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College of Pharmacy

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Poster Template Guidelines

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When printing posters is needed, please submit Online form. Please refer to the website for assistance in poster templates sizes and other questions you may have within the design of the poster.

Text and graphs in the template sample view is solely to allow faculty, staff and students some idea of the overall look.

1. **The following items are <u>required</u> for the UHCOP poster template:**

· The colors used in this poster are according to the UH Graphics manual

· Outside borders in the red and gray color

· Top left UH logo and UHCOP mortar/pestle graphic

· Top right could have our collaborative institutions logos

· Header red fill color

· If applicable, placement of printer company name/logo at bottom right or left must be smaller than any institutional logo

2. **The following items are <u>optional</u> for the UHCOP poster template:**

· Watermark of mortar/pestle within the poster body

· Collaborative institution acknowledgements located at the bottom of the poster as this may be determined by the presenter and collaborators

UNIVERSITY of HOUSTON COLLEGE OF PHARMACY

K-850/344

Impact of Glycemic Control on Outcomes of *Pseudomonas aeruginosa* (PA) Bacteremia

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ABSTRACT

Background: Infections caused by PA are associated with significant morbidity and mortality. While hyperglycemia is a common finding in patients with infection, its impact in PA bacteremia is unclear. The objective of this study was to determine the impact of early hyperglycemia on outcomes of patients with PA bacteremia.

Methods: A retrospective cohort study was performed in adult patients (≥ 18 years old) with PA bacteremia from 2005-9. Patients were identified by the microbiology laboratory database, and pertinent clinical data (demographics, co-morbidities, baseline APACHE II scores, source of bacteremia, empiric therapy) were collected. All patients received at least one drug empirically which the isolate was susceptible in-vitro. Classification and regression tree analysis was used to determine the threshold breakpoint for average blood glucose concentration within 48 hours of positive blood culture (BG48). Logistic regression was used to explore independent risk factors for 30-day mortality.

Results: A total of 176 bacteremia episodes were identified; patients in 66 episodes were diabetic (DM). DM patients had higher BG48 (165.2 ± 64.8 mg/dL vs 123.7 ± 31.5 mg/dL, p < 0.001) and lower 30-day mortality (10.7% vs 22.7%, p = 0.046) than non-DM patients. Multivariate regression revealed 30-day mortality in non-DM patients was associated with APACHE II score (OR 1.1; 95% CI 1.0-1.2) and BG48 > 168 mg/dL (OR 6.3; 95% CI 1.7 – 23.3). However, blood glucose concentration was not correlated with mortality in DM patients.

Conclusions: Hyperglycemia did not appear to affect outcomes in DM patients, whereas non-DM patients had a higher risk of mortality from PA bacteremia. Early management of hyperglycemic episodes in non-diabetic patients might be an important strategy for improving outcomes associated with PA bacteremia. However, prospective validation with a larger number of patients is required.

BACKGROUND

- *P. aeruginosa* (PA) is an important pathogen frequently implicated in healthcare-associated infections and associated with high morbidity and mortality.
- Acute hyperglycemia reduces neutrophil function, impairing chemotaxis and phagocytosis, in addition to altering cytokine patterns.
- Acute hyperglycemia has been associated with poor outcomes in patients with different types of infection but has not yet been established in patients with PA bacteremia.

OBJECTIVE

Determine the impact of early hyperglycemia on outcomes in diabetic and non-diabetic patients with PA bacteremia

METHODS

Study design / Inclusion

- Retrospective of adult patients hospitalized at least 48 hours at St. Luke's Episcopal Hospital in Houston, TX
- Patients included in the study had the following:
  - Positive PA blood culture from January 1, 2005 – December 31, 2009
  - At least one active antimicrobial on board started within 24 hours of culture
  - ≥ 2 blood glucose measurements within 48 hours of positive culture

Data Collection

- Demographics, comorbidities, severity of illness (APACHE II score) on first day of positive culture, length of hospital stay
- Source of bacteremia, antimicrobial treatment (appropriate defined as at least one agent with *in vitro* activity started within 24 h [excluding aminoglycosides when used as only active agent])
- All blood glucose measurements done within 48 hours of positive culture.

Statistical analysis

- Continuous variables compared using Student *t* test or Kruskal-Wallis test; categorical variables compared with Fisher's exact test
- Continuous variables transformed into categorical variables at the most significant threshold breakpoint identified by classification and regression tree (CART) analysis
- Multivariable logistic regression model to identify risk factors for 30-day mortality in diabetic and non-diabetic patients seperately
  - Any variable with a *p* value < 0.2 by univariate analysis was included in the regression model for multivariate analysis
- Performed with SYSTAT version 12.0 (Systat Software, Inc.; Point Richmond CA)

RESULTS

Table 1. Patient Demographics

Variable	Diabetics n = 66	Non-Diabetics n = 110	p
Age (years)	59.8 ± 11.7	62.8 ± 15	0.140
Male gender	57.8%	50.9%	0.437
Caucasian	43.9%	57.3%	0.090
LOS before Cx	18.7 ± 32.5	20.7 ± 35.1	0.704
APACHE II	13.4 ± 5.1	13.8 ± 7.6	0.477
> 1 active agent used empirically	24.2%	38.2%	0.069
Mortality	10.7%	22.7%	0.046
Co-morbidities, n (%)			
Cardiovascular	60 (90.9)	82 (74.5)	0.010
Respiratory	13 (19.7)	17 (15.5)	0.536
CNS	16 (24.2)	11 (10.0)	0.017
Renal	36 (54.5)	28 (25.5)	< 0.001
Imunosuppression	16 (24.2)	44 (40.0)	0.034

Table 2. Univariate analysis of risk factors for 30-day mortality in non-diabetic patients

Variables	OR (95% CI)	p
Age	1.022 (0.984-1.060)	0.137
Prior length of hospital stay	1.008 (0.997-1.020)	0.149
Baseline APACHE II score	1.102 (1.037-1.171)	0.002
Average BG24 > 193 mg/dL	7.579 (1.290-44.542)	0.025
Average BG48 > 168 mg/dL	9.000 (2.663-30.420)	<0.001
Co-morbidities		
Cardiovascular	0.512 (0.195-1.341)	0.173
Respiratory	2.917 (0.976-8.713)	0.055
Immunnosuppression	2.333 (0.943-5.776)	0.067
Source of bacteremia		
Lung	2.250 (0.849-5.961)	0.103
Abdomen	2.917 (0.976-8.713)	0.055
Line	0.211 (0.026-1.693)	0.143

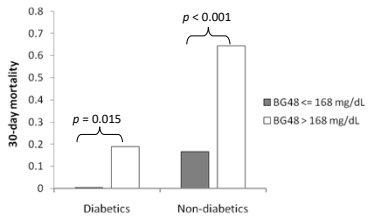
BG24 – Average blood glucose in the first 24 hours after positive culture;
BG48 – Average blood glucose in the first 48 hours after positive culture

Table 3. Multivariate analysis of risk factors for 30-day mortality in non-diabetic patients

Variables	OR (95% CI)	p
Baseline APACHE II score	1.089 (1.018-1.163)	0.013
Average BG48 > 168 mg/dL	6.310 (1.707-23.334)	0.006

- Independent risk factors for mortality in diabetic patients following multivariate analysis included:
  - Length of stay before culture (OR 1.031 (95% CI 1.004-1.059); p 0.022)

Figure 1. Thirty-day mortality for patients with PA bacteremia, stratified by diabetes status



CONCLUSIONS

- Baseline APACHE II score and average blood glucose of > 168 mg/dl in the first 48 hours of infection were predictors of 30-day mortality in patients with PA bacteremia.
- While probability of mortality was significantly higher in diabetic patients with elevated blood glucose, it was not an independent risk factor for mortality.
- Early glycemic control in non-diabetics may be a strategy for reducing mortality in PA infection, however prospective validation with a larger cohort of patients is warranted.