1086. Antimicrobial Stewardship: From Bedside to Man’s Best Friend

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Background. Antimicrobial stewardship plays an integral role in ensuring appropriate antimicrobial use in the inpatient hospital setting and is now required by The Joint Commission. Although it is well established that antimicrobial misuse and overuse has societal and ecological implications, the same regulations do not yet apply to our veterinary and agricultural counterparts.

Methods. At The Ohio State University Wexner Medical Center (OSUWMC), the Antimicrobial Stewardship Program (ASP) was created in 2007. A partnership was formed with The Ohio State University Veterinary Medical Center (OSUVMC) in 2017 and was leveraged through a pre-existing campus-wide One Health initiative. The goal was to develop a comprehensive Veterinary Hospital ASP. “The Core Elements of Hospital Antibiotic Stewardship Programs” (Centers for Disease Control and Prevention) and “The Core Principles of Antibiotic Stewardship in Veterinary Medicine” (American Veterinary Medical Association) were also referenced for guidance.

Results. Specific initiatives within the OSUVMC ASP were modeled after similar interventions in the OSUWMC including development of antibiotic use guidelines by animal type for commonly encountered infections, antimicrobial utilization tracking, antibiogram creation, and both active and passive surveillance of targeted resistant pathogens. A mobile-friendly website was created to allow providers easy access to these tools. Overall antimicrobial prescriptions decreased 22.4% during the first year of program implementation. Planning is currently underway for an ASP outreach program to local veterinary practices to increase awareness of ASP and improve antimicrobial prescribing. A parallel outreach program with rural Ohio hospitals is underway at OSUWMC.

Conclusion. A comprehensive veterinary hospital ASP was successfully implemented in collaboration with OSUWMC counterparts using successful human interventions applied in the animal setting. Optimizing antimicrobial use and resistance at both institutions will likely prevent resistance transmission between these geographically proximate hospitals. Sharing the details of our approach may benefit other institutions looking to expand their stewardship reach.

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1087. Fluoroquinolone Prophylaxis vs. No Bacterial Prophylaxis in Hospitalized Neutropenic Patients Undergoing Induction Chemotherapy for Acute Myeloid Leukemia

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Background. Despite evidence to support outpatient anti-pseudomonal fluoroquinolone (FQ) prophylaxis in neutropenic patients, limited data exist to support this for inpatients undergoing induction chemotherapy for acute myeloid leukemia (AML). At our institution, we implemented an initiative to replace FQ prophylaxis with a combination of a β-lactam for inpatients newly diagnosed with AML receiving induction chemotherapy is a feasible option to decrease FQ exposure. Though there were newly diagnosed with AML undergoing induction chemotherapy. The primary outcome was 90-day all-cause mortality. Secondary outcomes included the number of positive blood cultures, length of stay, and 30-day mortality.

Methods. A retrospective chart review was conducted to analyze the outcome differences between patients receiving FQ prophylaxis (pre-intervention) and those who had a conditional order for an anti-pseudomonal β-lactam to be given if a fever occurred. The primary outcome was 90-day all-cause mortality. Secondary outcomes included the number of patients requiring ICU admission and rate of bacteremic episodes caused by any pathogen and from a Gram-negative rod (GNR). Additionally, ciprofloxacin susceptibility of these pathogens was analyzed.

Results. There were 35 and 26 patients in the pre- and post-intervention groups, respectively. Between pre- and post-intervention groups, there was no difference in 90-day mortality (20.0% vs. 15.4%; P = 0.745) or ICU admissions (23.7% vs. 23.1%; P = 1), respectively. The rate of any bacteremic episode was similar between the pre- and post-intervention groups (51.4% vs. 65.4%; P = 0.307), but more patients in the post-intervention group developed GNR bacteremia (17.1% vs. 46.2%; P = 0.023). In the patients with GNR bacteremia, the number of ciprofloxacin nonsusceptible isolates was higher in the pre-intervention group (100% vs. 30.7%; P = 0.011).

Conclusion. Replacing FQ prophylaxis with a conditional order for an anti-pseudomonal β-lactam for inpatients newly diagnosed with AML receiving induction chemotherapy is a feasible option to decrease FQ exposure. Though there were increased episodes of GNR bacteremia observed, there was no difference in total bacteremic episodes or clinical outcomes, and the improved ciprofloxacin susceptibility patterns will allow for an additional treatment option in this extremely vulnerable patient population.

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1088. Evaluating the Timing of Antimicrobial Prophylaxis in Allogeneic and Autologous Hematopoietic Stem Cell Transplant

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Background. Hematopoietic stem cell transplant (HSCT) patients develop profound neutropenia during the transplant process and often fever, which is suggestive of infection. Antimicrobial prophylaxis (AP) during anticipated neutropenia is recommended; however, data regarding when to initiate AP is limited. A local quality improvement initiative adjusted AP initiation to target the duration of severe neutropenia, defined as ANC ≤ 500 mm³ (ANC500), which is when patients are at the greatest risk of infection. This initiative aimed to reduce antimicrobial utilization and consequences of unnecessary antimicrobial exposure while not adversely affecting patient outcomes.

Methods. A retrospective study was conducted across two cohorts over a 2-year period. The pre-intervention cohort (November 2016–2017) called for the initiation of AP on Day -1 prior to transplant. The post-intervention cohort (November 2017–2018) called for initiation of AP when patients reached ANC500. The primary outcome was frequency of febrile occurrences (temperature ≥38°C). Secondary outcomes included days of antimicrobial exposure, positive blood cultures, all-cause mortality, length of stay, graft-vs.-host disease, and Clostridiodes difficile rates. Patients were excluded if they received a hospedenteral transplant or inappropriate AP for the specified cohort.

Results. A total of 248 patients were included in the final analysis with 130 patients in the pre-intervention cohort and 118 patients in the post-intervention cohort. The final analysis included 40 allogeneic and 208 autologous HSCT patients. There was no difference in fever occurrences between the two groups (79% pre vs. 69% post; P = 0.078). There was a significant reduction in the mean antibacterial (10.3 vs. 4.95; P = 0.001) and antifungal (13.4 vs. 7.6; P < 0.001) prophylaxis per patient-days in the pre- and post-intervention group. No significant differences in positive blood cultures (11.5% vs. 16.9%; P = 0.22), ICU admissions, length of stay or all-cause mortality were identified.

Conclusion. Delaying antimicrobial prophylaxis (AP) until severe neutropenia showed no difference in fever occurrences or other patient outcomes. This approach is associated with a drastic reduction in antimicrobial exposure.

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1089. Implementation of a Febrile Neutropenia Management Algorithm on Antimicrobial Use and Outcomes: An Interrupted Time Series Analysis

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Background. Antimicrobial prophylaxis (AP) is widely used to reduce the risk of infection in patients with neutropenia; however, the empirical use of AP is common. We implemented a febrile neutropenia management algorithm (FNMA) that streamlined AP in patients with ANC ≤ 500 mm³ (ANC500) and required AP initiation only if fever occurred and the patient had a conditional order for AP.

Methods. The FNMA was implemented institution-wide at our institution, a 650-bed, urban, academic medical center in Columbus, Ohio. At our institution, AP was ordered for patients with ANC ≤ 500 mm³ and ≥1 positive blood cultures (P 0.001). AP was modified only if fever occurred and the patient had a conditional order for AP. The FNMA was implemented institution-wide at our institution, a 650-bed, urban, academic medical center in Columbus, Ohio. AP was ordered for patients with ANC ≤ 500 mm³ and ≥1 positive blood cultures (P 0.001). AP was modified only if fever occurred and the patient had a conditional order for AP.

Results. The FNMA was associated with a 25% reduction in the number of AP episodes in the post-FNMA period compared to the pre-FNMA period (P = 0.009). There was no difference in fever occurrences between the two periods (79% pre vs. 69% post; P = 0.078). There was a significant reduction in the mean antibacterial (10.3 vs. 4.95; P = 0.001) and antifungal (13.4 vs. 7.6; P = 0.001) prophylaxis per patient-days in the pre- and post-FNMA period. No significant differences in positive blood cultures (11.5% vs. 16.9%; P = 0.22), ICU admissions, length of stay or all-cause mortality were identified.

Conclusion. The FNMA was associated with a 25% reduction in the number of AP episodes in the post-FNMA period compared to the pre-FNMA period (P = 0.009). There was no difference in fever occurrences between the two periods (79% pre vs. 69% post; P = 0.078). There was a significant reduction in the mean antibacterial (10.3 vs. 4.95; P = 0.001) and antifungal (13.4 vs. 7.6; P = 0.001) prophylaxis per patient-days in the pre- and post-FNMA period. No significant differences in positive blood cultures (11.5% vs. 16.9%; P = 0.22), ICU admissions, length of stay or all-cause mortality were identified.

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Febrile Neutropenia Algorithm

Figure 1. Broad-spectrum IV antibiotic use (DOT/1000 patient-days) during the study period.

Febrile Neutropenia Algorithm

Figure 2. Intravenous vancomycin use (DOT/1000 patient-days) during the study period.

Febrile Neutropenia Algorithm

Figure 3. Meropenem use (DOT/1000 patient-days) during the study period.

Session: 133. Antibiotic Stewardship: Special Population
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Background. Febrile neutropenia (FN) is a common complication of cancer therapy and often necessitates prolonged antibiotic treatment. Antibiotic de-escalation can be challenging given the temporal clinical status. Furthermore, a microbiological or clinical etiology is identified in a minority of FN patients. In 2016 we implemented several evidence-based strategies to guide antibiotic use in high-risk FN patients including specifying vancomycin use indications, minimizing carbapenem escalation in stable patients with ongoing fevers, and defining antibiotic durations regardless of neutrophil count. The study objective was to characterize and evaluate our experience implementing these strategies on antibiotic use and clinical outcomes.

Methods. Interrupted time series analysis of all admissions to the Malignant Hematology service at the University of California, San Francisco between June 2014 and December 2018. The primary outcome was monthly days of therapy (DOT) per 1,000 patient-days of broad-spectrum IV antibiotics (aztreonam, cefepime, piperacillin–tazobactam, meropenem, and vancomycin). Secondary outcomes included DOT/1,000 patient-days for each IV antibiotic, incidence rates of bloodstream infections (BSI) and C. difficile infections (CDI), and in-hospital all-cause mortality. A segmented regression analysis was conducted to evaluate the impact of the FN management algorithm implementation on antibiotic use and clinical outcomes. Summary statistics and time series scatter plots were used to visualize the trends and outliers.

Results. 2319 unique patients with 6,788 encounters were included. The median (IQR) age was 59 (46–68) years and 60% were male. Regression results and time series plots are shown in Table 1 and Figures 1–3.

Conclusion. Implementation of an evidence-based FN management algorithm led to decreased vancomycin and meropenem use without a statistically significant impact on overall antibiotic use, CDI rates, or mortality. While BSI rates fluctuated in the 2 months post-implementation, rates returned to baseline thereafter. A multidisciplinary effort facilitated successful implementation of this stewardship project. This collaboration remains essential to addressing future antimicrobial management strategies in this population.

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