*The Great Eight winning abstracts for 2019 were as follows:*

* **Evaluation of Procalcitonin (PCT) in the Management of Influenza-Positive Patients Admitted from the Emergency Department (ED)** presented byRobyn A. Riggott, Hartford Hospital
* **Evaluating the Impact of Antibiotic Prophylaxis on the Microbiology and Incidence of Ventriculitis in Patients with External Ventricular Drains** presented by Jack McCormick, PharmD, Yale New Haven Hospital
* **Clinical Outcomes of Oseltamivir versus Baloxavir in Patients Hospitalized with Influenza A** presented by Sunish Shah, PharmD Yale New Haven Hospital

**Evaluation of Procalcitonin (PCT) in the Management of Influenza-Positive Patients Admitted from the Emergency Department (ED)**

**Authors:** Presenter **-** Robyn A. Riggott1;Joseph L. Kuti2; David M. O’Sullivan3; Kristin E. Linder1

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**Background:** Recent studies suggest that many hospitalized influenza patients are continued on empiric antibiotics inappropriately without evidence of bacterial infection. Procalcitonin(PCT) was implemented in our emergency department (ED) to aid providers in discontinuing unnecessary antibiotics in patients with influenza. Herein, we evaluated PCT utilization in the ED and its effects on antibiotic length of therapy (LOT) and patient length of stay (LOS) in the hospital.

**Methods:** This single-center, retrospective study included adult influenza-positive patients admitted from the ED during the 2017-2018 influenza season. Patient demographics, vitals, antimicrobial therapy, PCT use, and outcomes, including LOT, LOS, end of hospital mortality, and 30-day readmission were compared for patients who had PCT-guided therapy (PCT-GT) versus those who did not. PCT-GT was defined as antibiotics withheld or discontinued within 24 hours after resulting PCT ≤0.25 ng/mL, or antibiotics administered after a result of PCT >0.25 ng/mL.

**Results:** Of the 843 influenza encounters screened, 325 were admitted and met inclusion criteria. PCT was ordered in 176 patients (54.2%) and 118 (67.0%) of these patients were determined to have PCT-GT. Patients who had PCT ordered were older (mean ± SD, 70 ± 18 vs. 74 ± 17 years, P = 0.018) and had a trend toward a higher Charlson Comorbidity Index score (54.5% vs. 42.3% with CCI >2, P = 0.063). Patients with PCT-guided therapy were less likely to have received empiric antibiotic therapy (61.0% vs. 87.9%, P < 0.001), had a shorter median LOT (1.65 days, IQR 0.11 – 4.53 vs. 4.00, IQR 2.01 – 6.01 , P < 0.001) and shorter median LOS (3.54 days, IQR 2.34 – 6.20 vs. 4.83, IQR 3.56 – 7.92, P = 0.011). Mortality (6.6% vs. 8.6%, P = 0.66) and 30-day readmission rates (8.5% vs. 15.5%, P = 0.16) did not differ significantly between PT-GT vs. not guided groups, respectively.

**Conclusion:** PCT was ordered in approximately half of our ED patients admitted with influenza. When used correctly, PCT-GT was associated with reductions in antibiotic LOT and hospital LOS, without compromising clinical outcomes. Further education is justified to optimize utilization of PCT-GT for influenza patients in our ED.

**Evaluating the Impact of Antibiotic Prophylaxis on the Microbiology and Incidence of Ventriculitis in Patients with External Ventricular Drains**

**SUBJECT CATEGORY:** N. Healthcare Epidemiology and Prevention 🡪 N4. Device-related HAIs (CLABSI, CAUTI, VAP) C. Clinical Infectious Disease 🡪 C6. CNS Infection

**KEY WORDS:** CNS, Prophylaxis, Neurosurgery

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**BACKGROUND:** External ventricular drains (EVDs) are frequently used in acute brain injuries for continuous intracranial pressure monitoring and cerebrospinal (CSF) fluid diversion. EVDs are associated with a 0-22% risk of ventriculitis. The evidence for antibiotic prophylaxis (AP) for ventriculitis prevention is not robust. This study aimed to delineate the incidence of EVD related ventriculitis and causative organisms in patients receiving AP.

**METHODS:** A retrospective chart review from 2013 to 2018 at Yale New Haven Hospital was performed. Patients were included if ≥18 years of age, admitted to the neurosciences intensive care unit (ICU), and had AP with cefazolin, vancomycin, sulfamethoxazole/trimethoprim, or clindamycin. Patients were excluded if they had a diagnosis of meningitis or ventriculitis prior to EVD placement, on multiple agents for AP, on antibiotics for indications other than AP, CSF leak, or skull fracture. The primary endpoint was the incidence of ventriculitis per 1000 EVD-days. Secondary endpoints were causative organisms of ventriculitis, EVD duration, 30-day mortality, ICU length of stay (LOS), and hospital LOS.

**RESULTS:** Five hundred ninety-nine patients were reviewed and 249 patients were included. Baseline demographics are noted in Table 1. Cefazolin was the most common agent for AP (98%). There were 7 cases of ventriculitis with an incidence rate of 2.8% (4 infections per 1000 EVD-days). All of the causative organisms were resistant to the prophylactic agents administered (Table 2). Patients with ventriculitis had a significantly longer duration of EVD placement (10 ± 3 vs. 7 ± 6 days, p=0.03), hospital LOS (30 ± 19 days vs. 15 ± 12, p=0.04), ICU LOS (22 ± 14 vs. 10 ± 7, p=0.03). Two patients with ventriculitis (28%) died within 30 days of admission compared to 46 patients without ventriculitis (19%, p=0.53) (Table 3).

**CONCLUSION:** The rate of ventriculitis in our study was similar to previous studies that did not utilize AP. All of the causative organisms were resistant to the prophylactic agent. Patients who had ventriculitis had a longer duration of EVD placement, hospital LOS, and ICU LOS, however, 30 day mortality was not impacted. Based on our findings, the use of AP to prevent EVD related ventriculitis should be reconsidered.

Table 1. Demographics

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| --- | --- |
| **Demographic Category** | **Study Group**  **(n = 249)** |
| Age, mean (years) | 58 ± 16 |
| Male (%) | 109 (44) |
| EVD Duration, median (days) | 6 ± 6 |
| Duration of Prophylaxis, median (days) | 6 ± 7 |
| Reason for EVD   * Subarachnoid Hemorrhage (%) * Tumor (%) * Acute Ischemic Stroke (%) * Other (%) | 189 (76)  48 (19)  5 (2)  7 (3) |
| Prophylactic Agent   * Cefazolin (%) * Vancomycin (%) * Clindamycin (%) | 245 (98)  3 (1)  1 (1) |
| Overall EVD-Days | 1729 |
| Ventriculitis Cases (%) | 7 (2.8) |
| Ventriculitis per 1000 EVD-days | 4 |
| Length of Stay, median (days) | 13 ± 12.5 |
| ICU Length of Stay, median (days) | 6 ± 8 |
| 30-Day Mortality (%) | 48 (19.3) |

Table 2. Ventriculitis Causative Organisms

|  |  |  |
| --- | --- | --- |
| **Organism Cultured** | **Duration of EVD Prior to Positive Culture (days)** | **Susceptible to Prophylactic Agent**  **(yes/no)** |
| *Acinetobacter buamannii* | 6 | No |
| Coagulase-negative Staphylococcus | 26 | No |
| *Enterobacter cloacae* | 12 | No |
| *Enterobacter cloacae* | 12 | No |
| *Gordonia sputi* | 10 | No |
| *Klebsiella pneumoniae* | 6 | No |
| *Pseudomonas aeruginosa* | 13 | No |

Table 3. Secondary Outcomes

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Ventriculitis**  **(n=7)** | **No Ventriculitis**  **(n=242)** | **P-value** |
| Hospital LOS, mean (days) | 30.1 ± 18.9 | 15.2 ± 12.2 | 0.04 |
| ICU LOS, mean (days) | 22.3 ± 13.8 | 10.0 ± 7.3 | 0.03 |
| Duration of EVD, mean (days) | 9.8 ± 3.1 | 6.8 ± 5.6 | 0.03 |
| 30-Day Mortality (%) | 2 (28.5) | 46 (19) | 0.53 |

**Clinical Outcomes of Oseltamivir versus Baloxavir in Patients Hospitalized with Influenza A**

**Authors**: Presenter: Sunish Shah, PharmD; Dayna McManus, PharmD, BCPS-AQ ID; Nika Bejou, PharmD; Samad Tirmizi, PharmD, BCIDP; Ginger Rouse, PharmD, BCPS, BCCCP;Steven Lemieux, PharmD, BCPS, BCCCP; Diana Gritsenko, PharmD, BCCCP; Jeffrey Topal, MD

**Background:** Baloxavir marboxil is a new antiviral agent for the treatment of acute uncomplicated influenza in patients > 12 years of age who have been symptomatic for no more than 48 hours. However, clinical trials to date have excluded patients hospitalized with influenza infection.

**Methods:**  This study was a multi-center, retrospective chart review of adult patients admitted to the hospital who received oseltamivir or baloxavir for the treatment of influenza A. Patients were screened for inclusion between January 2018 and February 2018 in the oseltamivir group while patients in the baloxavir group were screened for inclusion between January 2019 and February 2019. Patients who had influenza diagnosed after 48 hours from hospital admission, were not admitted to the hospital, received baloxavir and > 2 doses of oseltamivir during their hospital stay, received > 1 dose of baloxavir during admission for influenza, received influenza therapy prior to admission, died within 48 hours of presentation to the hospital, were asymptomatic at the time of antiviral therapy, or who had left the hospital against medical advice were excluded. Influenza A diagnosis was confirmed by RT-PCR using a nasopharyngeal swab specimen. The primary outcome was hospital length of stay (LOS).

**Results:** Of the 699 patients reviewed, 359 met inclusion criteria. There were 221 patients who received baloxavir and 138 patients who received oseltamivir. Patients who received oseltamivir were older (65 years [55-78] versus 82 years [69-88], P<0.01) and were less likely to have a Body Mass Index > 40 kg/m2 (26 [12%] versus 7 [5%], P=0.03) compared to the baloxavir group. For the primary outcome of LOS, the baloxavir group had a shorter LOS compared to oseltamivir (4 days [3-6] versus 5 days [3-8], P=0.02). Of the 272 patients who were hypoxic at the time of antiviral administration, the baloxavir group was more likely to resolve their hypoxia (145 [88%] versus 84 [79%], P=0.04) and had a shorter time to resolution of hypoxia (43 hours [22-78] versus 81 hours [33-135], P < 0.001) compared to oseltamivir.

**Conclusions:** This study supports the use of baloxavir for the treatment of influenza A in hospitalized patients with possible benefits of reduced length of stay and faster time to resolution of hypoxia compared to oseltamivir.

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| --- | --- | --- | --- |
|  | Baloxavir (n=221) | Oseltamivir (n=138) | P-value |
| **Demographics** | | | |
| Age, median (IQR) | 65 (55-78) | 82 (69-88) | < 0.01 |
| Female Sex, n (%) | 109 (49) | 73 (53) | 0.51 |
| Active smoker, n (%) | 35 (16) | 15 (11) | 0.19 |
| Body Mass Index 30-40 Kg/m2, n (%) | 64 (29) | 32 (23) | 0.23 |
| Heart failure, n (%) | 40 (18) | 37 (27) | 0.05 |
| Diabetes, n (%) | 76 (34) | 36 (26) | 0.10 |
| Chronic respiratory disease, n (%) | 97 (44) | 53 (38) | 0.31 |
| Chronic kidney disease, n (%) | 45 (20) | 28 (20) | 0.99 |
| Dialysis, n (%) | 16 (7) | 7 (5) | 0.41 |
| End stage liver disease, n (%) | 2 (1) | 2 (1) | 0.64 |
| Immunosuppression\*, n (%) | 39 (18) | 19 (14) | 0.33 |
| Days from symptom onset to drug receipt, median (IQR) | 2 (1-4) | 2 (1-3) | 0.02 |
| **Clinical Outcomes** | | | |
| LOS (Days), median (IQR) | 4 (3-6) | 5 (3-8) | 0.02 |
| Hypoxia resolution, n (%) | n=165 145 (88) | n=107 84 (79) | 0.04 |
| Hours from antiviral to hypoxia resolution, median (IQR) | n=165 43 (22-78) | n=107 81 (32-135) | <0.01 |
| Hours from antiviral to fever resolution, median (IQR) | n=163 27 (11-40) | n=98 29 (12-46) | 0.38 |
| All-cause 30-day mortality, n (%) | 37 (17) | 14 (10) | 0.08 |
| \*Immunosuppressive medications, receipt of chemotherapy within the past year, bone marrow transplant recipient, human immunodeficiency virus with a CD4 < 200 cells/mm3, leukemia, lymphoma, solid organ transplant recipient, lupus erythematosus & vasculitis | | | |