Decreasing Time to Antibiotic Delivery for Febrile Immunocompromised Patients in a Pediatric Emergency Department

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BACKGROUND
Infections are common complications in immunocompromised patients (ICPs). Morbidity and mortality are increased in ICPs with fever if antibiotics are not received in a timely manner. Although the causes of fever in ICPs can be many, the risk of severe bacterial infection makes rapid detection and urgent intervention essential. It is recommended that patients have prompt evaluation for source of infection and rapid initiation of empirical broad spectrum intravenous antibiotics. The Infectious Diseases Society of America has recommended that antibiotic therapy be administered promptly to these patients but no specific time window has been recommended. The nationwide consensus amongst institutions is delivery of antibiotics in 60 minutes or less.

PURPOSE
We designed a quality improvement project to reduce antibiotic delivery time to less than 60 minutes for all febrile immunocompromised patients presenting to the pediatric emergency department (ED).

METHODS
We identified key drivers to decrease time to antibiotic delivery for 100% of febrile immunocompromised patients. We leveraged a quality improvement project to reduce antibiotic delivery time to less than 60 minutes for all febrile immunocompromised patients (ICPs). The project involved the following interventions:

1. Patient Knowledge
   - Lack of communication between patient and Hem/Onc team

2. Patient Identification
   - Patient not expected
   - Message lost amongst providers

3. Acuity Awareness
   - Patient not flagged as higher priority
   - Chief complaint vague

4. Primary Drivers
   - Hem/Onc reinforces to patients the need to call
   - Hem/Onc reminds patients to put EMLA on before arrival

5. Secondary Drivers
   - Message lost amongst providers
   - Chief complaint vague

CHANGES MADE
- 1. Hem/Onc speaks directly with ED attending
- 2. ED attending puts patient on expected list and notifies nursing staff
- 1. Patient given acuity level 2
- 2. Chief complaints of “fever, immunocompromised” and “fever, sickle cell” created and used
- 1. Antibiotics ordered before labs resulted
- 2. Nursing staff prepares drug in ED
- 3. Drug dose rounding chart displayed

MEASURES
Two key measures used to evaluate the effectiveness of interventions included mean time to antibiotic delivery in febrile ICPs and the percentage of febrile ICPs meeting the target for time to antibiotic administration. Data was collected and abstracted from the hospital electronic medical record for the twelve months prior to the intervention and four months following the intervention. During the pre-intervention period the ED saw, on average, 14 febrile ICPs (range: 10-19 monthly). During the post-intervention period, the ED saw, on average, 15 febrile ICPs (range: 8-19 monthly).

BENCHMARKS

<table>
<thead>
<tr>
<th>Category</th>
<th>Pre-Implementation (September 2012-September 2013)</th>
<th>Post-Implementation (September 1, 2013-February 24, 2014)</th>
<th>Percentage Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average time to antibiotics (min)</td>
<td>93.32</td>
<td>35.83</td>
<td>↓ 61.6</td>
</tr>
<tr>
<td># ICP’s receiving antibiotics in 60 minutes or less</td>
<td>56/138 (33.3%)</td>
<td>87/90 (96.6%)</td>
<td>↑ 63.3</td>
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</tbody>
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CONCLUSIONS
Our study demonstrates that education of healthcare providers and standardization of a process of care reduced antibiotic delivery time for febrile ICPs. Timely delivery of antibiotics can be achieved through implementation of patient education, a treatment algorithm and staff buy-in. Administering antibiotics in less than one hour is feasible and should become the standard of care for all febrile ICPs.