Presentation Type:
Poster Presentation
Subject Category: COVID-19
COVID-19 and Ventilator-Associated Event Discordance
Kelly Cawcutt; Mark Rupp and Lauren Musil

Background: The COVID-19 pandemic has challenged healthcare facilities since its discovery in late 2019. Notably, the subsequent COVID-19 pandemic has led to an increase in healthcare-acquired infections such as ventilator associated events (VAEs). Many hospitals in the United States perform surveillance for the NHSN for VAEs by monitoring mechanically ventilated patients for metrics that are generally considered to be objective and preventable and that lead to poor patient outcomes. The VAE definition is met in a stepwise manner. Initially, a ventilator-associated condition (VAC) is met when there an increase in ventilator requirements after a period of stability or improvement. An IVAC is then met when there is evidence of an infectious process such as leukocytosis or fever and a new antimicrobial agent is started. Finally, possible ventilator-associated pneumonia (PVAP) is met when there is evidence of microbial growth or viral detection. Since the beginning of the COVID-19 pandemic, our hospital has seen an increase in VAEs, which is, perhaps, not unexpected during a respiratory illness pandemic. However, the NSHN definitions of VAE, and PVAP in particular, do not account for the novelty and nuances of COVID-19. **Methods:** We performed a chart review of 144 patients who had a VAE reported to the NHSN between March 1 and December 31, 2020. **Results:** Of the 144 patients with a VAE reported to NHSN, 39 were SARS-CoV-2 positive. Of the 39 patients, 4 patients (10.25%) met the NHSN PVAP definition due to a positive SARS-CoV-2 PCR that was collected in the prolonged viral shedding period of their illness (< 90 days). One of the four patients also had a bacterial infection in addition to their subsequent positive COVID-19 result. All these patients were admitted to the hospital with a COVID-19 diagnosis and their initial PCR swab was performed upon admission. **Conclusions:** We believe that the PVAP definition was inappropriately triggered by patients who were decompensating on the ventilator due to a novel respiratory virus that was present on admission. Early in the pandemic, frequent swabbing of these patients was performed to try and understand the duration of viral shedding and to determine when it would be safe to transfer patients from isolation after prolonged hospitalization. The NSHN definition should take into consideration the prolonged viral shedding period of COVID-19 and natural history of the illness, and subsequent COVID-19 testing within 90 days of an initial positive should not require classification as a hospital-acquired PVAP.
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Stewardship of Remdesivir Use in a Rural Community Hospital During the COVID-19 Pandemic
Raghavendra Tirupathi and Melissa Gross

Background: Remdesivir was granted EUA followed by full FDA approval for treatment of hospitalized COVID-19 patients on October 22, 2020, based on the results from the ACTT1 trial. Remdesivir use was initially restricted to infectious disease (ID) physicians in our hospital with prescription needing formal ID consultation until complete approval. Due to increasing case counts in our hospital, a decision was made to allow intensivists and hospitalists the authorization to prescribe remdesivir in a phased manner. In this retrospective study, we assessed the impact of phased-in prescribing on remdesivir utilization and days of therapy of antimicrobials. **Methods:** Remdesivir prescribing was streamlined by real-time institutional guidelines developed by a COVID-19 treatment committee constituting ID and other clinicians. Eligibility for remdesivir included positive SARS-CoV-2 PCR test, severe disease defined as persistent hypoxia (<94% oxygen saturation on room air), requiring supplemental oxygen and/or on mechanical ventilation (MV) for <72 hours, and symptom onset of <10 days. We retrospectively reviewed cohorts of 3 periods during which remdesivir was prescribed. In the first cohort A, between October 23, 2020, and November 12, 2020, remdesivir was restricted to ID physicians with formal ID consultation. Cohort B comprised inpatients between November 13, 2020, and December 6, 2020, when hospitalists and intensivists were allowed to prescribe remdesivir through an EMR order set after prior authorization by an ID physician via curbside or telephonic consultation. Cohort C, from December 7, 2020, to December 26, 2020, comprised inpatients with unrestricted prescribing of remdesivir by hospitalists and intensivists. We also evaluated antibiotic use. **Results:** In cohort A, SARS CoV-2 positivity was 20.3%; 64 inpatients tested positive and 35 patients (54.7%) who met the criteria were prescribed remdesivir after a formal consultation with an ID physician. In cohort B, requiring prior authorization by an ID physician, SARS-CoV-2 positivity rapidly increased to 34%; 193 patients tested positive and 97 patients (50.3%) received remdesivir. In cohort C, during unrestricted access, positivity further increased to 38%; 235 inpatients tested positive and 123 (52.5%) received remdesivir. Remdesivir use remained steady during the 3 phases of gradual de-escalation of restricted prescribing and safe handoff in the context of clear guidelines, as well as ongoing curbside education provided by ID physicians during the second phase. Cohort B demonstrated the best prescribing rates. Antimicrobial prescribing data were also collected during the 3 cohort phases (Figures 1–3). **Conclusions:** Remdesivir is an expensive antiviral with limited utility and maximum benefit in COVID-19 inpatients who are hypoxic but do not require mechanical ventilation. Stewardship of remdesivir with safe, gradual handoff to inpatient can be achieved without overuse.

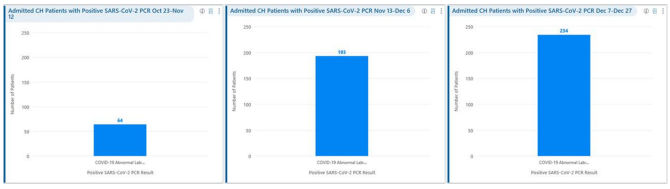

Figure 1.

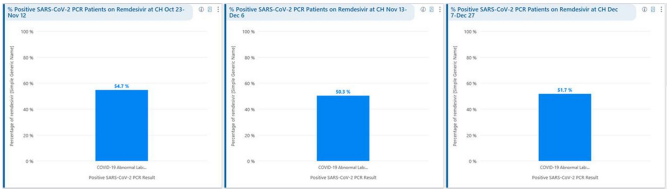

Figure 2.

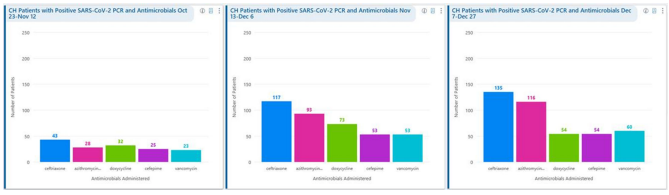

Figure 3.

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Comparing Hospital Healthcare-Associated Infection Incidence During Pre-COVID-19 Pandemic and Pandemic Eras
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Background: Diversion of resources from infection prevention activities, personal protective equipment supply shortages, conservation (extended

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Table 1.

Infection	Pre-Pandemic			Pandemic		
	Facilities	Incidence	95%-CI	Facilities	Incidence	95%CI
CDI	398	0.59*	0.57-0.62	382	0.56*	0.54-0.59
MRSA-BSI	398	0.73*	0.66-0.82	382	0.82*	0.73-0.92
VRE-BSI	397	2.51†	2.18-2.89	383	3.53†	3.11-4.01

* → Standardized·infection·ratio

† → Infections·per·100,000·patient·days.

use and reuse) or overuse with multiple gown and glove layers, and antimicrobial prescribing changes during the COVID-19 pandemic might increase healthcare-associated infection (HAI) incidence and antimicrobial resistance. We compared the incidences of *Clostridioides difficile* infection (CDI), methicillin-resistant *Staphyloccocus aureus* bloodstream infection (MRSA BSI), and vancomycin-resistant enterococci bloodstream infection (VRE BSI) reported by California hospitals during the COVID-19 pandemic with incidence data collected prior to the pandemic. **Methods:** Using data reported by hospitals to the California Department of Health via the NHSN, we compared incidences in the second and third quarters of 2020 (pandemic) to the second and third quarters of 2019 (before the pandemic). For CDI and MRSA BSI, we compared the standardized infection ratios (SIRs, based on the 2015 national baseline), and we calculated the *P* values. No adjustment model is available for VRE BSI; thus, we measured incidence via crude incidence rates (infections per 100,000 patient days). We calculated incidence rate ratio (IRR) with 95% CI for VRE BSI. To examine the possible effect of missing data during the pandemic, we performed a sensitivity analysis by excluding all facilities that had incomplete data reporting at any time during either analysis period. **Results:** Incidence measures and numbers of facilities contributing data in prepandemic and pandemic periods are shown in Table 1. There were no statistically significant changes in SIRs at $P = .05$ for either MRSA BSI or CDI between the prepandemic and pandemic periods (MRSA BSI $P = .17$; CDI $P = .08$). Crude VRE BSI incidence increased during the pandemic compared to the prepandemic period (IRR, 1.40; 95% CI, 1.16–1.70). Excluding facilities with incomplete data had minimal effect. **Conclusions:** We found insufficient evidence that MRSA BSI or CDI incidence changed in California hospitals during the pandemic relative to the prepandemic period; however, there was a significant increase in the crude incidence of VRE BSI. Next, we will include interrupted time series analyses to assess departure from long-term trends, including a risk-adjusted model for VRE BSI. Additionally, we will evaluate for changes in central-line–associated bloodstream infection incidence and antimicrobial resistance among HAI pathogens.

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Secondary Bacterial Pneumonias and Bloodstream Infections in Patients Hospitalized with COVID-19

Max Adelman; Divya Bhamidipati; Alfonso Hernandez; Ahmed Babiker; Michael Woodworth; Chad Robichaux; David Murphy; Sara Auld; Colleen Kraft and Jesse Jacob

Group Name: The Emory COVID-19 Quality and Clinical Research Collaborative

Background: Patients hospitalized with COVID-19 are at risk of secondary infections—10%–33% develop bacterial pneumonia and 2%–6% develop bloodstream infection (BSI). We conducted a retrospective cohort study to identify the prevalence, microbiology, and outcomes of secondary pneumonias and BSIs in patients hospitalized with COVID-19. **Methods:** Patients aged ≥18 years with a positive SARS-CoV-2 real-time polymerase chain reaction assay admitted to 4 academic hospitals in Atlanta, Georgia, between February 15 and May 16, 2020, were included. We extracted electronic medical record data through June 16, 2020. Microbiology tests were performed according to standard protocols. Possible ventilator-associated pneumonia (PVAP) was defined according to Centers for Disease Control and Prevention (CDC) criteria. We assessed in-hospital mortality, comparing patients with and without infections using the χ^2 test. SAS University Edition software was used for data analyses. **Results:** In total, 774 patients were included (median age, 62 years; 49.7% female; 66.6% black). In total, 335 patients (43.3%) required intensive care unit (ICU) admission, 238 (30.7%) required mechanical ventilation, and 120 (15.5%) died. Among 238 intubated patients, 65 (27.3%) had a positive respiratory culture, including 15 with multiple potential pathogens, for a total of 84 potential pathogens. The most common organisms were *Staphylococcus aureus* (29 of 84; 34.5%), *Pseudomonas aeruginosa* (16 of 84; 19.0%), and *Klebsiella* spp (14 of 84; 16.7%). Mortality did not differ between intubated patients with and without a positive respiratory culture (41.5% vs 35.3%; $P = .37$). Also, 5 patients (2.1%) had a CDC-defined PVAP (1.7 PVAPs per 1,000 ventilator days); none of them died. Among 536 (69.3%) nonintubated patients, 2 (0.4%) had a positive *Legionella* urine antigen and 1 had a positive respiratory culture (for *S. aureus*). Of 774 patients, 36 (4.7%) had BSI, including 5 with polymicrobial BSI (42 isolates total). Most BSIs (24 of 36; 66.7%) had ICU onset. The most common organisms were *S. aureus* (7 of 42; 16.7%), *Candida* spp (7 of 42; 16.7%), and coagulase-negative staphylococci (5 of 42; 11.9%); 12 (28.6%) were gram-negative. The most common source was central-line–associated BSI (17 of 36; 47.2%), followed by skin (6 of 36; 16.7%), lungs (5 of 36; 13.9%), and urine (4 of 36; 11.1%). Mortality was 50% in patients with BSI versus 13.8% without ($p < 0.0001$). **Conclusions:** In a large cohort of patients hospitalized with COVID-19, secondary infections were rare: 2% bacterial pneumonia and 5% BSI. The risk factors for these infections (intubation and central lines, respectively) and causative pathogens reflect healthcare delivery and not a COVID-19–specific effect. Clinicians should adhere to standard best practices for preventing and empirically treating secondary infections in patients hospitalized with COVID-19.

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COVID-19 Contact Tracing in a Pediatric Hospital: Maximizing Effectiveness Through Specialized Team and Automated Tools

Lindsay Weir; Jennifer Ormsby; Carin Bennett-Rizzo; Jonathan Bickel; Colleen Dansereau and Matthew Horman

Background: In their interim infection prevention and control recommendations for the coronavirus disease 2019 (COVID-19) pandemic, the Centers for Disease Control and Prevention (CDC) recommend that healthcare facilities have a plan to identify, investigate, and trace potential COVID-19 exposures. In an academic hospital, the scale of such tracing is substantial, given that medically complex patients can have dozens of staff contacts across multiple locations during an encounter. Furthermore, the family-centered care model employed by pediatric institutions precludes visitor exclusion, further complicating tracing efforts. Despite this complexity, tracing accuracy and timeliness is of paramount importance for exposure management. To address these challenges, our institution developed a contact-tracing system that balanced expert participation with automated tracing tools. **Methods:** Our institution's contact-tracing initiative includes positive patients, parents and/or visitors, and staff for the enterprise's inpatient, procedural, and ambulatory locations at the main campus and 4 satellites. The team consists of 11 staff and is overseen by an infection preventionist. For positive patients and parents and/or visitors, potentially exposed staff are automatically identified via a report that extracts staff details for all encounters occurring during the patient's infectious period. For positive staff, trained contact tracers call the staff member to determine whether mask and distancing practices could result in others meeting CDC exposure criteria. Any potentially exposed healthcare workers (HCWs) receive an e-mail that details exposure criteria and provides follow-up instructions. These HCWs are also entered into a secure, centralized tracking database that (1) allows infection prevention and occupational

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