Introduction:

• *Enterobacter* species (spp.) can cause complicated infections in patients with malignancy, and issue of antimicrobial resistance also could make it difficult to initiate an appropriate empirical antimicrobial treatment.

• The aim of this pilot study is to show the current status of bloodstream infection caused by *Enterobacter* spp. and find difference between cases with or without malignancies in a university-affiliated hospital in Japan.

Methods:

• The patients with positive culture results of *Enterobacter* spp. from blood or cathether tip were defined to have bloodstream infection, in Juntendo University Hospital, Tokyo, Japan, from January to December in 2016.

• Retrospective chart review of the patients was conducted and collected information was analyzed.

Results:

A total of 29 patients had *Enterobacter* spp. bacteremia in 2016.

• Age: 58.3±24.3 years old
• Sex: male: female= 17:12

Antimicrobial susceptibility rate:

- Piperacillin
  - 75.8 %
- Piperacillin/tazobactam
  - 82.8 %
- Cefmetazole
  - 10.3 %
- Cefotaxime
  - 75.9 %
- Meropenem
  - 100 %
- Gentamicin
  - 100 %
- Levofoxacin
  - 100 %

17 patients had active malignant diseases.

Diagnosis of malignant diseases

- Gallbladder cancer
  - 4 (23.5%)%
- Pancreas cancer
  - 3 (17.6%)%
- Esophageal cancer
  - 2 (11.8%)%
- Bladder cancer
  - 2 (11.8%)%
- Others
  - 6 (35.3%)%

<table>
<thead>
<tr>
<th>Cause of bacteremia (%)</th>
<th>Total (n=29)</th>
<th>Malignancy (n=17)</th>
<th>Non-malignancy (n=12)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Billiary tract infection</td>
<td>10 (34.5)</td>
<td>8 (47.1)</td>
<td>2 (16.7)</td>
<td>0.13</td>
</tr>
<tr>
<td>Intravascular line-associated infection</td>
<td>10 (34.5)</td>
<td>3 (17.7)</td>
<td>7 (58.3)</td>
<td>0.046**</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>4 (13.8)</td>
<td>3 (17.7)</td>
<td>1 (8.3)</td>
<td>0.62</td>
</tr>
<tr>
<td>Febrile neutropenia</td>
<td>3 (10.3)</td>
<td>3 (17.7)</td>
<td>0 (0)</td>
<td>0.24</td>
</tr>
<tr>
<td>Intraabdominal infection</td>
<td>1 (3.4)</td>
<td>0 (0)</td>
<td>1 (8.3)</td>
<td>0.41</td>
</tr>
<tr>
<td>Unknown</td>
<td>1 (3.4)</td>
<td>0 (0)</td>
<td>1 (8.3)</td>
<td>0.41</td>
</tr>
<tr>
<td>Abx use within 4 wks (%)</td>
<td>20 (69.0)</td>
<td>11 *(64.7)</td>
<td>9 (75.0)</td>
<td>0.69</td>
</tr>
<tr>
<td>Previous cefmetazole use (%)</td>
<td>8/20 (40.0)</td>
<td>8/11 (72.7)</td>
<td>0/9 (0)</td>
<td>&lt;0.01**</td>
</tr>
<tr>
<td>Resistance to Abx formally used (%)</td>
<td>12/20 (60.0%)</td>
<td>10/10 (100)</td>
<td>2/9 (22.2)</td>
<td>&lt;0.01**</td>
</tr>
</tbody>
</table>

Outcome (%):

- Hospitalized at 4 wks after Dx of bacteremia (%) | 15 (62.5) | 6 (46.2) | 9 (81.8) | 0.1 |
- Mortality at 4 wks after Dx of bacteremia (%)   | 5 (17.2)  | 4 (23.5) | 1 (8.3)  | 0.37 |
- Mortality at discharge from the hospital (%)   | 5 (17.2)  | 4 (23.5) | 1 (8.3)  | 0.37 |

Table. Comparison of patients with or without malignant diseases.

- Line-associated infection rate is lower in the malignancy group.
- Cefmetazole was used previously in the malignancy group, which developed cefmetazole-resistant Enterobacter bacteremia.

** One case used T/S but no susceptibility data.

Future plan:

- Establishment of the algorithm to predict Enterobacter bacteremia
- Investigation of risk factors of line-associated bloodstream infection

Conclusion:

• *Enterobacter* spp. bacteremia mostly developed as the result of biliary tract infection among the patients with malignancies with obstruction/narrowing of biliary tract.

• Previous use of cefmetazole could work as an antimicrobial selective pressure of *Enterobacter* spp..

• Empirical antimicrobial treatment should cover *Enterobacter* spp., waiting for the results of blood culture.