Clinical Pathway

Neutropenic Fever (Temp >38.3, or Temp 38 for > 1 hour and ANC ≤500)

Updated: March 2011

Outcomes/Goals	**1.** Rapid identification/treatment of pediatric patients w/neutropenia and fever **2.** Create an efficient team-oriented approach in conjunction with Peds Hem/Onc (PHO service) **3.** **Antibiotic administration within 60 minutes of arrival** **4.** Ensure stability of patient after antibiotic administration prior to admission to the floor.
NURSE Documentation	Vital signs, evidence of shock/decompensation, neuro status with attention to alertness. Onset of fever. Presence of central line, last access to port, history of line infections or problems with port. Chief complaint with associated symptoms. Medications, allergies, vital signs, weight per standard of care and triage guidelines. General appearance. Monitor vital signs throughout antibiotic infusion and post infusion.
INTERVENTIONS Initiate on arrival	ESI Triage level II Mask patient and place immediately in room LMX to Port (if not done prior to arrival) – Do not delay access if unstable Bedside vitals and weight, complete triage in room. No Rectal temps. Central line access Cardiac/respiratory monitoring with minimum Q30 minutes vitals 20 mg/kg NS bolus – initiate with antibiotic infusion
DIAGNOSTICS	Blood Cultures (central draw – each lumen, peripheral only w/specific order) Consider bedside CBG CBC with Manual Diff CMS – hold. Send if indicated/LIP order Type and cross – hold in anticipation of blood, platelets or FFP UA/Mandatory culture – Do Not Cath for specimen – Do not delay antibiotics for urine collection Localized signs of infection may be appropriate for culture Chest x-ray if indicated (URI sxs, abnormal lung exam, hypoxia, tachypnea)
PHYSICIAN (LIP)	
Documentation	Onset of fever, date of most recent chemo, type of chemo, last blood counts
Fluids	Normal Saline bolus 20 ml/kg if indicated for hypotension or poor perfusion May repeat as indicated by abnormal vitals/poor perfusion
Medication Antipyretics	Acetaminophen 12.5 mg/kg PO
Antibiotics **(Administer within 60 minutes of arrival)**	Cefepime 50 mg/kg IVPB ***High risk (ill appearing, ANC<500, history of MRSA, hypotension)*** Add Vancomycin 10-15 mg/kg/dose IV - upon direction of peds hem/onc fellow
ADMISSION	Call Peds Hem/Onc Fellow with results and develop follow-up/admission plan Prepare family/patient for admission as appropriate Ensure stability of vital signs prior to admission to floor
*High Risk versus Low Risk Considerations	Factors that favor **low risk** for severe infection: 1. ANC > 500 2. Nearly normal results of hepatic and renal function tests 3. Resolution of Neutropenia expected in <10 days 4. No intravenous catheter site infection 5. Early evidence of bone marrow recovery 6. Non-toxic presentation

Clinical Pathway Decision Making Process

Neutropenic Fever

Temp >38.3, or Temp 38 and ANC ≤500

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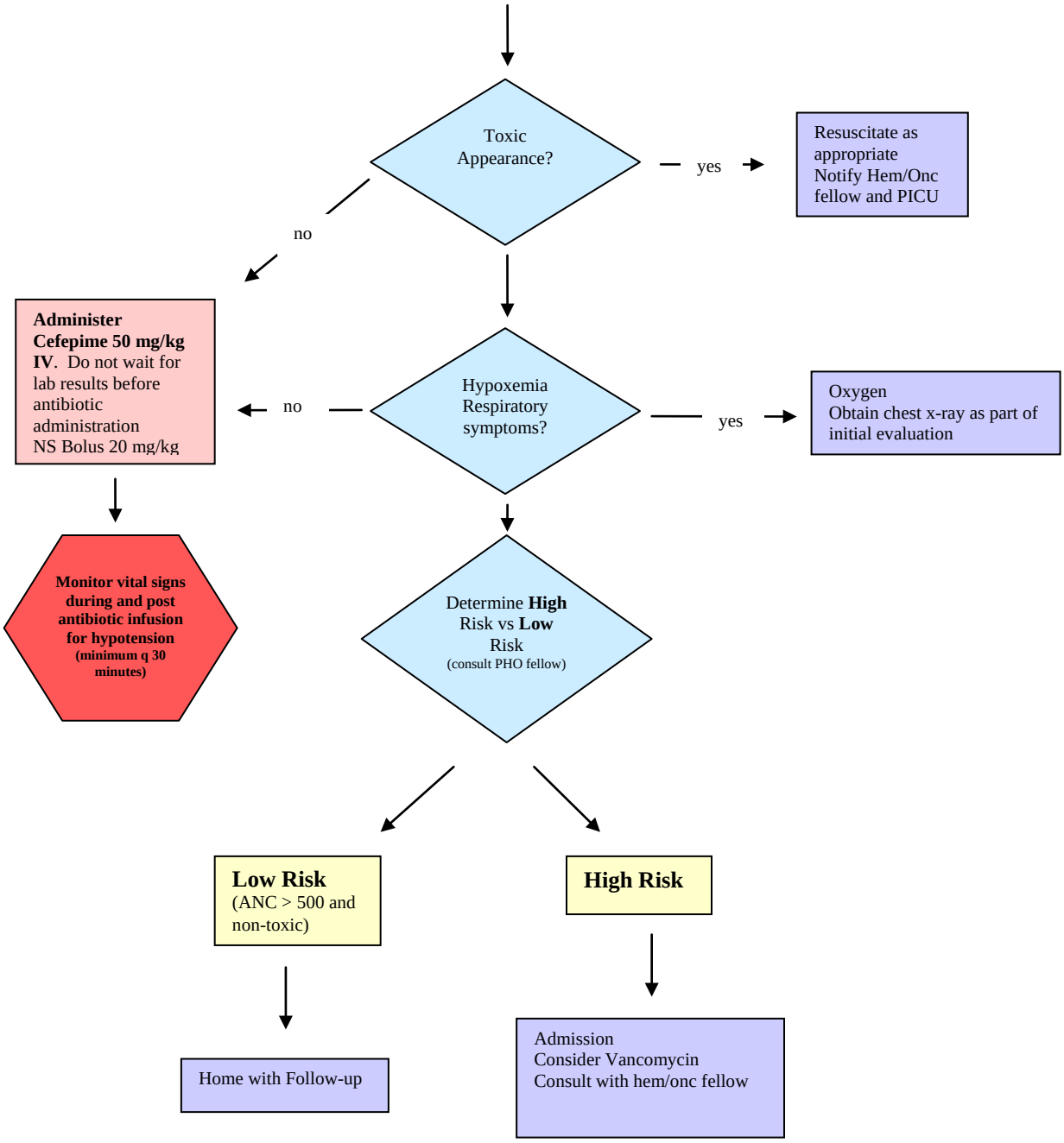
Immediate Action

1. Mask patient and place immediately in room
2. Bedside triage/registration
3. Central line access
4. Blood cultures
5. CBC with manual diff
6. Draw/hold CMS
7. UA/mandatory cx (do not delay antibiotics for UA)
8. Administer Cefepime within 60 minutes of arrival



Neutropenic Fever Rationale and Data

Goals of Clinical Pathway

1. Rapid identification and treatment of the pediatric patient with neutropenia and fever
2. Create a team-oriented approach to efficient and timely evaluation and work-up in conjunction with Peds Hem/Onc
3. Antibiotic administration within 60 minutes of arrival

Data Considerations	Interventions	Rationale
Neutropenia	Documented ANC level	The absolute neutrophil count (ANC) number defines Neutropenia. The ANC is calculated by multiplying the percentage of bands and neutrophils (segmented neutrophils or granulocytes) on a CBC differential times the total white WBC count. The risk of bacterial infection is related to both the severity and duration of neutropenia. In prolonged severe neutropenia, life-threatening gastrointestinal and pulmonary infections occur, as does sepsis. However, patients with neutropenia are not at increased risk for parasitic and viral infections. (Godwin 2006).
Urine collection	Urine specimen collection	Urine analysis and culture indicated if no focal point for infection. Due to compromised immune response urine should not be obtained via catheterization. *Note: Bag collection sample has an increased risk of contamination, false-positive rate ranging from 12-83%.*
Blood Culture		*Pseudomonas* spp., *Escherichia coli*, *Streptococcus* spp., *Staphylococcus aureus*, and *Klebsiella* spp. were the most common bacteria identified in the cultures (Courtney 2004). The majority of patients with fever and bacteremia rapidly respond to antibiotics, however 10% will develop toxic shock-like syndrome with fever, hypotension, diffuse rash with subsequent desquamation and ARDS with mortality rates of 6-30% (Donowitz 2005).

Risk Stratification

- Intravenous monotherapy can be given if neutropenia is anticipated to be of short duration; it is also acceptable if neutropenia is expected to be more prolonged but the patients is stable and do not have an infectious focus. All other patients should receive combination therapy with an aminoglycoside, if infection with a gram-negative pathogen is suspected, or a glycopeptide, if a gram-positive organism is suspected. However, antimicrobial therapy with coverage against gram-negative organisms should always be provided because of the significant mortality associated with these infections (Klastersky, 2006).

Low Risk Criteria

- Outpatient treatment of low-risk febrile neutropenic cancer patients utilizing standard treatment pathways is associated with minimal morbidity and mortality and should be considered an acceptable standard of care with appropriate infrastructure available to provide strict and careful follow-up while on treatment. Certain factors are associated with higher risk of hospitalization and should be further examined in eligible patients with low-risk febrile neutropenia.

Bacterial Pathogen Consideration

Gram-positive cocci and bacilli accounts for 60-70% of isolates
- Staphylococcus
- Streptococcus
- Enterococcus
- Corynebacterium

Gram-negative cocci and bacilli
- Escherichia coli
- Klebsiella pneumoniae
- Pseudomonas aeruginosa

Anaerobes
- Bacteroides
- Clostridium
- Fusobacterium
- Peptococcus/peptostreptococcus
- Veilonella

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