Purpose: To provide a practice guideline for diagnosis and optimal antibiotic treatment for suspected and confirmed urinary tract infections in preterm and term infants adhering to antibiotic stewardship aims.

Scope: Neonatologists, Neonatal Nurse Practitioners, Pharmacists, Registered Nurses.

Definitions: Urinary tract infection (UTI)  
Urosepsis: Sepsis caused by infection of the urinary tract  
CFU: Colony forming units  
Late-onset sepsis (sepsis that occurs after 72 hours of life)  
Pyuria: presence of pus in urine  
Pus: exudate abundant with white blood cells  
Concordant: same organism identified in the blood or CSF within 3 days of the urine culture

Background: Urinary tract infections are common among infants admitted to the NICU and are most common in infants with birthweight <1500 (Downey, et al). Urine cultures are rarely positive in the first 24-72 hours of life in neonates. Therefore, urine cultures should be obtained as part of the late-onset sepsis evaluation. Large study performed by Downy, et. al (2013) supports obtaining urine culture as part of late-onset sepsis evaluation because 13% of UTIs were concordant between blood and urine cultures.

Clinical manifestations of UTI are nonspecific systemic symptoms such as fever, lethargy, poor feeding, failure to thrive, vomiting, apnea/bradycardia, and jaundice (Uptodate). Neonatal urinary tract infections (UTI) may also be associated with bacteremia. Due to the risk of urosepsis, intravenous broad spectrum antibiotics should be initiated empirically pending urine culture results. Once the pathogen culture has been identified, organism-specific antimicrobial therapy should be modified based on the isolated organism and its antibiotic susceptibility.
Over-diagnosis of UTI is a common problem, leading to overuse of antibiotics. Minimizing false positive urine culture results can contribute to appropriate and judicious antibiotic therapy.

The diagnosis of a UTI should be based on a positive urine culture (greater than or equal to 1,000 CFU of a single organism in a urine specimen obtained by suprapubic aspiration or greater than or equal to 10,000 CFU of 1 or 2 organisms from a specimen obtained by urethral catheterization. Urine specimens collected by bag should never be used for diagnosis of UTI, due to increased rates of false positives. Urine specimens with low colony counts or growth consisting of mixed organisms and absence of pyuria usually reflect contamination.

Most common organisms identified in urine cultures include Escherichia coli, klebsiella, and enterococcus. Other less common pathogens identified include coagulase-negative staphylococcus and enterobacter. (Foglia and Lorch).

Common organisms considered as contaminants include: non-specified streptococci, bacillus sp., Corynebacterium sp., diphtheroids sp., gram-positive rods (not including Listeria sp.), Lactobacillus sp., Micrococcus sp., Stomatococcus sp., and Bacteroides sp.

**Medical management:**

1. Medical management should be initiated promptly when fever of unknown etiology is present or late-onset sepsis is suspected. As part of the work up, a urinalysis and urine culture should be obtained. Urinalysis is not sensitive or specific enough to be used alone to diagnose UTI, but can be used to evaluate leukocyte esterase (marker of pyuria) and nitrite (marker of Enterobacteriaceae). Suprapubic tap is most reliable source for obtaining urine culture. Bladder catheterization is an alternative to suprapubic tap. Urinalysis can be obtained by any method.

2. Begin antibiotic therapy: Due to the risk associated with bacteremia, broad spectrum antibiotics should be initiated, as outlined in Saint Joseph Hospital “NICU Late-Onset” Sepsis” guideline.

3. Monitor all cultures. If cultures remain negative at 48 hours and infant has clinically improved, discontinue antibiotics.

4. If an organism has been identified, antibiotics should be changed to the narrowest-spectrum and targeted to the sensitivities of the pathogen.

5. Length of treatment with antibiotics should be determined by the clinical condition. If infant is greater than 30 days of age, antibiotics may be given orally after 7 days of IV antibiotics (Seattle Children’s).
6. Follow-up urine culture for “test of cure” is not routinely recommended unless there is no improvement in clinical status. (Currie, 2003) and (Oreskovic, 2007).

7. Consider imaging studies to evaluate for congenital anomalies of the kidney and urinary tract.

References:


Robinson, Joan L., Jane C. Finlay, Mia Eileen Lang, and Robert


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