Preoperative Management

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VTE Prophylaxis
Risk

• The morbidity and mortality of VTE make consideration of prophylaxis mandatory for every major operation

• Several risk factors have been identified
Risk Factors

- Age, obesity, previous thromboembolic disease, varicose veins, smoking, major surgery (especially pelvic, urological, orthopedic, and cancer surgery), and several hematologic disorders

- Risk is increased further by the presence of several risk factors
Considerations

- Lowest-risk patients are those undergoing only minor surgery and who have no risk factors – no prophylaxis
- Risk is increased for any patient > age of 40 who undergoes GET for > 30 min
Many prophylactic regimens have proven efficacy for patients at moderate to high risk, and the morbidity is acceptable. Standard regimens are employed increasingly for virtually all patients.
Options

- Prophylaxis options of proven benefit in prospective trials include low-dose unfractionated heparin, low molecular weight heparin, intermittent pneumatic compression, and coumadin
Subcutaneous heparinoids must be administered 2h before induction to be maximally effective, making them somewhat inconvenient for use in ambulatory or same-day admission settings
LMWH

- LMWH is inadvisable with recent neurosurgery, GIB, or renal insufficiency
- Has been reported to cause spinal or epidural hematomas with epidural catheters
- Recommended that an epidural catheter should be removed at least 12h before instituting LMWH
- Concomitant LMWH and epidural catheterization are contraindicated
High Risk

- Require aggressive prophylaxis
  - Multimodality therapy
  - Anticoagulation plus intermittent pneumatic compression
- Although expensive and lacking any RPT, prophylactic use of IVC filters is popular
  - High-risk patients undergoing high-risk surgery may be appropriate candidates
  - h/o DVT or PE or multi-trauma
Bleeding Risk
Evaluation

• Requires a careful H&P to be cost-effective
• Routine screening tests of hemostasis have a low yield
• Important historical data includes a prior episode of bleeding or a thromboembolic event, prior transfusions, prior surgery, heavy menstrual bleeding, easy bruising, frequent nosebleeds, or bleeding gums after brushing the teeth
Coexistent liver or kidney disease, poor diet, excessive alcohol use, ingestion of aspirin, other nonsteroidal antiinflammatory drugs, lipid-lowering drugs (possible vitamin K deficiency), and anticoagulant /antiplatelet therapy must be ascertained.
In the absence of clinical suggestion of a bleeding disorder, the chance that a patient will have a major clotting disorder during surgery has been estimated to be < 0.01%.

Even when indicated, the usual screening tests (PT, aPTT, and platelet count) identify abnormalities of importance in only 0.2%.

False-positives are especially common with the aPTT.
Testing

- One study found the aPTT to be abnormal 14% of the time but consequential in only 16% of positives (2.2% overall)
- Similarly, prolongation of the bleeding time does not correlate with increased operative blood loss
- If a clinically important coagulopathy is identified, therapeutic strategies exist
Anticoagulation
What to Do

• It is often necessary to operate on an anticoagulated patient.

• In such circumstances, it is desirable to reverse the patient's anticoagulation temporarily so that hemostasis can be optimized.

• Procoagulant therapy may sometimes obviate the need for surgery.
What to Do

• Previously, perioperative anticoagulant management was needed for patients with a metal prosthetic heart valve, but now chronic atrial fibrillation is the most common indication

• The approach should be individualized, based on the urgency and magnitude of the surgery to be performed and the strength of the indication for anticoagulation
Most patients who take coumadin and are to undergo ambulatory or same-day admission elective surgery can be managed simply by discontinuing it several days before surgery.

The timing of the medication adjustment depends on the degree of anticoagulation determined by preoperative testing, which in turn depends on the indication for the anticoagulation.
Options

• If there is concern that the patient should not be without anticoagulation, then the patient can be heparinized systemically (heparin drip or LMWH)

• Heparin drip is stopped 4h pre-op (1/2-life is 90 min)

• Data are insufficient for a definitive recommendation regarding LMWH
Antiplatelet

• Plavix, a potent selective inhibitor of ADP-mediated platelet aggregation, is prescribed increasingly for prophylaxis of thrombosis of drug-coated stents
• Effect is immediate and irreversible
  − Should be withheld for 5 to 7 days prior to elective surgery
  − There is increased risk of stent occlusion without Plavix for at least 6 months after stent placement
Aftercare

• In most circumstances, there is less urgency for re-anticoagulation than is generally appreciated

• Protection of a cardiac valve prosthesis is the most urgent indication

• Metal valve can be without anticoagulation for at least 72h and perhaps as long as 1 week, although such a long interval is seldom necessary
Aftercare

- High-risk patients or those unable to take coumadin by mouth can be heparinized safely as early as 12h after almost any operation with secure hemostasis, except neurosurgical procedures and some operations for major trauma.
Aftercare

• Patients who take Plavix appear to be at risk for postoperative bleeding for up to 2 weeks even if Plavix is withheld for several days after surgery

• *Should be reintroduced with particular caution*
Steroids
Traditionally patients on a maintenance glucocorticoid regimen, or who have received corticosteroids within the past 6 months, receive supplemental "stress dose" steroid prophylaxis.

Secondary to concern that a hypophysis-pituitary-adrenal axis suppressed by exogenous steroids may not respond to surgical stress.
Stress Dose

• Large doses (100mg hydrocortisone i.v, every 8h or equivalent) were given for undefined periods without any monitoring

• Normal adrenal glands, stimulated maximally, increase their output from about 35 to 150mg cortisol/day
Exogenous high-dose steroids have deleterious effects on wound healing, host defenses, CHO metabolism and other systems.

There has been no accounting for variability in the stress response.
Adrenal Insufficiency

- A high index of suspicion for adrenal insufficiency is necessary.
- It can be precipitated by postoperative events, such as infection.
- Dx is best made by a stimulation test using cosyntropin.
**Stimulation Test**

- Baseline [cortisol] is drawn, and 0.01 or 0.25mg cosyntropin is administered intravenously.
- Serum [cortisol] is repeated 30 to 60min after the challenge.
- Glucocorticoids can be given immediately thereafter as indicated, pending the results.
Diagnosis

• Dx is confirmed if neither of the values exceeds 15ng/ml or the stimulated [cortisol] does not increase by at least 9ng/ml

• Patients respond hemodynamically within 12 to 24h of starting glucocorticoid (50 to 75mg hydrocortisone q8h or equivalent)

• It may take several days to correct the electrolyte abnormalities or for fever to dissipate
Fever
Fever is common in surgical patients

The list of potential causes of fever is long and includes many noninfectious etiologies

Any fever in a surgical patient is a potential cause for concern

There is a tendency to equate fever with infection

Approximately 1/2 of febrile episodes in surgical patients are noninfectious in origin
Work-up

• The workup and therapy for the individual patient will vary depending on the patient's underlying diagnosis, clinical appearance, and the clinician's suspicion of infection

• Current guidelines for the evaluation of fever in critically ill adults suggest that fever mandates a H&P

• Subsequent testing should be based on the clinical evaluation – in some instances, no further evaluation will be necessary
Elevated body temperature increases basal metabolic rate 7%-15% per °C.

Aside from increased insensible fluid losses and some discomfort, fever is usually not the primary source of morbidity.

Tachycardia or increased oxygen demand may make it desirable to suppress fever in select patients with coronary ischemia or critical acute respiratory failure.

**Treatment**
Treatment

However, most adults without a neurologic diagnosis do not specifically require antipyresis unless temperature exceeds 40°C.

To do so may be harmful because of the salutary effects of fever on host defenses (enhanced neutrophil function, suppressed bacterial growth).
Treatment

- If antipyretic therapy is chosen, then cyclooxygenase (COX) inhibition is most effective, bearing in mind that deleterious effects on renal function and the gastric mucosa are possible with COX inhibitors
  - Potential deleterious effects on renal function and the gastric mucosa
  - Topical cooling is generally ineffective
  - Cutaneous vasoconstriction causes core retention of heat
Non-infectious
Etiology

- A nosocomial infection is a less likely cause of postoperative fever than a noninfectious cause in the first 72h after surgery
- The problem of postoperative fever is a useful paradigm for consideration of the priorities in the workup
- Perhaps more money is wasted in evaluation of early postoperative fever than in any other aspect of postoperative care
Etiology

• The most common cause of early postoperative fever is **ATELECTASIS**

• If atelectasis is present, then pulmonary physiotherapy and early ambulation (if possible) should be undertaken immediately

• Cultures are generally not useful in the immediate postoperative period

• It is unusual for a fresh postoperative patient to have been admitted with a CAP
Endocrine emergencies, including acute adrenal insufficiency or thyroid storm, can be challenging to diagnose because they can be precipitated by infection.

Both can create high fevers with a constellation of systemic signs.
Drug Fever

- Fever coincident with administration of a drug that disappears after discontinuance, when no other cause of fever is apparent
- Dx is one of exclusion
- Skepticism is always in order lest another treatable cause of fever is overlooked
- True drug-related fever probably accounts for no more than 2% to 3% of episodes of fever in hospitalized patients
One of the most common causes of fever in the inpatient setting is a transfusion reaction.

Almost any intracranial pathology can lead to centrally mediated fevers.

Any traumatic or infectious condition of the brain can stimulate a hyperpyrexic response – most common = SAH.

A blood clot anywhere in the body can cause fever.
Health care-associated (nosocomial) infections are potentially devastating complications. Every effort must be made to prevent them. Often arise in association with indwelling devices, such as intravascular catheters, endotracheal or tracheostomy tubes, or other devices that breach or degrade a natural epithelial barrier to infection.
SSI or infection of a traumatic wound is rare in the first few days after operation.

Erysipelas, a necrotizing soft tissue infection caused by pyogenic streptococci.

Clostridial fasciitis or myonecrosis.

It is important to take down the surgical dressing to inspect the incision for a fever in the early postoperative period.
Antibiotic-Associated Colitis

• One complication to which every surgical patient who receives antibiotics is potentially subject

• The most distinguishable of these syndromes, *Clostridium difficile*-associated disease, results from overgrowth and toxin production after antibiotic use
  
  – Even a single dose of a cephalosporin used appropriately for surgical incision prophylaxis
Antibiotic-Associated Colitis

- Practically every antibiotic has been implicated in the pathogenesis.
- The symptoms are nonspecific.
- The spectrum of disease is broad – ranging from asymptomatic disease to fulminant colonic ischemia.
Treatment

- Supportive care, the exclusion of peritonitis or an indication for laparotomy, and flagyl (iv or PO), which is comparable to PO vanc.
- PO vanc can be used for patients who are intolerant of flagyl or who fail therapy with flagyl.
Treatment

- Vancomycin can be administered by lavage or enema if necessary
- IV vanc is ineffective
- Severe cases may require a total abdominal colectomy for cure
  - Operative mortality of up to 50%