Introduction

Identification of clues that differentiate TI from contamination. It is often difficult to determine whether it is true infection (TI) or contamination.

Methods:

Study period: April 2004 – July 2017

Exclusion: Patients with polymicrobial infection and patients who were less than 18 years old.

Definition: We defined the TI on the following criteria.

1) Patients with persistent bacteremia due to (CoNS)

2) BCs that were positive more than 2 sets

3) Patients with foreign body 28 days before taking BCs.

We defined remaining patients as contamination.

Materials and Methods

Design: Retrospective cohort study

Setting: St. Luke's International Hospital, Tokyo, Japan (520 beds, tertiary-level community teaching hospital)

CVC, n (%)

No. 1035 Differentiation between True Infection and Contamination of Coagulase-Negative Staphylococci by Developing a Prediction Rule

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Introduction

To investigate clues that differentiate TI from contamination.

Determination to develop a prediction rule.

Baseline Characteristics

1. Baseline Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>TI (N=201)</th>
<th>Contamination (N=726)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD)</td>
<td>69.7 (17)</td>
<td>68.7 (17.1)</td>
<td>.471</td>
</tr>
<tr>
<td>Sex, n (%)</td>
<td></td>
<td></td>
<td>.728</td>
</tr>
<tr>
<td>Male</td>
<td>116 (57.7)</td>
<td>409 (56.3)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>85 (42.3)</td>
<td>317 (43.7)</td>
<td></td>
</tr>
<tr>
<td>BMI, mean (SD)</td>
<td>21.0 (4.4)</td>
<td>21.7 (4.5)</td>
<td>.082</td>
</tr>
<tr>
<td>BCs collection location, n (%)</td>
<td></td>
<td>&lt;.001</td>
<td></td>
</tr>
</tbody>
</table>

General wards 131 (65.2) 311 (42.9)

Unit 70 (34.8) 414 (57.1)

Inpatient vs Outpatient, n (%) <.001

Inpatient 482 (66.4) 170 (84.6)

Outpatient 244 (33.6) 315 (15.4)

Malignant tumor, n (%) 82 (40.8) 210 (28.9)

Steroid use in 90 days, n (%) 68 (33.8) 181 (24.9)

Chemotherapy in 90 days, n (%) 31 (15.4) 74 (10.2)

CVC, n (%) 103 (50.3) 236 (32.5) <.001

quick SOFA, n (%)               .809

Positive 98 (48.8) 347 (47.8)

Mortality in 30 days, n (%) 35 (17.4) 96 (13.2) <.001

Mortality in 90 days, n (%) 56 (27.9) 149 (20.5) .027

Time to positivity, n (%) <.001

> 24 hours 81 (40.3) 121 (16.7)

24-48 hours 103 (51.2) 454 (62.5)

> 48 hours 17 (8.5) 151 (20.8)

2. Multivariate Analysis & Prediction rule of CNS true infection.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>OR (95%CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTP (h)</td>
<td>&gt;24</td>
<td>Reference</td>
</tr>
<tr>
<td></td>
<td>&gt;24</td>
<td>1.93 (1.11-3.36)</td>
</tr>
<tr>
<td></td>
<td>&lt;24</td>
<td>4.83 (2.68-8.68)</td>
</tr>
<tr>
<td>BCs collection location</td>
<td>General wards</td>
<td>2.21 (1.58-3.10)</td>
</tr>
<tr>
<td></td>
<td>CVC (+)</td>
<td>1.91 (1.37-2.66)</td>
</tr>
</tbody>
</table>

3: Ability of prediction rule.

<table>
<thead>
<tr>
<th>Cutoff point</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>LR+</th>
<th>LR-</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>98.5%</td>
<td>8.82%</td>
<td>1.80</td>
<td>0.17</td>
</tr>
<tr>
<td>4</td>
<td>83.1%</td>
<td>43.4%</td>
<td>1.47</td>
<td>0.39</td>
</tr>
<tr>
<td>7 ≤</td>
<td>32.8%</td>
<td>87.6%</td>
<td>2.65</td>
<td>0.77</td>
</tr>
<tr>
<td>9 ≤</td>
<td>18.9%</td>
<td>96.6%</td>
<td>5.49</td>
<td>0.84</td>
</tr>
</tbody>
</table>

Discussion

To the best of our knowledge, this is the first study to make the useful prediction rule differentiating TI from contamination.

Previous studies showed that TTP was a useful factor to differentiate TI from contamination. In theory, larger amount of bacteria will grow faster than smaller amount of bacteria. Result of this study is consistent with past studies[2].

Location of blood collection identified as a predictor for differentiating TI and contamination is new. In this study, contamination was more often in unit than in general ward.

This result was due to difference of source of culture. In unit, patients had more intravascular catheter (CVC, PICC, A-line), and at least one of the BC was drawn from intravascular catheter to diagnosis catheter-related blood stream infection (CRBSI). Because of colonization of CVC, BCs drawn from CVC has lower positive predictive value than percutaneous cultures[3].

Presence of CVC is also identified as a predictor for TI in this study. This is also consistent with past studies[4].

Prediction rule developed in this study seems to be meaningful in the clinical situation. If score is 0 point, it is acceptable for clinicians not to use antibiotics, and if score is 7 points or more, using antibiotics is reasonable. These findings may lead to a reduction in inappropriate antibiotic use.

To time positively, location of blood collection and the presence of CVC were associated with true infection.

The prediction rule developed in this study can be useful for clinicians to make decision whether to use antibiotics or not.

References