

2–3 sets of peripheral blood cultures (Table 37). Antimicrobial susceptibility results from isolated organisms can be used to direct therapy to reduce the likelihood of sepsis, further extension of infection to contiguous organs, and mortality. Sterile cultures of necrotic pancreatic tissue are not unusual but may trigger consideration of an expanded search for fastidious or slowly growing organisms, parasites, or viruses.

XI. URINARY TRACT INFECTIONS

Clinical microbiology tests of value in establishing an etiologic diagnosis of infections of the urinary tract are covered in this section which includes specimens and laboratory procedures for the diagnosis of cystitis, pyelonephritis, prostatitis, epididymitis, and orchitis.

Key points for the laboratory diagnosis of urinary tract infections:

- In the absence of signs and symptoms consistent with urinary tract infection, a urine culture is typically not recommended.
- Urine collected for culture should not be kept at room temperature for more than 30 minutes. Hold at refrigerator temperatures or utilize a preservative tube if not processed by the laboratory within 30 minutes.
- Reflexing to culture based on a positive pyuria screen may be considered. If a reflexive algorithm is implemented, it should be a locally approved policy guided by clinicians and laboratorians.
- Three or more species of bacteria in a urine specimen usually indicates contamination at the time of collection and interpretation remains challenging.

IDSA guidelines for diagnosis and treatment of urinary tract infections are published [317] as are ASM recommendations [318]. These guidelines provide diagnostic recommendations that are similar to those presented here (Table 38). The differentiation of cystitis and pyelonephritis requires clinical information and physical findings as well as laboratory information, and from the microbiology laboratory perspective, the spectrum of pathogens and diagnostic approach are similar for the 2 syndromes [319]. Urine culture is one of the most commonly ordered diagnostic tests in the “work up” of infectious diseases, and its effectiveness relies on a multimodal and multidisciplinary diagnostic stewardship [320]. In the absence of signs and symptoms consistent with urinary tract infection, primarily dysuria, urgency, frequency, and/or costovertebral tenderness, a urine culture is typically not recommended, regardless of the presence of pyuria, except in specific patient populations. There is no single laboratory parameter or

combination of parameters that can sufficiently predict whether the patient has a urinary tract infection or if bacteria will be recovered in culture. Recent studies have demonstrated that pyuria alone is likely the best marker in terms of negative predictive value, and culturing urine samples with demonstrated pyuria, including markers such as leukocyte esterase or white blood cells (WBCs), increases the likelihood of a positive culture; however, methods for detection of pyuria (both WBCs and leukocyte esterase) have not been standardized, and variable results can be seen due to the use of spun versus unspun urine, different lengths of centrifugation, and utilization of an automated versus manual system (ie, “dipstick”) [321, 322]. Although >10 WBCs per low power field is a commonly adopted threshold for a urinalysis with reflex to culture (UARC) algorithm, this threshold cannot be effectively applied to all patient groups, and exceptions are recommended for specific groups including patients who are pregnant and patients with urologic abnormalities or undergoing urologic procedures [321]. Laboratory algorithms should take into account local patient populations (patients with neutropenia, pediatric patients, patients with a high prevalence of asymptomatic bacteriuria or non-specific pyuria, such as patients with indwelling catheters, etc.) and should be guided by both clinicians and laboratorians. In older adults with mental status changes or falls and without classic localizing UTI symptoms, bacteriuria may be unrelated, and a thoughtful approach should be taken before including urine culture as part of the diagnostic plan [317].

Cystitis and Pyelonephritis

Laboratory culture of urine continues to be routinely performed using quantitative methods, with the standardized threshold in symptomatic patients of >100 000 CFU/mL for organisms identified as common pathogens; however, many sites now use either 10 000 CFU/mL or 1000 CFU/mL threshold based on the method of collection or patient population as a baseline for culture workup and clinical significance [323]. Laboratories typically provide antimicrobial susceptibility testing (AST) for potential pathogens recovered in significant numbers as part of standard laboratory protocol. The Gram stain is not routinely utilized for the diagnosis of uncomplicated urinary tract infection, but it may have limited utility in patients with febrile urinary tract infection (pyelonephritis, prostatitis, urosepsis) where high numbers of gram-negative bacilli may be present in urine [324].

Because urine may be readily contaminated with urogenital microbiota, proper specimen collection is essential for urine culture and should be performed using a process that minimizes contamination from the perineal and superficial mucosal microbiota. Although some literature suggests that traditional skin cleansing in preparation for the collection of midstream voided or “clean catch” specimens is not of benefit, no recommendation against cleansing can be made due to lack of