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. - A phase 6-35 months with uncomplicated AOM who were prospectively enrolled in an AOM study in Denver, CO from Jan 2019-Dec 2020 were included. All patients had an NP swabbed (Eswab, Copan Diagnostics) at enrollment. Otopathogen culture was completed using standard techniques. Nucleic acids were extracted using the NucliSENS® easyMAG® system (Quidel, San Diego, CA) per manufacturer's instructions. Multiplex RT-PCR for S. pneumoniae, H. influenzae, and M. catarrhalis was completed using Lyra (Quidel, San Diego, CA) and AnDiaTec assay kits (Quidel Germany GmbH, Kornwestheim, Germany). Nucleic acid amplification and detection was completed on the Applied Biosystems (ABI) 7500 Fast Dx Real-Time PCR Instrument.

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). NPVs were high (>96%) for all otopathogens, whereas, PPV ranged from 53.3 to 68.5. PCR did detect 1.4 times more organisms than culture (149 vs. 96).

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 Bress, PhD, Quidel Laboratories- Germany (Employee) Richard Egan, PhD, Quidel Laboratories (Employee) Samuel R. Dominguez, MD, PhD, BioFire Diagnostics (Consultant, Research Grant or Support) Daisorin Molecular (Consultant) Pfizer (Grant/Research Support) Samuel R. Dominguez, MD, PhD, BioFire (Individual(s) Involved: Self); Consultant, Research Grant or Support; Daisorin 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 first 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 initial blood sample, the contaminant rate was 4.7% in diversion device periods versus 8.9% in standard equipment periods (P = 0.018). There was a marked difference in blood culture contamination rates between the two EDs with contaminant rates at the Memorial ED of 1.1% and 1.4% (P=0.57), and at the University ED of 2.3% and 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. All Authors: 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 Coccioides 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 coccidiodomycosis. 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 or 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 Coccioides 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 hemato logical 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 Coccioides 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, Shionogi 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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Session: O-24. New Developments in Infectious Diseases Diagnostics

Background. Bacterial small colony variants (SCVs) that are tolerant to commonly used antibiotics are well recognized. Clinical SCV Candida have been rarely reported. We describe SCV C. glabrata (CG) strains recovered from within a population causing bloodstream infection (BSI) in a patient (pt), which were not recognized by the micro lab. 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 BSI 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 LG, SCVs were fluconazole (FLU) resistant (MIC: 128 µg/mL), and exhibited enhanced CDR1 and PDR1 expression (257 ± 15, 15 ± 4, respectively). Compared to LCs, SCVs grew slowly in YPD, did not grow on media containing glycerol as sole carbon source, and were less adherent to agar. SCVs stained poorly with rhodamine 123 by fluorescence flow cytometry and had transmission electron microscopy consistent with WGS findings and respiratory deficiency. SCVs 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 SCVs in concentration-dependent manner. Likewise, LCVs passed through spleens of mice following IV inoculation yielded SCVs in both presence and absence of FLU.
117. Trends in Four-class HIV Drug Resistance in Treatment-experienced Patients in the United States

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

Background. Despite the availability of potent antiretroviral therapy, only 56% of people living with HIV in the US were virally suppressed in 2018. Drug resistance can hinder suppression, especially among treatment-experienced patients, in whom the prevalence of 4-class drug resistance (4CR) is unknown.

Methods. Genotypic results of PhenoSense GT+ Plus Integrate (Monogram Biosciences, South San Francisco, CA) obtained from Apr 2014 to Dec 2020 were used to assign susceptibility to nucleos(t)ide reverse transcriptase, non-nucleoside reverse transcriptase, integrase, and protease inhibitors (NRTIs, NNRTIs, INIs, and PIs). Data were analyzed using summary statistics, 2 proportion Z test, one-way ANOVA and Tukey-Kramer; p < 0.05 was significant.

Results. Among 13,651 patients with 15,372 tests, median age was 43 years; most had HIV-1 subtype B infection (95.09%), followed by AG (1.32%). Among 12,303 patients with only one test, 4CR prevalence was 1.55%. Among 1,348 patients with more than one test, 4CR was seen in 3.64% of patients, and in 4.60% if cumulative resistance reports were assembled for each patient. Patients with 4CR were significantly older than those with less resistance.

The incidence of 4CR fluctuated, with a decline from 2.61% of patients tested in 2014 to 1.38% in 2017, an increase to 2.36% in 2018, and a decline to 1.56% in 2020. Among patients with more than one test, 21.01% gained resistance to a drug in a new class over an average of 19.5 months.

Most new resistance each year was to NNRTIs, followed by NRTIs, INIs, and PIs. The percentage of PI resistance declined for PIs from 13.34% of patients tested in 2014 to 11.82% in 2020, but increased for INIs from 14.56% in 2014 to 16.49% in 2020. The regimen expected to be suppressive in the greatest proportion of patients was dolutegravir + dolutegravir/cobicistat (94.51%).

Conclusion. The prevalence of 4CR has declined over time, but remains clinically relevant, particularly in older patients who may struggle with adherence due to complex regimens, comorbidities and polypharmacy. New drug classes may benefit this group. The concurrent increase in INIs and decline in PI resistance may reflect changes in prescribing practices. Drug resistance may be underestimated unless cumulative resistance is determined.

Disclosures. Dusica Curanovic, PhD, Monogram Biosciences (Employee); Johnny Lai, BS, Monogram Biosciences (Employee, Shareholder); Christos J. Petropoulos, PhD, Monogram Biosciences (Employee, Shareholder); Charles M. Walworth, MD, Monogram Biosciences (Employee, Shareholder)