Session: O-24. New Developments in Infectious Diseases Diagnostics

Background. Among children with acute otitis media (AOM) S. pneumoniae, H. influenzae, and M. catarrhalis are the predominant bacterial pathogens. There is a high correlation between nasopharyngeal (NP) and middle ear fluid (MEF) organisms during AOM. Thus, NP samples could serve as a surrogate for detection of otopathogens and are more easily collected in a typical practice environment than MEF. Though culture is considered the gold standard for detection, it is time-consuming, which can limit its diagnostic utility to guide clinical care. We aimed to determine the sensitivity, specificity, positive (PPV) and negative predictive value (NPV) for NP qualitative PCR for bacterial pathogens compared to NP culture.

Methods. Blood diversion device initially in use at one ED (Memorial) and standard equipment for the initial blood sample from the blood culture bottle. We have assessed the effectiveness of a novel blood diversion device developed to reduce the risk of blood culture contamination by diverting a portion of the initial blood sample from the blood culture bottle. We have assessed the effectiveness of this diversion device in a prospective trial performed at two separate emergency departments (EDs) of a three-campus Academic Medical Center.

Results. Of the 80 children included, 18 (22.5%) had no organism detected on culture, 31 (38.8%) had one and 31 (38.8%) had multiple organisms detected. The most commonly identified organisms on culture were M. catarrhalis (42, 52.5%), followed by S. pneumoniae (30, 37.5%), and H. influenzae (17, 21.3%). Of H. influenzae isolates 8 (47.1%) produced beta-lactamase. The sensitivity of PCR was high (>94%) for all organisms whereas the specificity was lower (50.0-77.8%) and varied by organism (Table). NPV were high (>96%) for all organisms, whereas, PPV ranged from 53.0 to 68.2. PCR detected more than once more organisms than culture (49 vs 46). Sensitivity, specificity, positive and negative predictive value of PCR compared to culture for otopathogens.

Conclusion. NP PCR has a high predictive value for excluding otopathogens and warrants further exploration as a diagnostic tool to evaluate for otopathogens in children.

Disclosures. Andreas Bres, PhD, Quidel Laboratories- Germany (Employee) Richard Egan, PhD, Quidel Laboratories (Employee) Samuel R. Dominguez, MD, PhD, BioFire Diagnostics (Consultant, Research Grant or Support) DiaSorin Molecular (Consultant) Pfizer (Grant/Research Support) Samuel R. Dominguez, MD, PhD, BioFire (Individual(s) Involved: Self); Consultant, Research Grant or Support; DiaSorin Molecular (Individual(s) Involved: Self); Consultant; Pfizer (Individual(s) Involved: Self); Grant/Research Support

114. Prospective Trial of Passive Diversion Device to Reduce Blood Culture Contamination

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Background. Blood culture contaminants can lead to inappropriate antibiotic use, prolonged length of stay, and additional hospital costs. Several devices have been developed to reduce the risk of blood culture contamination by diverting a portion of the initial blood sample from the blood culture bottle. We have assessed the effectiveness of one blood diversion device in a prospective trial performed at the two separate emergency departments (EDs) of a three-campus Academic Medical Center.

Methods. A multi-phase prospective crossover trial was performed with the blood diversion device initially in use at one ED (Memorial) and standard equipment at the other ED (University) for 10 weeks. After a washout phase, a second 10-week study phase used the blood diversion device in the other ED (University) and standard equipment at the other ED (Memorial). Contaminants were identified by the clinical microbiology lab using standard criteria, and further defined by independent retrospective review by 3 infectious disease physicians prior to statistical analysis. An intention-to-treat analysis was performed, and Chi-square tests were used to compare contaminant rates among samples obtained using the blood diversion device versus standard equipment.

Results. 5,675 blood samples were obtained with 5,661 samples analyzed after 14 were deemed inconclusive by the ID physician review. There were 1,719 samples obtained at Memorial ED and 3,942 at University ED, with 2,836 samples collected during diversion device periods and 2,825 during standard equipment periods. Based on the threshold of 1.50 log CFU/mL, the contaminant rate was 3.5% (P=0.024) for the diversion device and standard equipment periods, respectively.

Conclusion. The blood diversion device was able to significantly lower blood culture contamination rates overall by 1% at the institution's two EDs (34% relative reduction), with a stronger effect noted at the campus with both a level 1 trauma center and transplant programs.

Disclosures. No reported disclosures

115. The Utility of (1–3)-β-D-glucan Assay in the Diagnosis of Severe Coccidioidomycosis Infections among Immunocompromised Hosts

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Background. Coccidioidomycosis is associated with increased morbidity and mortality in immunocompromised (IC) patients. The diagnosis of invasive fungal infections can be challenging in IC hosts. Culture results may take time to identify Coccidioides species, and serologic based tests are less sensitive in IC patients. (1–3)-β-d-glucan (BDG) has been reported to be detected in patients with coccidioidomycosis. We hypothesized that BDG in combination with serology may assist in the early detection of coccidioidomycosis in IC patients.

Methods. After the institutional review board approved the study, we conducted a retrospective chart review from 10/1/2017 through 09/15/2020, including ≥18 years old IC patients with a confirmed diagnosis of coccidioidomycosis by culture. Information regarding demographics, comorbidities, immunosuppression, medications, BDG, serology, and clinical presentation was collected. Patients with infusions that can result in positive BDG were excluded. Patients with other fungal infections were also excluded. Chi-square test was used to compare categorical variables, Wilcoxon rank-sum and Kruskal-Wallis tests were used to compare non-parametric variables, accordingly.

Results. Over the study period, 269 encounters with positive Coccidioides spp. cultures were identified, 78/269 of patients were IC patients, 55/78 were excluded, and 23 cases were included in the final analysis. Among the 23 IC patients, the median age was 64, 43% were female, 74% were White. There were 8 post solid organ transplantation, 7 with a hematological malignancy, and 8 with other types of IC conditions. 19/23 had a pulmonary infection. 4/23 patients died within one month of their encounter. There was no statistical significance difference between positive BDG and serology tests, with 12/23 had positive BDG, and another 12/23 had positive serology. Combined serology and BDG detected 18/23 of the Coccidioidomycosis cases. 17% of the cohort died within the one-month follow-up.

Conclusion. The combined use of BDG assay and Coccidioides serology increases the sensitivity of coccidioidomycosis diagnosis to 78% in IC patients. Future prospective studies are needed to further evaluate the utility of serum BDG in diagnosing coccidioidomycosis in IC patients.

Disclosures. Mohanad Al Obaidi, MD, Shiomoni Inc. (Advisor or Review Panel member)

116. Characterization of small colony variants from a patient with bloodstream infection of Candida glabrata

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Background. Bacterial small colony variants (SCVs) that are tolerant to commonly used antibiotics are well recognized. Clinical SCC Candida have been rarely reported. We describe SCC C. glabrata (CG) strains recovered from within a population causing bloodstream infection (BSI) in a patient (pt), which were not recognized by the microlab. Pt 1 developed CG BSI shortly after liver transplant (OLTX), which was treated with voriconazole (VOR). VOR was also used for post-OLTX mold prophylaxis. 67 d after BSI, he developed intra-abdominal infection due to VOR-resistant CG. We hypothesized that BSIs might be caused by an unrecognized mixed population of azole-susceptible and -resistant strains.

Methods. Ten colonies from small (SCV) and large colonies (LC) from blood culture (BC) agar plates underwent Illumina NextSeq WGS and phenotype testing.

Results. BCs from pt 1 harbored a diverse population of genetically distinct CG strains, differing by unique SNPs and indels [Fig. 1]. Gene variants identified were enriched for biological processes involved in mitochondrial processes (2.5e-9), cell adhesion (3.3e-5), and respiration (3.5e-4). Unlike LC, SCCs were fluconazole (FLU) resistant (MIC: 128 μg/mL), and exhibited enhanced CDR1 and FDR1 expression (257 ± 15, 15 ± 4, respectively). Compared to LCs, SCCs grew slowly in YPD, did not grow on media containing glyceral as sole carbon source, and were less adherent to agar. SCCs stained poorly with rhodamine 123 by fluorescence flow cytometry and had transmission electron microscopy consistent with WGS findings and respiratory deficiency. SCCs were less susceptible to macrophage (J774) phagocytosis, and they were significantly outgrown by other strains in competitive infections in vitro and during disseminated candidiasis in mice. LCs incubated with FLU in vitro yielded SCCs in concentration-dependent manner. Likewise, LCs passed through spleens of mice following IV inoculation yielded SCVs in both present and absence of FLU.