

692. Secondary Infections and Coinfections in Coronavirus Disease 2019 (COVID-19)

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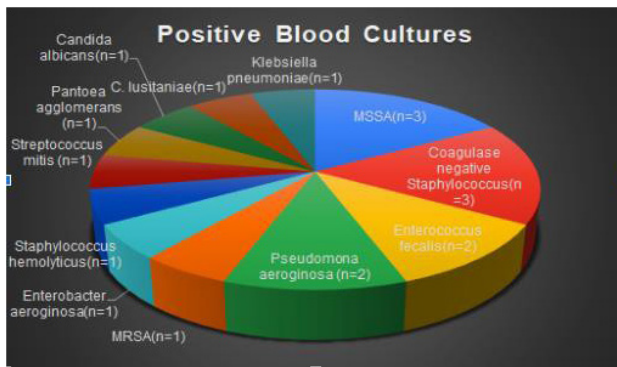
Session: P-27. Diagnostics: Virology

Background: While a common phenomenon in other viral illnesses, data regarding coinfection/superinfections in Coronavirus Disease 2019 (COVID-19) is limited and emerging. Superinfections may contribute to the overall high mortality in those suffering from severe COVID-19. We aimed to study the rate of coinfections and secondary bacterial/fungal infections among SARS-CoV-2 positive cases in a community hospital.

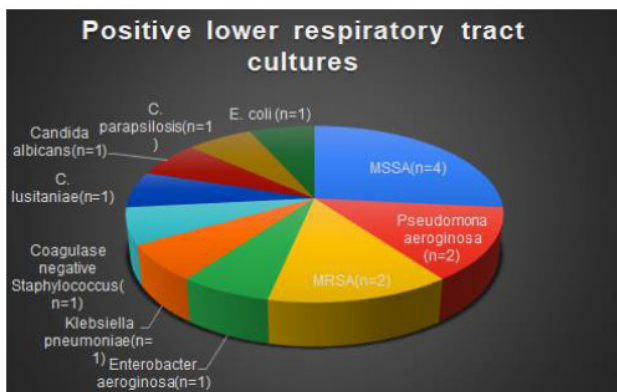
Methods: This is a single-centre IRB approved, retrospective observational study. Adult patients with laboratory-confirmed SARS-CoV-2 by Real-Time Reverse Transcriptase-Polymerase Chain Reaction assay of nasopharyngeal swabs admitted from March 1st to April 20th 2020 were included. Relevant clinical and laboratory data were manually collected from electronic medical records.

Results: A total of 129 patients were included in the study. 91 patients had a respiratory pathogen panel PCR on admission. This panel includes testing for influenza, parainfluenza virus, respiratory syncytial virus, coronavirus, adenovirus, rhinovirus, *Bordetella pertussis*, *Bordetella parapertussis*, *Chlamydia pneumoniae*, and *Mycoplasma pneumoniae*. Only one patient was positive for coinfection with the parainfluenza virus. None of them was found to be positive for bacterial coinfection at admission. Thirteen patients (10.1%) had secondary bacterial or fungal infections that developed during their respective hospital stays, 12 of them were critically ill. The mean duration from admission to the onset of secondary infection was 13 days.

Positive Blood Cultures



Positive Lower Respiratory Tract Cultures



Conclusion: Our data revealed that the rate of viral coinfection was 1.1 % and bacterial coinfection was 0% at admission. Study timing can play a role as upper respiratory virus infection rate is low in the population during March and April. Secondary infections were found to be common in patients admitted to the ICU. Potential explanations for this include compromised immunity in severely ill patients, extended ICU stay, central venous catheters and endotracheal intubation. It is evident that with severe COVID-19 illness, an extended hospital course often ensues, leading to increased risk of secondary infections and contributing to the overall high mortality of these patients.

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693. Shaking Things Up: Direct-to-PCR Viral Detection off Swabs Using Shaker-Mill Homogenization

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Session: P-27. Diagnostics: Virology

Background: As the number of viral diseases are on the rise, it is critical to continue to innovate and advance diagnostic, treatment, and surveillance methods surrounding viral infections. Currently, one of the most reliable methods for viral infection detection are polymerase chain reaction (PCR) based assays. These assays often involve procedures of swabbing a patient, processing the sample to lyse the virus, extract, and purify its nucleotides, and then run the purified genetic material via PCR for detection of a gene product needed to confirm the patient's suspected diagnosis. This process requires time to complete and is dependent on the availability of the reagents and plastics required to complete the lysis, extraction, purification, and amplification procedures. Herein, we have developed a method to detect virus off a swab using solely shaker-mill based mechanical lysis and the transfer of the viral lysate directly to a PCR based assay, bypassing the reagent heavy and time consuming extraction and purification steps.

Methods: Using Human Coronavirus 229E (HCoV-229E) as a model system, we spiked swabs with clinically relevant levels of the virus for proof-of-concept testing. Swabs were spiked in serial dilutions from 1.2e7 copies/mL to 1.2e1 copies/mL. The swabs were then placed in 2mL tubes with viral transport media (VTM) to mimic the specimen collection procedures in the clinic prior to processing via shaker-mill homogenization. After homogenization, 1 uL of viral lysate was run in RT-qPCR for amplification of the nucleocapsid (N) gene, qualifying viral detection from the sample.

Results: HCoV-229E spiked swabs were run through the two-step process of homogenization direct to RT-qPCR for viral detection. After running 54 swabs, we confidently determined our limit of detection to be 1.2e3 viral copies/mL with 96.30% sensitivity in vitro.

Conclusion: We have successfully proven that shaker-mill homogenization provides sufficient viral lysis off swabs, where the resulting lysate can be used directly in PCR based assays for the detection of virus. This finding allows for decreased run time in traditional PCR based diagnostics and reduces the reagents and plastics required for each sample, ultimately reducing the cost and time of each viral test when compared to traditional PCR based methods.

Disclosures: Zachary P. Morehouse, MS, OMS-III, Omni International Inc (Consultant) Caleb Proctor, BS, Omni International Inc (Employee) Gabriella Ryan, BS, Omni International Inc (Employee) Rodney J. Nash, PhD, Omni International Inc (Employee)

694. Unexpected Diversity of Rotavirus Genotypes in Pediatric Population

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Session: P-27. Diagnostics: Virology

Background: Rotavirus (RV) is the leading cause of viral gastroenteritis in children. Although RV genotypes differ geographically and temporally, five are the predominant genotypes circulating worldwide. Aim of our study was to monitor possible changes in distribution of Rotavirus genotypes circulating in Greek pediatric population during the post vaccine era.

Methods: Demographic data and fecal samples were collected from children ≤15 years old with symptoms of acute gastroenteritis who visited emergency units of Pediatric Hospitals in Greece from September 2016 to August 2019. Samples were tested for RV Group A antigen with rapid immunochromatographic assay. Positive samples were further G and P typed employing RT-PCR, semi-nested multiplex PCR and Sanger sequencing of the VP7 and VP4 genes.

Results: A total of 660 children participated in the study with median age 31±29 months. Males outnumbered females (59%). Most of them lived in urban cities (85%). RV genotyping distribution was G4P[8] (41%), G1P[8] (22%), G2P[4] (14%), G9P[8] (8%), G9P[4] (5.5%), G12P[8] (2%) and G3P[8] (1.8%). Unusual and mixed genotypes were identified in 3,2% and 2,5% of the samples respectively. During 2016-2017 and 2017-2018, G4P[8] was the predominant genotype in 67% and 51% of the annual samples. However, in 2018-2019 the most common genotypes were G9P[8] and G9P[4] (33% in total) followed by G2P[4] (27%). Interestingly, the genotype G9P[4] was not detected at all in the first two years of the study.

Conclusion: This study indicates diversity of the predominant RV genotypes in Greek children during 2016-2019. The emergence of G9 as the most common genotype as well as the significant detection of uncommon ones highlight the importance of continuous surveillance of RV genotyping during the post vaccine period.

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695. Infective endocarditis in people who inject drugs (PWID) at UK Medical Center

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Session: P-28. Endocarditis

Background: The Intravenous Drug Use (IVDU) epidemic has been developing into a public health crisis in the last twenty years. As a result, the incidence of severe bacterial infections such as infective endocarditis (IE) has been rising dramatically.

Methods: Cross-sectional study, we reviewed records of all admissions to University of Kentucky hospitals with IVDU associated ICD9/10 codes who received an Infectious Diseases consult during 2018 and focused on the cases with a diagnosis of IE. We describe associated epidemiologic, clinical, and microbiological features

Results: We include 391 patients in this cohort, among those 157 patients were for IE. Patients had a median age of 34 years old (range: 20 - 62); 81 (51.5%) were female, and five (6.1%) were pregnant and 153 (97.4%) identified as white. A previous episode of infective endocarditis was reported in 55 (35%) cases. The most common illicit substances used were heroin 68 (43.3%) and methamphetamine 65 (41.45%). Tobacco abuse was reported in 134 (86.4%) cases. Fever reported in 93 (59.8%) cases, shortness of air in 43 (28.0%) cases, and chest pain in 44 (28.6%) cases were the most common symptoms. Hepatitis C antibody was positive in 115/149 (73.2%) and 3/143 (1.9%) were HIV positive. Right-sided IE was more frequent, the tricuspid valve was involved in 94 (59.8%) patients. Gram-positive pathogens were isolated in 139 (88.5%) patients, *Staphylococcus aureus* was isolated in 102 (64.9%) patients, of which 67 (65.7%) were methicillin resistant. Gram-negative pathogens were isolated in 18 (11.2%) patients. Eighty-eight (56.4%) patients had an addiction medicine consult during their admission, (22.9%) patients left against medical advice and 20 (12.7%) patients needed to be readmitted within 30 days after discharge. Overall mortality was 12.7% and was significantly associated with infection by gram-negative pathogens (RR: 2.5; CI 95% 1.05 - 6.25, p=0.037).

Conclusion: Infective endocarditis is a frequent complication in PWID which carries a high risk of mortality and often involves the tricuspid valve. The most common pathogen isolated was *S. aureus*, isolation of gram-negative pathogens was associated with increased mortality.

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696. *Bartonella quintana* Endocarditis, A Case Series

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Session: P-28. Endocarditis

Background: Homelessness has been a growing issue in the United States and worldwide. *Bartonella quintana*, the causative agent of "Trench fever", is a well known illness among homeless populations in urban centers. While many cases of *B. quintana* are self limited, the disease can have advanced presentations including endocarditis. We present a short case series of three cases of *B. quintana* infective endocarditis (IE) in homeless individuals in Los Angeles and review the literature of cases of *B. quintana* IE in the homeless population.

Methods: Here we report three cases of *B. quintana* IE encountered in homeless individuals at the University of California, Los Angeles (UCLA) hospital system. A literature review was also conducted. PubMed was searched for published cases of human IE secondary to *B. quintana* in homeless individuals.

Results: All three patients were male with ages ranging from 39 to 57 years old with a history of homelessness and alcohol use. Presentations were subacute to chronic in nature consisting of constitutional symptoms as well as a range of symptoms corresponding with heart and renal failure. Each patient was found to have varying degrees of aortic insufficiency with either identified aortic valve vegetation or valvular thickening. Diagnosis was made with a combination of *Bartonella* serologies and whole genome sequencing PCR. All three patient's courses were complicated by renal failure at varying points limiting the use of gentamicin for the full treatment course. Two patients ultimately underwent aortic valve replacement due to severe aortic insufficiency and completed therapy with doxycycline and rifampin. A single patient was discharged with plan to complete doxycycline and rifampin therapy however was lost to follow up.

A literature review of 10 manuscripts describing 13 cases of *B. quintana* IE were identified. All the patients were male and the median age was 45. Six of the cases were in Europe and eight were in North America. All cases had left sided valve involvement (10 aortic, 6 mitral, 3 both valves). No cases of right sided IE were identified.

Conclusion: *B. quintana* IE should be considered in homeless patients with a clinical presentation concerning for IE. A combination of serology and PCR testing can be useful in diagnosis of this uncommon cause of infective endocarditis.

Disclosures: Jeffrey Klausner, MD, MPH, Nothing to disclose

697. 8 Years of Characteristics and Outcomes of Patients with MRSA Endocarditis Based on Vancomycin Minimum Inhibitory Concentration: Experience at a Tertiary Care Hospital

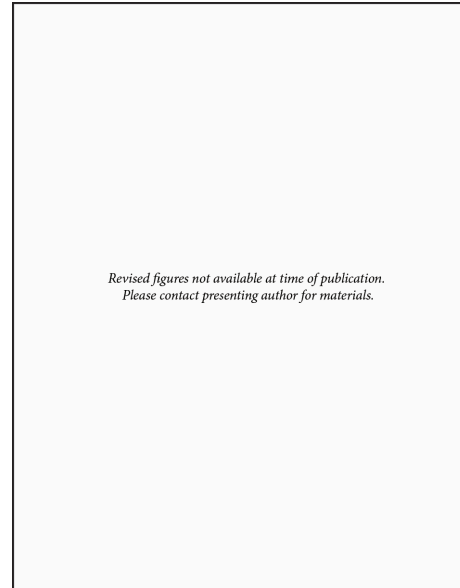
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Session: P-28. Endocarditis

Background: Vancomycin has been the mainstay of treatment for methicillin-resistant *Staphylococcus aureus* (MRSA) infective endocarditis (IE). MRSA reduced susceptibility to vancomycin is a growing threat. Data assessing the effect of vancomycin reduced susceptibility on outcomes is limited. Our study aimed to evaluate

characteristics and outcomes of MRSA-related IE based on the minimum inhibitory concentration (MIC) to vancomycin

Characteristics and outcomes of 51 patients with MRSA-related endocarditis according to the minimal inhibitory concentration (MIC) to vancomycin



Revised figures not available at time of publication.
Please contact presenting author for materials.

Methods: IRB approval was obtained for a retrospective cohort study at a tertiary care center. Records of hospitalized adults diagnose with IE by ICD-9/ICD-10 CM codes were identified from 2011 to 2018. 51 patients had MRSA-related IE and were selected for the analysis. Demographic, microbiologic, Imaging and outcome variables were obtained. Characteristics and outcomes of patients with MRSA-related IE according to the MIC to vancomycin (\leq vs. $>$ 1 mcg/mL) were compared

Results: 35.3% of patients had a MIC $>$ 1 mcg/mL. 59% were men, mean age was 46 \pm 3 years old. 65% acquired the infection through injection drug use. Only 3.9% of patients had prosthetic valve IE. 35.3% had tricuspid valve vegetation, 25.5% mitral valve and 21.6% aortic valve vegetation. Two patients had IE possibly related to a PICC-line infection; both of these patients had a MIC to vancomycin $>$ 1 mcg/mL, suggestive of prolonged antibiotic therapy. All patients with MRSA-related IE were started empirically on vancomycin. Patients with a MIC $>$ 1 mcg/mL were more likely to be switched to a combination of daptomycin and ceftaroline, compared to those with a MIC \leq 1 mcg/mL (44.4% vs. 6.1%; P=0.001). 25.4% underwent valvular replacement within 6 months. 12% died within 90 days. MRSA-related IE with MIC $>$ 1mcg/mL did not confer and an increase risk in in-hospital mortality (11.1% vs. 15.2%; P=0.67) or mortality at 90 days (11.1% vs. 12.5%; P=0.89).

Conclusion: In this single-center experience, we found that in 8 years 35% of patients with MRSA-related IE had MIC $>$ 1 mcg/mL. This is an alarming finding. Although our study did not reach statistic significance we didn't found difference in valvular surgery requirement or mortality among those with MIC $>$ 1mcg/d as compared to those with a more sensitive MRSA strain. A study with more power or a meta-analysis will be require to better answer this question.

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698. 8 Years of Infective Endocarditis in Intravenous and Non-Intravenous Drug Users a Single Center Experience

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Session: P-28. Endocarditis

Background: Despite advances in diagnosis and management, infective endocarditis (IE) is associated with considerable morbidity and mortality. Given the emergence of drug-resistant organisms, it is unclear whether this has impacted the characteristics and outcomes of IE among intravenous drug users (IDUs) and non-IDUs.

Methods: We conducted a single center retrospective cohort study. 306 records of hospitalized adults diagnose with IE by ICD-9/ICD-10 codes were identified from 2011 to 2018. 244 patients met criteria. IRB approval was obtained. The baseline demographic, microbiologic, echocardiographic variables and outcomes were extracted from the chart, and compared between IDUs and non-IDUs.

Results: 112 (45.9%) patients were IDUs and significantly younger (mean age 36 vs. 64, p< 0.001). Both methicillin-sensitive (44.6% vs. 23.5%, p< 0.001) and methicillin-resistant (29.5% vs. 13.6%, p= 0.002) *Staphylococcus aureus* associated IE were more prevalent in IDUs compared to non-IDUs. *Streptococcus* species (22.7% vs 11.6%, p=0.02), excluding *Enterococcus* species, and coagulase-negative *Staphylococcus* (12.1% vs 1.8%, p=0.002) were significantly more prevalent in non-IDUs. IE in IDUs were more likely to have tricuspid valve vegetations (56.3% vs. 13.6%, p< 0.001), whereas non-IDUs