Number of Blood Cultures per 1,000 Patient Days at University-Affiliated Hospitals in Korea

Eui Chong Kim1, Jeong Hwan Shin2, Sunjoo Kim3, Nam Yong Lee4, Ji-Hyun Cho5, Sun Hoe Koo6, Nam Hee Ryoo7, Sae Ick Joo1

Departments of Laboratory Medicine, 1Seoul National University College of Medicine, Seoul, 2Inje University College of Medicine, Busan, 3Gyeongsang National University School of Medicine, Jinju, 4Sungkyunkwan University School of Medicine, Samsung Medical Center, Seoul, 5Wonkwang University Medical School, Iksan, 6Chungnam National University College of Medicine, Daejeon, 7Keimyung University School of Medicine, Daegu, Korea

The authors calculated the number of blood cultures per 1,000 admitted patient days at seven university-affiliated hospitals in 2010, which ranged from 65 to 129 (mean 110). The number of blood cultures per 1,000 patient days could possibly be a good parameter for assessing the appropriateness of blood culture. (Korean J Clin Microbiol 2012;15:67-69)

Key Words: Blood culture, Cost, Sepsis, Quality control

Blood culture is the gold standard primary test to evaluate patients with sepsis. The need for use of blood culture is increasing, because the incidence of sepsis is rising [1,2]. Several guidelines for optimal blood culture have been proposed including timing and volume of blood collection, number of cultures obtained for each patient, and thoroughness of skin disinfection before collection [3,4]. However, the optimal number of blood cultures per year has not been well documented. Blood culture should be requested adequately, neither overused nor underused [5]. In the Cumitech 1C [4], released in 2005, the number of blood cultures per 1,000 patient days was recommended to be 103-188 in the USA. As the patient population, disease incidence, proportion of acute illnesses, and medical insurance systems in the USA are different from those in Korea, we cannot apply this data directly. The numbers suggested by this documentation need to be evaluated before to be applied to our country. The authors tried to calculate the blood culture numbers per 1,000 patient days, which to our knowledge has not previously been conducted in Korea. The absolute number of blood cultures performed per year could be difficult to compare among hospitals, because the proportion of acute illnesses, hospital size, and turnover rate will be different at each hospital.

Using 1,000 patient days could be the denominator to compensate for these variables. The authors compared the number of blood cultures by 1,000 patient days for seven university-affiliated hospitals in 2010. The average stay in the hospital ranged from 6.9 to 11.3 days.

The mean number of blood cultures per 1,000 days was 110±23 (SD), ranging from 65 to 129 (Table 1). Interestingly, one hospital showed a very low number, 65, whereas all other hospitals reported more than 100. In the detailed analysis of blood culture request patterns, this hospital had a much higher proportion (44%) of cases in which only one set of blood cultures was ordered for adults [6]. The 95% confidence intervals (CI) of the number of blood cultures per 1,000 patient days were 95 to 125, which is slightly higher than the data (73-110) from 18 other university-affiliated hospitals in the previous year (data obtained by the authors, but not published). Patients’ constitution, disease severity, underlying illness, location of the hospital, and numbers of intensive care units may affect the results. Accordingly, the numbers of blood cultures per 1,000 patient days in this study should not be applied to small hospitals or long-term care facilities. The number (103-188) of blood cultures per 1,000 patient days suggested by Cumitech 1C [5] was higher than ours. The difference between two studies might be secondary to the proportion of patients with acute illnesses or blood culture ordering pattern. Many hospitals had used two sets (about 70%) for adult patient and one set (about 80%) for child
Table 1. Statistics of yearly requested blood culture at 7 university-affiliated hospitals in 2010

<table>
<thead>
<tr>
<th>Hospitals</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood culture performed (A)</td>
<td>76,062</td>
<td>70,763</td>
<td>45,925</td>
<td>35,404</td>
<td>29,940</td>
<td>22,649</td>
<td>16,372</td>
<td>297,115</td>
</tr>
<tr>
<td>Admitted patient numbers (B)</td>
<td>75,477</td>
<td>97,040</td>
<td>39,161</td>
<td>35,843</td>
<td>24,151</td>
<td>32,618</td>
<td>28,605</td>
<td>332,895</td>
</tr>
<tr>
<td>Average admission days (C)</td>
<td>7.8</td>
<td>6.9</td>
<td>8.8</td>
<td>8.37</td>
<td>11.3</td>
<td>9.7</td>
<td>8.8</td>
<td>7.9</td>
</tr>
<tr>
<td>Total admitted patient days (B×C)</td>
<td>588,718</td>
<td>669,571</td>
<td>334,619</td>
<td>299,985</td>
<td>269,823</td>
<td>219,695</td>
<td>251,726</td>
<td>2,634,137</td>
</tr>
<tr>
<td>Adjusted blood culture by 1,000 patient days* (1,000×A/B×C)</td>
<td>129.2</td>
<td>105.7</td>
<td>137.2</td>
<td>118.0</td>
<td>111.0</td>
<td>103.1</td>
<td>65.0</td>
<td>109.9</td>
</tr>
</tbody>
</table>

*Mean, SD, and 95% confidence intervals are 110, 23, and 95-125, respectively.

In conclusion, the mean number of blood cultures per 1,000 patient days was 110 at seven university-affiliated hospitals. The number of blood cultures per 1,000 patient days could be a good parameter to evaluate overuse or underuse of blood culture, but could be affected by blood culture requesting pattern.

ACKNOWLEDGEMENTS

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대학병원의 1,000명 입원환자당 혈액배양 시행 건수

저자들은 2010년 7개 대학병원에서 1,000명 입원환자당 시행한 혈액배양 건수를 조사하였는데, 그 범위는 65-129 (평균 110)였다. 1,000명 입원환자당 혈액배양 시행건수는 혈액배양이 적절히 이용되고 있는지 평가하는 도구로 사용될 수 있을 것이다. [대한임상미생물학회지 2012;15:67-69]