Venous Thromboembolism

Resident Review
Venous Thromboembolism

- DVTs
- PE
- SVT

- Etiology, Diagnosis, Treatment, Complications of Treatment
VTE – Incidence

- More than 500,000 recognized DVTs per year (U.S.)
- More than 50,000 recognized deaths from P.E. per year (U.S.)
VTE - Etiology

- Virchow’s Triad
- Stasis
- Endothelial Injury
- Hypercoagulable States
VTE - Etiology

• Stasis
  – Calf veins / soleal sinuses source of most DVTS (roles of muscle contraction, reflux)
  – Pelvic veins alone (certain procedures)
  – Upper extremity rarer – lines, trauma
VTE - Etiology

Hypercoaguable States

- Congenital and Acquired
- Must know basics of coagulation vs thrombolysis
Acquired Hypercoagulable States

Common Examples

• Malignancy (esp mucin secreting tumors)
• Oral Contraceptives (reduce AIII levels)
• Pregnancy
• Trauma / Surgery
• Cardiac / Renal Disease
Congenital Hypercoagulable States

Common Examples
- Antiphospholipid Antibodies
- Protein C and S deficiencies
- Antithrombin III deficiencies
- Factor V Leiden
- Hyperhomocysteinemia
VTE - Presentation

- Extremely Variable
- 40-50% DVTs are silent
- Edema, pain, colour change
- Phlegmasia
  - Cerulea dolens
  - Alba dolens
  - Venous limb gangrene
VTE - Diagnosis

DVTs
- Clinical judgement 50/50
- Duplex
  - >95% sens, >90% spec
  - Clot characteristics
  - Extent of study (ie. Calf veins)
- Other
  - Venography, IPG etc
VTE - Diagnosis

- PE
  - V/Q scans
  - CT chest
  - Pulmonary Angio

- PE may be the first and only sign of VTE
VTE - Prevention

• Must know ACCP Consensus on Antithrombotic Therapy (last Chest Jan 01)

• Issues
  – Risk without prophylaxis
  – Prophylaxis strategies and recommendations
  – Level of evidence
  – Special circumstances
General Surgery – Evidence for Prevention

• Without Prophylaxis
  – Incidence DVT is 25%, (30% with malign)
  – Proximal DVT is 7%
  – PE 1.6%, Fatal PE 0.9%

• With Prophylaxis, Risk DVT
  – Aspirin – 20%
  – Elastic Stockings – 14%
  – Low – dose heparin – 8%
  – Low molecular weight heparin – 6%
  – Pneumatic Compression – 3%
General Surgery
Recommended Prophylaxis

• Low risk, minor procedure – no
• Moderate risk – (defn) s.c. heparin, l.m.w. heparin, stockings, pneumatic compression
• High risk – (defn) – s.c, l.m.w, pneumatic compression

• If bleeding risk – mechanical (filter) plus stockings or compression.
VTE - Treatment

Goals

• Reduce
  – Propogation
  – PE
  – Local sequelae
  – Recurrence
VTE - Treatment

• Options
  – Oral Agents
  – S.C. Agents
  – I.V. Agents
  – Thrombolytics
  – Mechanical Devices

• Must Know mechanism, indications, contraindications and complications
Treatment

Oral Agents / Coumarins

• Act by inhibiting production of Vit K dependant coagulants (II, VII, IX, X)
• Also inhibit Protein C and S production
• Indications – long-term anticoagulation
• Contraindications – pregnancy
• Complications – bleeding, skin necrosis (vascular purpura)
Treatment

Heparins

• Acts (mainly) as co-factor for AntiIII
• Unfractionated versus LMW
  – Advantages / disadvantages
• Indications – (usually) short-term anti-coag
• Contraindications – Hx of allergy, HIT, HITT/HAPA, AIII deficiency
• Complications – bleeding, allergy, HIT, HITT, osteopenia, alopecia
Heparin Alternatives to know about

- Danaproid – direct factor XA inhibitor, may be i.v. or s.c.
- Hirudin – direct thrombin inhibitor, for treatment of HITT
Treatment

Thrombolytics

- Convert plasminogen to plasmin etc
- Options – streptokinase, urokinase, TPA
- Indications – fresh clot (less than 5-10 days), ileofem DVT, large PE
- Contraindications – bleeding risks
- Complications – bleeding, allergy
Treatment

Mechanical
• Surgical Thrombectomy (rare)
• IVC ligation
• IVC filter
Treatment

IVC Filters

- Indication – failure of, contraindication to, complication of anticoagulation, previous PE with little pulmonary reserve.
- Placement may be difficult, impossible in some cases
- Does not necessarily preclude anticoagulation
VTE - Sequelae

Issues

• Recanalization
  – 1 week 15%
  – 1 month 50-60%
  – 3 months 85%

• Chronic Venous Insufficiency
  – Reflux, post-phlebitic syndrome

• Recurrence / Duration of Anticoagulation
Superficial Thrombophlebitis

- Usual risk factors for DVT
- Common in Varicose veins, local trauma
- Present with pain, heat, erythema
- Up to 20% may have associated DVT
- Treatment
  - NSAIDS, warm compresses, elevation, compression
  - If “proximal” – anticoagulation, surgery
Septic Thrombophlebitis

Wide spectrum of disease, may be very difficult to diagnose (co-existing illness)

- Etiology – most commonly seen with catheters; perivascular, intravascular suppuration, thrombosis, septicemia
- May be superficial, deep, portal system, intracranial etc
- Treatment – compresses, antibiotics, local drainage, stripping, major interventions.
Pregnancy and VTE

• Incidence – 1 in 250 full term pregnancies
  – 1 in 2000 pregnancies have PE (2nd cause maternal mortality)
  – Ileofem DVT 6x more common in preg (vs nonpreg)

• Etiology
  – Stasis
  – Injury (delivery)
  – Hypercoaguable state (more procoag, less anticoag proteins)

• Treatment – no coumadin, lmw heparin
Upper Extremity

• Etiology
  – Line related
  – Local trauma – Paget- Schroetter syndrome

• Diagnosis
  – Duplex less reliable, venography best

• Treatment
  – Early treatment essential to avoid sequelae
  – Thrombolysis is ideal, then anticoagulation
  – Longer-term - ?role for rib resection