PHASE I (ED or INPATIENT)

Inclusion Criteria
- Inpatients within 30 days of tumor resection with fever (Temp ≥ 38.3°C or greater than 38 C for > 1 hour)
- Patients without prior chemotherapy
- Neutropenia
- Neurosurgical patients
- Patients who are readmitted after discharge.
- Patients who have resumed chemotherapy within 30 days of surgery

Exclusion Criteria
- Patients without prior chemotherapy
- Neutropenia
- Neurosurgical patients
- Patients who are readmitted after discharge
- Patients who have resumed chemotherapy within 30 days of surgery

Antimicrobials:
- Start cefazidime for empiric coverage for 48 hours urgently. Do not delay first dose for any diagnostic evaluations with the exception of blood cultures.
- Continue perioperative prophylactic vancomycin;
- Discontinue other perioperative antibiotics
- Consult Infectious Disease if cefazidime is continued >48 hours
- For post op head and neck surgery, add Clindamycin
- For post op abdominal surgery, add metronidazole

Fever management:
- Use acetaminophen for fever management only after cultures have been obtained.
- Non-steroidal anti-inflammatory drugs (NSAIDs) are CONTRAINDICATED.
- No rectal temperatures

Recommended Tests (C³PO) and Treatment

Labs:
- CBC + Diff
- C Reactive Protein
- Cultures – blood

Physical Exam
- Consider removing foreign bodies (e.g. Foley catheters, epidural catheters) as soon as feasible in the setting of fever

Other diagnostic tests as indicated:
- Urinalysis and culture
- Viral and respiratory FA if symptoms
- Sputum culture if productive cough
- Wound culture if drainage present
- Chest X-ray with clinical findings suspicious of pneumonia
- Obtain lower extremity doppler if deep venous thrombosis (e.g. swelling, calf tenderness) suspected
- No rectal temperatures

Definitive Antibiotic Treatment
- Any positive cultures identified or other diagnostic evidence of infection should prompt the tailoring of antibiotic therapy to the narrowest effective agent for an appropriate duration.
- For central catheter-related infections, manage in partnership with Hematology/Oncology consultation

Cultures positive?
- Yes, gram positive
- Yes, other
- Neutropenia
- Consult Hematology Oncology if patients are going to be transferred to their service

Absolute Neutrophil Count (ANC) < 500 cells/mm³?
- Yes
- No

Negative Cultures
- If the initial cultures are all negative at 48 hours and there is no other evidence of infection, then empiric antibiotics should be discontinued. If you wish to continue empiric antibiotics for any reason you should consult Infectious Diseases.
Why is fever management different for post-op oncology patients?

- It is known that chemotherapy can have an inhibitory effect on antibacterial, antiviral, and antimycotic immune responses. The surgical oncology patient, although not usually neutropenic at the time of surgery, is likely immunosuppressed owing to prior chemotherapies. Pediatric oncology patients therefore may be at a higher risk than the general population to acquire an infection in the postoperative period. This risk is compounded by several factors: a lower baseline performance status, malnourishment, altered gastrointestinal mucosa, lengthy and complicated surgeries, indwelling central venous catheters (CVC), and gastrointestinal tubes. Special consideration needs to be taken when caring for surgical oncology patients. LOE: [E (Expert Opinion), (Hendershot, et al. 2009)]
This fever management algorithm applies to:

- Inpatients who have had chemotherapy and are now within 30 days of tumor resection with fever (Temp ≥ 38.3 C. or greater than 38 C for > than 1 hour).
- Does NOT apply to :
  - Patients who have NOT had chemotherapy
  - Patients who are neutropenic
  - Patients who resume chemotherapy within 30 day post-op period
  - Patients who have been readmitted after discharge
Key recommendations for providers:

1. Febrile post-operative oncology patients require prompt assessment and work-up for infection including cultures, CBC, CRP, and physical examination.

2. Fever definition: Temperature greater than 38.3°C or greater than 38.0°C for more than 1 hour. This is in keeping with the definition of fever for the neutropenic patient.

3. Empiric broad spectrum antibiotics should be started ASAP after fever recognition. (**Goal: within 1 hour**)

4. The Hematology / Oncology team should be consulted for neutropenic patients (ANC < 500 cells/mm³) or assistance in management of complex patients.

Recommendations:

5. Once the cultures have been obtained, **oral** acetaminophen may be used for fever management. Rectal meds and NSAIDS should not be used.

6. Infectious Disease should be consulted for assistance with the selection of empiric antibiotics, decisions about continuing antibiotics beyond 48 hours, and assistance with ongoing fevers/concerns for infection with no clear etiology despite antibiotics.

[LOE: E (Expert Opinion)]
Hour 1

- Fever 38.3 or >38 for 1 hour
- Order cultures
- Start empiric antibiotics
- Continue Workup C3PO
We used the GRADE method of rating evidence quality. Evidence is first assessed as to whether it is from randomized trial, or observational studies. The rating is then adjusted in the following manner:

Quality ratings are *downgraded* if studies:
- Have serious limitations
- Have inconsistent results
- If evidence does not directly address clinical questions
- If estimates are imprecise OR
- If it is felt that there is substantial publication bias

Quality ratings can be *upgraded* if it is felt that:
- The effect size is large
- If studies are designed in a way that confounding would likely underreport the magnitude of the effect OR
- If a dose-response gradient is evident

**Quality of Evidence:**
- ✭✭✭✭ High quality
- ✭✭✭ Moderate quality
- ✭✭✭✭ Low quality
- ✭✭✭✭ Very low quality
- Expert Opinion (E)

Summary of Version Changes

- **Version 1.1 (12/15/2011):** Go live
- **Version 2.0 (10/14/2014):** Antibiotics changed from Zosyn to ceftazidime per antibiotic stewardship program recommendations; executive summary and slide decks amended to align with these changes
- **Version 3.0 (5/22/2017):** Change to the fever definition to align with Hem/Onc as part of a CSW HOBSI pathway improvement.
Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required.

The authors have checked with sources believed to be reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication.

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