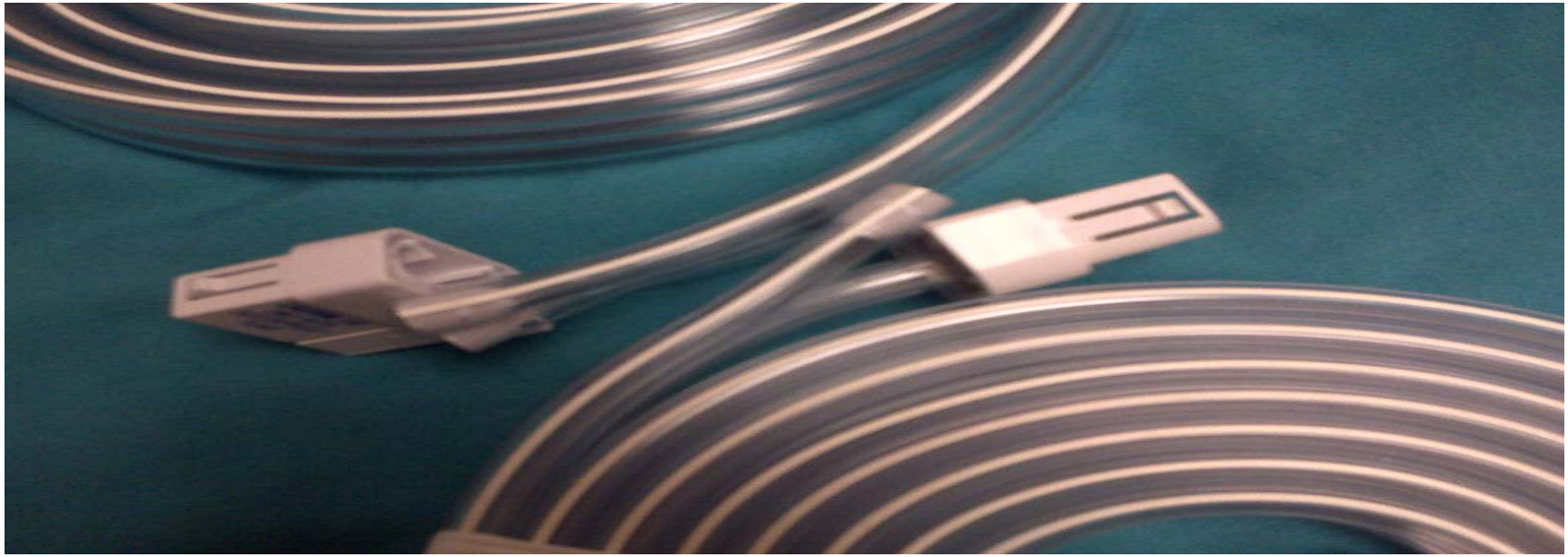

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Summer School 8/19/11

THE RATIONALE FOR DVT PROPHYLAXIS

Objectives

- Available comprehensive source: 2008 ACCP Guidelines
- Understand basic rationale for DVT prophylaxis
- Understand common risk factors, diagnosis, treament of DVT
- Brief review of practice guidelines for General Surgery patient populations

CHEST®

Official publication of the American College of Chest Physicians

Prevention of Venous Thromboembolism*: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition)

William H. Geerts, David Bergqvist, Graham F. Pineo, John A. Heit, Charles M. Samama, Michael R. Lassen and Clifford W. Colwell

Chest 2008;133;381S-453S
DOI 10.1378/chest.08-0656

The Rationale

- Number one cause of preventable hospital death
- 2nd most common medical complication
- 2nd most common cause for excess LOS
- Abundant Level 1 evidence supporting risk reduction with appropriate prophylaxis
- Abundant Level 1 evidence demonstrating safety

Virchow's Triad and the Surgical Patient

- Stasis: supine positioning, immobility, operative time
- Hypercoagulability: decreased clearance of procoagulants, preexisting conditions
- Intimal injury: excessive vasodilatation by vasoactive amines (e.g. histamine) or anesthetics

Comerota AJ, Stewart GJ. In: Goldhaber SZ, ed. *Prevention of Venous Thromboembolism. New York, NY: Marcel Dekker Inc; 1993:25-33*

DVT Risk Factors: 40% of patients have 3 or more of these!

- Surgery
- Trauma (major trauma or lower-extremity injury)
- Immobility, lower-extremity paresis
- Cancer (active or occult)
- Cancer therapy (hormonal, chemotherapy, angiogenesis inhibitors, radiotherapy)
- Venous compression (tumor, hematoma, arterial abnormality)
- Previous VTE
- Increasing age
- Pregnancy and the postpartum period
- Estrogen-containing oral contraceptives or hormone replacement therapy
- Selective estrogen receptor modulators
- Erythropoiesis-stimulating agents
- Acute medical illness
- Inflammatory bowel disease
- Nephrotic syndrome
- Myeloproliferative disorders
- Paroxysmal nocturnal hemoglobinuria
- Obesity
- Central venous catheterization
- Inherited or acquired thrombophilia

Risk of DVT without prophylaxis

Table 4—*Approximate Risks of DVT in Hospitalized Patients (Section 1.2)

Patient Group	DVT Prevalence, %
Medical patients	10–20
General surgery	15–40
Major gynecologic surgery	15–40
Major urologic surgery	15–40
Neurosurgery	15–40
Stroke	20–50
Hip or knee arthroplasty, HFS	40–60
Major trauma	40–80
SCI	60–80
Critical care patients	10–80

*Rates based on objective diagnostic screening for asymptomatic DVT in patients not receiving thromboprophylaxis.

Risk of PE without thromboprophylaxis

- Estimated fatal PE in 0.2-0.9% elective general surgery patients

Methods of Thromboprophylaxis

- Early ambulation
- Unfractionated heparin
  - Prophylatic: 5000 units SQ q8h (or q12h)
  - Therapeutic: IV weight-based dosing protocol
- Low molecular weight heparin (lovenox)
  - Prophylactic: 30 or 40 mg SQ q12h
  - Therapeutic: 1 mg/kg SQ q12h
  - Caution in renal failure (DO NOT USE)
- Graduated compression stockings (TEDs)
- Sequential compression devices (SCDs)

Recommended Thromboprophylaxis

Table 5—*Levels of Thromboembolism Risk and Recommended Thromboprophylaxis in Hospital Patients (Section 1.3)**

Levels of Risk	Approximate DVT Risk Without Thromboprophylaxis, %†	Suggested Thromboprophylaxis Options‡
Low risk		
Minor surgery in mobile patients	< 10	No specific thromboprophylaxis
Medical patients who are fully mobile		Early and "aggressive" ambulation
Moderate risk		
Most general, open gynecologic or urologic surgery patients	10–40	LMWH (at recommended doses), LDUH bid or tid, fondaparinux
Medical patients, bed rest or sick		
Moderate VTE risk plus high bleeding risk		Mechanical thromboprophylaxis§
High risk		
Hip or knee arthroplasty, HFS	40–80	LMWH (at recommended doses), fondaparinux, oral vitamin K antagonist (INR 2–3)
Major trauma, SCI		
High VTE risk plus high bleeding risk		Mechanical thromboprophylaxis§

General Surgery

- Low risk: early ambulation (example: thyroidectomy)
- Mod risk: heparin (q8h, q12h) or lovenox
- High risk: SQ heparin q8h, or lovenox
- Particularly high risk: add mechanical method
- High risk of bleeding: mechanical method, eventual resumption of pharmacologic agent

Epidurals

- Use SQH for patients with an epidural
  - Vanderbilt APS- prophylactic lovenox okay (not therapeutic dosing)
- Do not give pre-op SQH if patient is scheduled for epidural; dose given 1 hr after placement
- Hold dose SQH if want APS to pull epidural
- *Also hold SQH/lovenox for certain IR procedures (call)

Laparoscopic Surgery

- Low-risk: early ambulation

- With any additional risk factors: recommend one or more of following:
  - LMWH, SQH, SCDs

Bariatric Surgery

Incidence of clinically evident deep venous thrombosis after laparoscopic Roux-en-Y gastric bypass

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- 380 patients (1 surgeon)
- 9 with chronic DVT prior to operation
- 1 patient (0.26%) with "clinically evident postoperative popliteal DVT"
- 0 pulmonary emboli

- CONCLUSION: "The incidence of clinically evident DVT after laparoscopic Roux-en-Y gastric bypass is low when the procedure is accomplished with a relatively short operative time, with the initiation of calf-length pneumatic compression hose before the induction of anesthesia, and with routine early ambulation. No form of heparin anticoagulation is mandatory when these conditions can be met."

Bariatric Surgery

- Routine prophylaxis with lovenox (q12h) or SQH (q8h) +/- SCDs
- Should use higher doses of lovenox or SQH for obese patients

Trauma

- All major trauma patients should get LMWH
  - Start when clinically safe
  - SCDs in interim
- Recommend against routine screening.
  - Screen with duplex for high risk patients (SCI, TBI, pelvic fx) only if suboptimal thromboprophylaxis
- Recommend against IVC filter for thromboprophylaxis

Signs/symptoms of DVT

- Calf tenderness
- Warmth
- Unilateral LE or UE swelling (difference in calf diameter)
- “Knot” or “cord” on palpation
- Pain with passive flexion (Homan’s sign)
- *Prior catheter site- especially if UE

Diagnosis

- D-dimer not helpful
- Compression ultrasound- LE duplex ultrasound (radiology menu- doppler)
  - Unilateral for suspicion; bilateral if surveillance
  - Does not need to be done in vascular lab
  - Can be portable
- *UE: considered DVT if subclavian, axillary, brachial, or jugular veins (not cephalic or basilic)

Treatment

- Goals: prevent clot extension, recurrence, PE (50% will have PE if untreated)
- If catheter in place, remove if possible
- Anticoagulation with therapeutic heparin drip (PTT 60-80, q6h PTT) or lovenox (1 mg/kg q12h) with bridge to coumadin
- Coumadin for *at least* 3 months if first DVT
  - INR 2.0-3.0

Why not anticoagulate?

- HIT: heparin-induced thrombocytopenia
  - Affects up to 5% of patients exposed to heparin > 4 days
  - Occurs 5-10 days after heparin started
  - Pt makes antibodies against heparin-platelet factor 4 (PF4)
  - Causes thrombosis and thrombocytopenia
- If HIT positive: anticoagulate with lepirudin, argatroban, or fondaparinux
  - *Typically requires hematology consult

Reversing anticoagulation

- Heparin: protamine (1 mg/100 units heparin)
  - *can cause anaphylaxis (1%) if prior exposure
- Lovenox: protamine (less effective)
- Coumadin: vitamin K (10 units IV), FFP
- ASA/plavix: platelet transfusion
- Renal failure: DDAVP (increases release vWF from endothelium) or dialysis


Fotos 4 Frandsen