Effectiveness of early antibiotic administration in cancer patients with sepsis

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Introduction

Improving sepsis management is a challenge for acute physicians. A UK national audit found only 26% of patients are being treated with anti-microbial therapy within the guideline time of one hour from admission(1). Cancer patients are at an increased risk of becoming septic and have a higher mortality than the general population (2). Optimal treatment is key in reducing hospital stay and mortality and it has been found that speed of empirical antibiotics delivery is paramount (3).

Aim

This retrospective analysis aimed to determine differences in patient outcomes after improvement in compliance with the one hour door to needle (D2N), surviving sepsis campaign, guideline (4). Introducing nurse lead care and a key performance indicator at the Christie cancer hospital lead to an improvement from 40% of patients treated within an hour from admission in 2008 up to 88.6% in 2012.

Method

This study compared patients from 2008 and 2012, admitted to the Christie cancer hospital’s Medical admission unit with sepsis. The cohorts of patients taken allowed us to identify how the improvement in anti-microbial delivery effected the outcomes of patients.

Retrospective analysis of four months of admission data and patient database information was collated before the improvement in D2N time. The outcome measures compared between the two groups were mortality and length of stay as a hospital inpatient. The study also identified demographic details to ascertain whether any differences between the group demographics could account for changes in patient outcome.

Table 1. Table showing the averages for length of stay between 2008 and 2012 and neutropenic and non neutropenic patients.

<table>
<thead>
<tr>
<th></th>
<th>2008 Patients</th>
<th>2012 Patients</th>
<th>2008 neutropenic patients</th>
<th>2012 neutropenic patients</th>
<th>2008 non neutropenic patients</th>
<th>2012 non neutropenic patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=301)</td>
<td>(n=225)</td>
<td>(n=72)</td>
<td>(n=69)</td>
<td>(n=154)</td>
<td>(n=259)</td>
</tr>
<tr>
<td>Median</td>
<td>5</td>
<td>4</td>
<td>6.5</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Mean</td>
<td>7</td>
<td>6</td>
<td>6.8</td>
<td>6.9</td>
<td>6.9</td>
<td>6.9</td>
</tr>
<tr>
<td>Standard Error</td>
<td>0.32</td>
<td>0.44</td>
<td>0.50</td>
<td>0.60</td>
<td>0.60</td>
<td>0.60</td>
</tr>
</tbody>
</table>

Results

- Demographics
  Four months of sepsis admission data produced 225 patients in 2008 and 301 in 2012. There was no significant difference in patients demographics (p=0.05) in; age, sex, cancer type (fig. 1), neutropenia, positive blood cultures and admission to critical care.

- Length of stay
  There was a statistically significant (P=0.045) reduction in the length of inpatient stay (table 2). This was more pronounced in the neutropenic population. This reduction was greater than a day, therefore is also clinically significant.

- Mortality
  The 30 day mortality showed a non-significant reduction (fig.2). Mortality at six months and one year also showed improvement in 2012 compared to 2008.

Conclusion

• Improvement in speed of administration of antibiotics was observed when nurse lead management was introduced in treatment of sepsis patients.

• Improvement in D2N was associated with a statistically and clinically significant reduction in the length of hospital inpatient stay. The impact of this reduced inpatient stay needs to be assessed in further studies

• 30 day mortality at the Christie is low and has showed a trend towards improvement associated with one hour D2N compliance.

• Widespread analysis of nurse lead care and outcome of sepsis in relation to door to needle time needs to be analysed to assess the importance of this protocol.

Citations

3. Duration of Hypoventilation before initiation of effective antiinfective therapy is the critical determinant of survival in human septic shock. Je Akoussou et A, s.l - Critical Care Medicine, 2006, Vol. 34, pp. 1599-96