated Compression Stockings

Intermittent Pneumatic Compression

Combined GCS / IPC

IVC Filter

Pharmacologic

Heparins

Warfarin

Combined Mechanical — Pharmacologic

Advantages of LMWH Over UFH

Effect

Much Less Protein Binding

Cleared Primarily by Renal Mechanism

Much Less Binding to Osteoblasts

Less Binding to PF4

Consequence

More Predictable Dose Response

Longer Plasma Half-Life

Less Osteopenia

Lower Risk of HIT

General Surgery

- Heparin 5,000 units SC q8h (begin 2h preop)
- Enoxaparin 40 mg SC q24h (begin 2h preop)
- Dalteparin 5,000 units SC q24h (begin 12h preop, or give 2,500 units 2h preop)

Orthopedic Surgery

- Enoxaparin 40 mg SC q24h
- Enoxaparin 30 mg SC q12h
- Dalteparin 5,000 units SC q24h
- Fondaparinux 2.5 mg SC q24h
- Warfarin, target INR 2.0-3.0

LMWH in Neurological Surgery

307 patients undergoing neurological surgery randomized to Enoxaparin 40 mg daily or Placebo. All had bilateral leg venography pre-discharge
No pneumoboots

Placebo:	32% DVT rate
Enoxaparin:	17% DVT rate
Major Bleeding:	3% each group

Summary

- **DVT and PE are common in hospitalized patients and represents among the most common preventable adverse outcomes**
- **Routine prophylaxis is not common given**
- **Standard use of prophylaxis reduces adverse events**