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2103. Emergency Department (ED) Stewardship: Stratifying ED Sepsis Order Sets by Penicillin (PCN) Allergy Severity

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Abstract

Background:

The Surviving Sepsis Campaign Guidelines recommends administration of broad-spectrum antibiotics within 1 hour of sepsis diagnosis; electronic order sets drive antibiotic selection with pre-populated regimens based on the suspected infectious indication. Given the low rate of cephalosporin cross-reactivity in patients with a PCN allergy, we modified our ED sepsis order set (Images 1 and 2) to include cephalosporin options in patients with reported mild-to-moderate PCN reaction histories. This was a single-center, retrospective analysis evaluating the impact of this change on antibiotic prescribing and associated outcomes.

Methods:

An electronic medical record (EMR) report identified patients ≥18 years of age with a documented PCN allergy that received antibiotics via the ED sepsis order set from December 30, 2012 to September 28, 2013 (pre-intervention) and January 3, 2014 to July 18, 2015 (post-intervention). The primary objective was to compare antibiotic days of therapy (DOT) and length of therapy (LOT) between the pre- and post-groups. The secondary objectives included 30-day readmission and mortality, hospital length of stay (LOS), incidence of *C. difficile* within 6 months and documented hypersensitivity reactions. Bivariate analyses, with chi-square, Mann–Whitney U, and Poisson means test, were used.

Results:

A total of 180 patients (90 pre- and 90 post-intervention) were included. Demographics were similar between groups, with the exception of congestive heart failure (CHF) which was more prevalent in the post-intervention group ($P = 0.039$). Aztreonam, vancomycin, aminoglycoside, and fluoroquinolone DOTs were significantly reduced (*P < 0.001) while cephalosporin DOTs significantly increased (*P < 0.001) in the post-intervention group. There were no statistical differences in antibiotic LOT, 30-day readmission and mortality, hospital LOS, or incidence of *C. difficile* infection. For those patients that received cephalosporin antibiotics, there were no hypersensitivity reactions documented in the EMR.

Conclusion:

Stratifying ED sepsis order sets by PCN allergy history severity is a safe and effective intervention that reduces second-line antibiotics in PCN allergic patients presenting to the ED with suspected sepsis.

Disciplines

Pharmacy and Pharmaceutical Sciences

Comments

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Session: 241. Antibiotic Stewardship: Sepsis
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Background. Elevated levels of procalcitonin (PCT) reflect systemic inflammation associated with bacterial infection (BI). Compared with other acute-phase reactants, PCT levels more rapidly rise with BI and decline quickly as BI improves. A PCT protocol was implemented at University Medical Center New Orleans (UMCNO) in November 2017 that guided discontinuation of antimicrobial therapy in septic and septic shock patients if clinically improving with declining levels of PCT.

Methods. We performed a retrospective chart review of UMCNO patients 18+ years with a diagnosis of sepsis and a PCT level between January 1st, 2018 to July 31st, 2018 compared with those with sepsis and no PCT level. ICD-9/10 codes were used for diagnoses of sepsis and septic shock. The baseline characteristics including age, gender, body mass index, race and Charlston Comorbidity Index (CCI) data were collected. The primary objective was to compare the total days of antibiotic therapy (DOT) between the two groups. Secondary outcomes were broad-spectrum antibiotic DOT, patient length of stay (LOS), and all-cause 28-day mortality. SPSS was used for data analysis. $P < 0.05$ indicated statistical significance.

Results. There were 44 patients in the PCT group (PCTg) and 35 in the non-PCT group (nPCTg). The demographics are outlined in Table. The mean DOT was 6.25 days in PCTg and 10.74 days in nPCTg ($P = 0.006$). LOS was 7.5 days in PCTg and 14 in nPCTg ($P = 0.006$). The mean CCI was 2.4 in PCTg and 4 in nPCTg ($P = 0.007$). The all-cause 28-day mortality was 11% in PCTg and 23% in nPCTg (OR 0.4; 95% CI 0.128–1.466). On bivariate analysis, LOS was significantly associated with CCI ($P < 0.05$) and total DOT ($P = 0.000$). On multivariate analysis, LOS was only significantly associated with age ($P = 0.015$) and total DOT ($P = 0.000$) but not CCI ($P = 0.811$) nor PCTg ($P = 0.250$).

Conclusion. DOT was significantly shorter in the PCTg than in nPCTg. The LOS was 50% less in PCTg than in nPCTg; however, PCT monitoring did not contribute to LOS in multivariate analysis. Although the nPCTg were sicker, CCI did not correlate with LOS either. However, age and total DOT therapy remained positive predictors of LOS. Monitoring PCT levels decreased antibiotic use in septic patients. LOS, however, was not significantly affected by PCT monitoring.

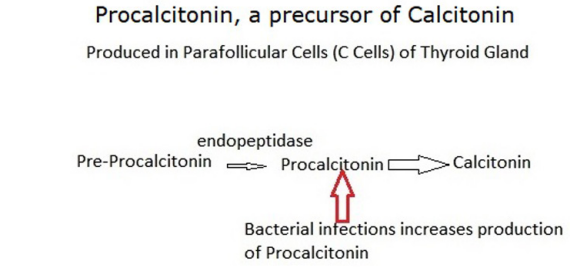
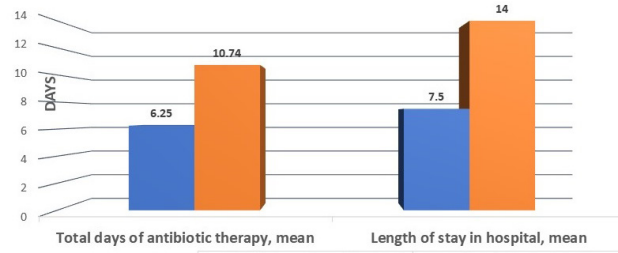


Table 1: Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
• 18 years old and above • Diagnosis of sepsis and septic shock • Patient who received broad spectrum antibiotics for at least 24 hours	• Recent major surgery or trauma • Presence of only localized infection (cellulitis, osteomyelitis, abscesses) without sepsis • Bacteremia and endocarditis due to *Staphlococcus aureus* • End stage renal disease and hemodialysis • Treatment with cytokine stimulating agents • Malaria • Fungal infections • Patients admitted to the burn unit • Patients admitted to the trauma ICU

Table 2: Demographics of Patient Population in Both Groups

Demographics	Procalcitonin Group (n = 44)	No Procalcitonin Group (n = 35)	P-value
Age – mean ± SD	48 ± 15.45	54 ± 17.31	0.167
Male – n (%)	32 (72.7)	18 (51.4)	0.051
Body mass index- Kg/m^2 mean ± SD	25.7 ± 5.89	25.9 ± 7.52	0.895
Race – n (%)			>0.05
Caucasian	17 (38.6)	9 (25.7)	
Black	19 (43.2)	20 (57.1)	
Other (Asian, Hawaiian/Pacific, Declined, Other)	8 (18.2)	6 (17.1)	
Charlson Comorbidity Index – mean	2.39	4.00	0.007



	Total days of antibiotic therapy, mean	Length of stay in hospital, mean
Procalcitonin Group	6.25	7.5
Non Procalcitonin Group	10.74	14

Disclosures. **All authors:** No reported disclosures.

2103. Emergency Department (ED) Stewardship: Stratifying ED Sepsis Order Sets by Penicillin (PCN) Allergy Severity

Mary L. Staicu, PharmD[1]; Maryrose R. Laguio-Vila, MD[2]; Allison Ramsey, MD[2]; Kelly M. Conn, PhD, MPH[3]; Kristin Woodring, PharmD[1]; [1]Rochester General Hospital, Rochester, New York; [2]Rochester Regional Health, Rochester, New York; [3]St. John Fisher College, Wegmans School of Pharmacy, Rochester, New York

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Methods. An electronic medical record (EMR) report identified patients ≥18 years of age with a documented PCN allergy that received antibiotics via the ED sepsis order set from December 30, 2012 to September 28, 2013 (pre-intervention) and January 3, 2014 to July 18, 2015 (post-intervention). The primary objective was to compare antibiotic days of therapy (DOT) and length of therapy (LOT) between the pre- and post-groups. The secondary objectives included 30-day readmission and mortality, hospital length of stay (LOS), incidence of *C. difficile* within 6 months and documented hypersensitivity reactions. Bivariate analyses, with chi-square, Mann–Whitney U, and Poisson means test, were used.

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Conclusion. Stratifying ED sepsis order sets by PCN allergy history severity is a safe and effective intervention that reduces second-line antibiotics in PCN allergic patients presenting to the ED with suspected sepsis.

Antibiotic Indication	No PCN Allergy History	PCN Allergy History
Urinary tract infection	piperacillin/tazobactam + gentamicin	ciprofloxacin + gentamicin
Community-acquired pneumonia	ceftriaxone + azithromycin ± vancomycin	moxifloxacin + aztreonam ± vancomycin
Healthcare-associated pneumonia	piperacillin/tazobactam + vancomycin + gentamicin	aztreonam + vancomycin + gentamicin + metronidazole
Empiric	piperacillin/tazobactam + vancomycin + gentamicin	aztreonam + vancomycin + gentamicin + metronidazole
Intra-abdominal	piperacillin/tazobactam + ciprofloxacin	aztreonam + ciprofloxacin + metronidazole
Skin/Soft tissue infection	piperacillin/tazobactam + vancomycin + clindamycin	aztreonam + vancomycin + clindamycin

Antibiotic Indication	No PCN Allergy History	Mild to Moderate PCN Allergy History	Severe PCN Allergy History
Urinary tract infection	Cefepime ± gentamicin	cefepime ± gentamicin	ciprofloxacin ± gentamicin
Community-acquired pneumonia	ceftriaxone + azithromycin	ceftriaxone + azithromycin	moxifloxacin
Healthcare-associated pneumonia	piperacillin/tazobactam + vancomycin	cefepime + metronidazole + vancomycin	aztreonam + vancomycin + metronidazole
Empiric	piperacillin/tazobactam + vancomycin ± gentamicin	cefepime + metronidazole + vancomycin ± gentamicin	ciprofloxacin + metronidazole + vancomycin ± gentamicin
Intra-abdominal	cefepime + metronidazole ± gentamicin	cefepime + metronidazole ± gentamicin	ciprofloxacin + metronidazole ± gentamicin
Skin/Soft tissue infection	cefepime + vancomycin + clindamycin	cefepime + vancomycin + clindamycin	aztreonam + vancomycin + clindamycin

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