

O3

Reduction in workload by use of CHROMagar Orientation™ for urine cultures compared to the use of Blood Agar/MacConkey agar split plate

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Objective: Urine culture is traditionally done by inoculating 0.001 ml onto Blood and MacConkey agar (BA/MAC split plate). CHROMagar Orientation™ medium for urine culture offers presumptive identification of organisms by means of distinct colony colors. The objective of this retrospective study was to assess the impact on workload by using the CHROMagar Orientation™ medium as a primary medium.

Methods: The workload for approximately 14,000 urine cultures (6 months of data) from 2006, 2007 and 2008 was analyzed. In 2006, the cultures were done on BA/MAC split plate, in 2007, CLSI spot tests were implemented, and in 2008 CHROMagar Orientation™ was implemented as the primary culture medium. Work Load Units (WLUs) set up by the Standards for Management Information Systems (MIS) for tests performed on specimens were tracked automatically by the Delphic Laboratory Information System (Sysmex, Auckland, New Zealand).

Results: The total wlu/6 months was 232,462, 220,096 and 212,309 for 2006, 2007 and 2008, respectively. This represents 16.21, 15.27 and 14.34 wlu/urine specimen for 2006, 2007 and 2008, respectively. There was a net 6% reduction in wlu/spec from 2006 to 2007 and a further 6% reduction in wlu/spec from 2007 to 2008. The reduced workload was due to fewer Gram stains (30%), sub-cultures (44%), rapid biochemicals (44%), tube biochemicals (60%), ID cards (60%), latex agglutination (75%) and slide agglutination (84%). Only wet mount tests increased (by 51%). In 2008 there was a net saving of 1.865 wlu/specimen and this amounts to 55,215 wlu/year which equals 0.72 EFT.

Conclusions: Implementation of CLSI spot tests reduced workload by 6% and implementation of CHROMagar Orientation™ gave an additional 6% reduction. We now need 0.72 EFT less technologist time per year to process urines with CHROMagar Orientation™ versus using BA/MAC. In addition it has resulted in a reduction in cost as 60% fewer ID cards are needed. Our data demonstrate that use of CHROMagar Orientation™ reduced labour and cost for urine culture.

O4

Increased rate of true pathogen recovery from pediatric blood cultures when body weight-appropriate volumes are collected

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Background: In adults, the volume of blood collected for culture is the single most important factor for optimal pathogen recovery. Traditionally, very small volumes have been collected in children, despite the knowledge that low level bacteremias occur in 60% of children. Recent guidelines suggest basing the volume of blood collected on a percentage of the total blood volume (TBV) of the child, as estimated by weight or age. We studied the effect of increased volume of blood collected for culture in a pediatric population by comparing the rate of pathogen recovery from cultures with appropriately (A) versus inappropriately (I) drawn volumes in a 372 bed pediatric tertiary care facility.

Methods: New guidelines for blood volume for blood culture (BC) were implemented based on approximating 1.5% of the TBV per BC set as determined by weight of child. Blood was drawn into pre-weighed BC vials which were weighed again post-inoculation. During Jun to Oct 2007 and Feb to Jul 2008, BC data were collected for study. BCs were performed using BACTEC Peds Plus/F and Standard 10 vials in the BACTEC 9240 BC system.

Results: Approximately 15,000 BC were received during the study periods, of which 4349 (~29%) were eligible for study (pre and post weights). The average age was 5.4 years (range 0d–18y).

Table 1: Blood volume and culture positivity rates according to weight of child

Wt (kg)	Suggested Vol (mL)	No. of BC-A	No. of BC-I	Mean Vol-A (mL)	Mean Vol-I (mL)	TP-A (%)	TP-I (%)	FP-A (%)	FP-I (%)
≤1	0.5–1	9	0	0.8	n/a	11.1	n/a	0.0	n/a
>1–2	1–2	16	6	1.8	0.6	0.0	0.0	0.0	0.0
>2–6	2–3	352	274	3.0	1.0	3.7	1.8	2.3	5.8
>6–12	3–6	656	290	5.1	1.6	2.3	1.7	2.9	3.4
>12–24	6–10	950	496	9.8	3.3	3.5	2.2	1.8	3.2
>24–36	10–20	350	180	15.0	5.3	5.7	3.3	2.0	3.9
>36	20	338	432	21.9	9.1	2.1	2.8	1.2	3.2
Total	n/a	2671	1678	9.9	4.3	3.3	2.3	2.1	3.8

n/a = not applicable, TP = true positives, FP = false positives/contaminants.

Conclusions: Despite intensive education regarding new guidelines for increased blood volume collection for culture, almost 40% (1678/4349) of all blood cultures had inadequate blood volumes drawn. In most weight categories, the true positivity rate was higher and contamination rates lower in BCs with appropriate volume collected for body weight. This clearly shows that appropriately drawn blood volume for BC based on weight of the child improves pathogen recovery and that such practices must be implemented to optimize patient care practice.

O5

Utility of Gram stain and cell counts for diagnosing septic arthritis

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Objectives: Determine the sensitivity of synovial Gram stain and cell counts in establishing the diagnosis of SA and to determine the rate of submission of synovial cell count when SA is suspected.

Methods:

- A retrospective study
- Study population – patients with SA confirmed by positive synovial fluid cultures due to pathogenic organism(s).
- Study period: January 2004 to December 2007.
- Extracted data:
 - clinical presentation, medical history, physical examination.
 - synovial fluid: leukocyte count; Gram's stain, culture.
 - peripheral WBC, CRP and ESR.
- Number of synovial specimens: 1225 submitted to HHS LAB.
 - 155/1225 (12.7%) positive culture
 - 121/155 (78%) were excluded due to presence of prosthetic joint, isolation of non-pathogenic organism, soft tissue abscess, bursitis and absence of data.

Results:

- Positive Gram stain 19/34.
- Negative Gram stain 15/34.
- Concordance of Gram stain with culture (100%)
- Sensitivity of the Gram stain is 56% (95%CI 38–72%)
- Specificity of the Gram stain is 99% (95% CI 98.8–99.8%)
- Only 30/155 (19%) samples were submitted.
- Only 9/34 (26%) samples were submitted in our study.
- 4/9 samples were rejected because they were too viscous or clotted.
- 5 samples:
 - <50,000 (2)
 - 50,000–100,000 (2)
 - >100,000 (1)
- Blood culture done in 28/34 (82%)
 - Positive 13/28 (46%)
 - Negative 15/28 (54%)
 - All patients with multiple joint involvement had positive blood cultures.

Conclusions:

- Clinical assessment is superior to Gram stain to establish the diagnosis of septic arthritis
- Negative Gram stain result cannot be used to rule out underlying septic arthritis
- Synovial cell count should be submitted when SA is suspected.