Methods: We performed a historical cohort study on 57 adults with P. aeruginosa (PA) nBSI to define the associated systemic inflammatory response syndrome (SIRS). We examined SIRS scores 2 days prior through 14 days after the first positive blood culture. Imipenem resistant (n=15) and susceptible infections (n=42) were compared. Variables significant in univariate analyses were entered into a logistic regression model.

Results: 73.7% of BSI were caused by imipenem susceptible P. aeruginosa (ISPa) and 26.3% by imipenem resistant P. aeruginosa (IRPa). Median APACHE II (AP2) score on the day of BSI was 22. Appropriate antimicrobials were begun within 24 hours in 59.6%. Septic shock was defined as sepsis associated with hypotension unresponsive to intravenous fluid challenge or the need for >5µg/kg/minute of dopamine or any other vasopressor agent. Organ system failure was assessed using the criteria described by Fagon.

Statistical methods: Mean values were compared using 2 sample t tests for independent samples. Proportions were compared using a χ² test. All tests of significance were 2-tailed, and a was set at 0.05. Independent predictors of mortality were identified by means of stepwise logistic regression analysis, using variables found to be significant in univariate analysis.

Table 1: Patient characteristics and outcomes, stratified by resistance pattern of infecting organism (ISPa vs. IRPa) and underlying severity of illness before infection (APACHE II score ≥ 20 vs. < 20)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total (n=57)</th>
<th>ISPa (n=15)</th>
<th>IRPa (n=37)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years)</td>
<td>55.5</td>
<td>57.0</td>
<td>53.0</td>
</tr>
<tr>
<td>Women</td>
<td>40.4%</td>
<td>42.9%</td>
<td>33.0%</td>
</tr>
<tr>
<td>Mean LOS prior to nBSI (days)</td>
<td>35.0</td>
<td>25.0</td>
<td>47.0</td>
</tr>
<tr>
<td>Mechanical ventilation</td>
<td>61.4%</td>
<td>52.4%</td>
<td>69.7%</td>
</tr>
<tr>
<td>Hemocritosis</td>
<td>10.5%</td>
<td>7.1%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Transfusion</td>
<td>60.0%</td>
<td>45.0%</td>
<td>75.0%</td>
</tr>
<tr>
<td>Prior antibiotics</td>
<td>95.0%</td>
<td>90.0%</td>
<td>93.3%</td>
</tr>
<tr>
<td>ICU</td>
<td>85.0%</td>
<td>81.0%</td>
<td>87.0%</td>
</tr>
<tr>
<td>Central venous line</td>
<td>94.2%</td>
<td>78.6%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Neutropenia</td>
<td>7.0%</td>
<td>4.8%</td>
<td>13.3%</td>
</tr>
<tr>
<td>Imipenem resistance</td>
<td>26.3%</td>
<td>23.3%</td>
<td>32.4%</td>
</tr>
<tr>
<td>AP2 ≥ 20 at day 0</td>
<td>22.0%</td>
<td>22.0%</td>
<td>22.0%</td>
</tr>
<tr>
<td>Mean time to appropriate therapy (days)</td>
<td>1.7</td>
<td>1.4</td>
<td>3.3</td>
</tr>
</tbody>
</table>

Results (continued)

Figure 3: Severe sepsis, septic shock and death in patients with P. aeruginosa nBSI stratified by imipenem resistance pattern

Table 2: Risk factors for death in patients with P. aeruginosa nosocomial bloodstream infection

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Univariate Analysis</th>
<th>Multivariate Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematologic failure</td>
<td>12.4 (p=0.001)</td>
<td>7.8 (p=0.006)</td>
</tr>
<tr>
<td>AP2 ≥ 20 at BSI onset</td>
<td>10.6</td>
<td>6.0 (p=0.014)</td>
</tr>
<tr>
<td>Time to appropriate therapy ≥ 24 hours</td>
<td>3.0 (p=0.046)</td>
<td>4.7 (p=0.031)</td>
</tr>
</tbody>
</table>

Conclusions:
The overall morality and mortality of patients with P. aeruginosa nBSI is high.

Patients with IRPa BSI are not more acutely ill prior to infection than those with ISPa BSI.

When controlling for underlying severity of illness in patients with P. aeruginosa nBSI, the hematologic failure, AP2: 20 at BSI onset and the time to appropriate therapy ≥ 24 hours were independent predictors of death.

Background: Pseudomonas aeruginosa is the third most common gram-negative pathogen causing nosocomial bloodstream infections (BSIs), and has the highest crude mortality among bacteria causing nosocomial BSI. The crude mortality of P. aeruginosa BSI in immunocompromised patients ranges from 22 to 33%. In a study of patients with P. aeruginosa pneumonia, determination of the APACHE (Acute Physiologic and Chronic Health Evaluation) II score at admission was not useful as a prognostic marker, while progression of organ dysfunction after the infection due to P. aeruginosa proved to be an ominous sign. There exist only a few small-scale studies evaluating the effect of antimicrobial resistance in hospital pathogens on clinical outcome. This study was conducted to explore the inflammatory response, clinical course and outcome of nBSI due to P. aeruginosa.