

CHROMagar Orientation Medium Reduces Urine Culture Workload

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Microbiology laboratories continually strive to streamline and improve their urine culture algorithms because of the high volumes of urine specimens they receive and the modest numbers of those specimens that are ultimately considered clinically significant. In the current study, we quantitatively measured the impact of the introduction of CHROMagar Orientation (CO) medium into routine use in two hospital laboratories and compared it to conventional culture on blood and MacConkey agars. Based on data extracted from our Laboratory Information System from 2006 to 2011, the use of CO medium resulted in a 28% reduction in workload for additional procedures such as Gram stains, subcultures, identification panels, agglutination tests, and biochemical tests. The average number of workload units (one workload unit equals 1 min of hands-on labor) per urine specimen was significantly reduced ($P < 0.0001$; 95% confidence interval [CI], 0.5326 to 1.047) from 2.67 in 2006 (preimplementation of CO medium) to 1.88 in 2011 (postimplementation of CO medium). We conclude that the use of CO medium streamlined the urine culture process and increased bench throughput by reducing both workload and turnaround time in our laboratories.

Urinary tract infections are one of the most common infectious diseases for which patients seek medical attention, and although many of these infections are treated empirically, urine cultures account for a significant portion of every clinical microbiology laboratory's daily workload (1, 2, 3, 4). The laboratory diagnosis of urinary tract infection requires quantitative urine culture on standard agar media. Because only 20 to 30% of urine samples result in significant growth, a considerable amount of time is expended evaluating samples that do not have clinical utility (5). Therefore, any new medium or method with the ability to streamline urine culture processing in a meaningful way, such as reducing technologist workload, improving result turnaround times (TATs), or reducing laboratory costs, would be welcomed and has the potential to have considerable laboratory impact.

Urine cultures have traditionally been performed using sheep blood agar (BA), a nonselective medium, and a selective medium such as MacConkey (MAC) agar, cysteine lactose electrolyte-deficient (CLED) agar, or eosin methylene blue (EMB) agar (6). Chromogenic media applicable to urine culture processing and reporting have been commercially available for more than 10 years and offer another option for diagnostic laboratories. Chromogenic media are intended to correctly identify more-frequently occurring bacteria and yeasts or organism groups on primary culture with no further testing or a minimum number of confirmatory tests. Substrates present in chromogenic media target specific classes of enzymes produced by certain bacteria and yeasts (7). Target enzymes hydrolyze chromogenic substrates generating colored products which allow for easy identification of specific organisms (7, 8). Chromogenic media have been reported to be an acceptable alternative to traditional media for the isolation of urinary pathogens (1, 9, 10, 11, 12, 13, 14). Chromogenic media may facilitate improved sensitivity of identification of some Gram-positive cocci (e.g., enterococci) in mixed cultures with *Enterobacteriaceae* and may promote more uniform interpretation of urine culture plates by less experienced bench technologists (1, 10, 13, 15). Chromogenic media may also promote more rapid identification of the etiological agent(s) of infection and may provide

clinicians with relevant information regarding their choice of empirical antimicrobial therapy for their patients. Consequently, this may decrease inappropriate use of antibacterial and antifungal agents (1, 4, 16, 17). Published data support performing antimicrobial susceptibility testing on colonies taken directly from CHROMagar Orientation (CO) medium (Becton, Dickinson, Cockeysville, MD) (1, 14).

Only two previous reports have been published describing an assessment of workload and/or cost savings associated with chromogenic media used for urine cultures (1, 13). D'Souza et al. reported that the use of CO resulted in a >50% reduction in inoculation time and a >20% reduction in workup time (1). Ohkusu (13) reported that the cost associated with identification of Gram-negative bacilli using CO medium was reduced 70% compared to that of identifications generated using the Crystal E/NF system (Becton, Dickinson).

The purpose of the current study was to add to the limited literature in this area by determining if a reduction in additional test workload, TAT, and/or labor costs could be realized by implementing CO medium as the primary medium for urine culture. The use of CO medium was compared to the traditional method of using BA and MAC agar for routine urine cultures in two hospital microbiology laboratories.

MATERIALS AND METHODS

Study sites and timeline. The study was conducted at Diagnostic Services of Manitoba's two largest clinical microbiology laboratories (Health Sciences Centre and St. Boniface Hospital), which collectively process approximately 65,000 urine specimens per year. Between 2006

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