POSTOPERATIVE FEVER

- There is no consensus on the definition of fever; many use temperature ≥38.5C/101.3F. Consider using a cutoff of 38.0C/100.4F for immunocompromised patients.
- Axillary measurements of temperature are unreliable and should not be used.
- Atelectasis does **not** cause fever; it can cause hypoxia and should still be treated.
- Remember, patients may have infection in the absence of fever, especially with advanced age, corticosteroid use, and other risk factors; infection may occasionally present with hypothermia.
- Less common causes of postoperative fever: neoplastic, collagen-vascular disease.
- Medications commonly implicated with causing fever: beta-lactams, phenytoin, heparin.

1. Timing after surgery is key to correctly identifying the cause of a fever.

Immediate (within hours)	**Acute (within the first week)**	**Subacute (1-4 weeks out)**
Trauma/cytokine release	Surgical site infection (after 48 hours)	Surgical site infection
Medications	Pneumonia	Thrombophlebitis/DVT/PE
Transfusion reaction	UTI	C. difficile
Necrotizing fasciitis	IV catheter infection	Drug reaction
Infection, thrombosis, or other non-infectious cause present prior to surgery	Non-infectious: MI, DVT/PE, CVA/SAH, thrombophlebitis, hematoma, pancreatitis, EtOH withdrawal, gout, bowel ischemia, TTP, hyperthyroidism, adrenal insufficiency, transfusion or medication reaction, inflammatory reaction to implanted hardware, etc.	Nosocomial or other infection: Pneumonia, UTI, IV catheter, intra-abdominal abscess. sinusitis, otitis media, osteomyelitis, endocarditis, cholecystitis (can be acalculous), etc.

**Watch for surgery-specific causes: meningitis after neurosurgery, toxic shock after nasal or vaginal packing, parotitis after oral surgery, rejection after transplant surgery, fat emboli after orthopedic surgery, infected hardware, etc.

2. Evaluation. Examine the patient carefully (especially the wound) for possible source!

- Most early fever is due to cytokine release and resolves spontaneously.
- Watch for life-threatening causes of early fever such as malignant hyperthermia, neuroleptic malignant syndrome, necrotizing fasciitis, toxic shock syndrome, transfusion reaction, etc.
- Cultures have little utility in the first 48 hours after surgery, unless suspicious for antecedent infection.
- After 48 hours, consider ordering the following tests:
  - CBC with differential ± other blood tests, as indicated by the situation
  - Blood culture when fever is present (draw 2 sets peripherally; or one from central line, one peripheral)
  - Urinalysis, Gram stain, urine culture from catheter port (not urine bag)
  - Chest x-ray ± sputum gram stain and culture if pneumonia suspected
  - Tap fluid collections, as appropriate (pleural, peritoneal, joint, CSF, etc.)
  - Appropriate imaging (e.g., CT or ultrasound for abdominal pain)
  - Stool for C. difficile reflexive panel if suspicious diarrhea and recent antibiotics
  - Test for non-infectious causes, as indicated (LE duplex, CT pulmonary angiogram, ECG, etc.)

3. Treatment. Identify and treat the underlying cause.

- Avoid empiric antibiotics unless they are indicated. (i.e., the patient is neutropenic or hemodynamically unstable, or for certain suspected diagnoses, such as hospital-acquired pneumonia or meningitis)
- Infected wounds and fluid collections require debridement and/or drainage.
- Acetaminophen may be given for comfort (risk of hepatotoxicity with liver disease or starvation); use aspirin and NSAIDs only with caution (risk of renal failure, GI ulceration or wound bleeding).

4. Fever Prevention:

- Discontinue unnecessary medications, especially antibiotics.
- Discontinue catheters as soon as possible (Foley, NG tube, central lines, etc.)
- Subclavian lines are preferred to femoral for reducing infection rates.
- Daily spontaneous breathing trials for intubated patients to reduce pneumonia.
- Use enteral nutrition when possible, in place of total parenteral nutrition.

References

1. Enogoren, M. Lack of Association Between Atelectasis and Fever. Chest. 1995;107:81-84.
2. Netea MG, Kullberg BJ, Van der Meer JW. Circulating Cytokines as Mediators of Fever. Clin Infect Dis. 2000;31:S178-S184.
3. O'Grady NP, Barie PS, Bartlett JG, et al. Practice Guidelines for Evaluating New Fever in Critically Ill Adult Patients. Clin Infect Dis. 1998;26:1042-1059.
4. Plaisance KI, Mackowiak PA. Antipyretic Therapy: Physiologic Rationale, Diagnostic Implications, and Clinical Consequences. Arch Intern Med. 2000;160:449-456.
5. Weed HG, Baddour LM. Postoperative Fever. UpToDate Online 14.2. Printed October 4, 2006.