An Interdisciplinary Team Model to Enhance Early Administration of Empirical Antibiotics for Patients with Neutropenic Infection in QMH AED

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Queen Mary Hospital
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Empirical Antibiotics for Neutropenic Infection

- Neutropaenic patients with infection is a medical emergency and can deteriorate rapidly

- It requires immediate evaluation and administration of empiric broad-spectrum antibiotics

- Rapid identification of these patients in AED can enhance prompt management
An 1-hour cutoff of triage-to-antibiotics time appeared to correlate with survival of patients presenting to AED.

<table>
<thead>
<tr>
<th>Cutoffs</th>
<th>Number</th>
<th>Mortality, %</th>
<th>Difference, %</th>
<th>Adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤1 hr</td>
<td>41</td>
<td>19.5</td>
<td>13.7</td>
<td>0.30</td>
</tr>
<tr>
<td>&gt;1 hr</td>
<td>220</td>
<td>33.2</td>
<td></td>
<td>0.54</td>
</tr>
<tr>
<td>≤2 hrs</td>
<td>124</td>
<td>28.2</td>
<td>5.4</td>
<td>0.54</td>
</tr>
<tr>
<td>&gt;2 hrs</td>
<td>137</td>
<td>33.6</td>
<td></td>
<td>0.53</td>
</tr>
<tr>
<td>≤3 hrs</td>
<td>172</td>
<td>27.9</td>
<td>9.2</td>
<td>0.53</td>
</tr>
<tr>
<td>&gt;3 hrs</td>
<td>89</td>
<td>37.1</td>
<td></td>
<td>0.53</td>
</tr>
<tr>
<td>≤4 hrs</td>
<td>200</td>
<td>28.5</td>
<td>10.8</td>
<td>0.62</td>
</tr>
<tr>
<td>&gt;4 hrs</td>
<td>61</td>
<td>39.3</td>
<td></td>
<td>0.62</td>
</tr>
<tr>
<td>≤5 hrs</td>
<td>218</td>
<td>30.7</td>
<td>1.8</td>
<td>0.82</td>
</tr>
<tr>
<td>&gt;5 hrs</td>
<td>43</td>
<td>32.6</td>
<td></td>
<td>0.82</td>
</tr>
</tbody>
</table>

Gaieski et al., Crit Care Med 2010
Delays of antibiotics administration from the onset of hypotension are associated with inferior survival.
Old practice
Empirical Antibiotics Administration for Neutropenic Infection

Target :-

Prompt and Timely Administration of First dose of Antibiotics in AED for patients with neutropenic infection (within 1 hour)
Strategies

1. Evidence Based Medicine (Get the evidence)
2. Starts small; focus on Hematology patients first
3. Through interdisciplinary Team Collaboration
4. Engagement of frontline colleagues and patients
5. Independent Audit by CND case manager
6. Regular Communication & Critical reviews of the Program
Evidence Based Medicine

For patients with sepsis, the standard care is to administer antibiotics within 1 hour of AED arrival.


Guidelines to offer consistency and up-to-date safe practice

NHS Guidelines 2012, Wingard 2014
Interdisciplinary Team Collaboration

- AED
- Microbiology
- Pharmacy
- Medicine (Haematology)
- Central Nursing Division
- Clinical Oncology

Patient
• Briefing and **engaging** AED doctors and nurses
• Creation of **Alert Cards** to facilitate AED nursing staff in triage
• Training of **Phlebotomy team** for blood taking including blood C/ST
• Assigning supporting staff for immediate collection of medication from pharmacy
• Designing clear-cut flow-chart, documentation and treatment protocol
Empirical Antibiotics Treatment in AED for Neutropenic Infection

Date & Time
Management Orders
Doctor Sign. & No.
Date & Time
Management Orders
Nurse Sign. & No.

Aim: Door-to-Antibiotics time < 1 hour

Drug / Food Allergy: □ Not known □ No □ Yes ____________

Principal Diagnosis: □ Leukemia □ Lymphoma (Hodgkin's / non-Hodgkin's) □ Myelodysplastic Syndrome
□ Severe aplastic anaemia □ Post haemopoietic stem cell transplantation (autologous / allogeneic)
□ Myeloma □ Others ________________

Last Chemotherapy ____________ given on ____________

Haemopoietic Stem Cell Transplant (HSCT) on ____________

AED

Haematology Patients:
- Fever: (Either at home or by patient OR at AED)
  □ Temperature ≥38.3°C (101°F) or
  □ Hx of Fever ≥ 38.3°C (101°F) within last 24 hours

Yes

No

Start IV Antibiotics:
- 1st choice: meropenem
- If allergic to Penicillin: Levofloxacin
- Vancomycin for patients with poor condition
- No need to wait for WBC count, antibiotics can be started without/before septic workup

Admit to Medical Admission ward
Inform receiving ward

Managed as per AED protocol

Empirical Antibiotics Treatment in AED for Neutropenic Infection
• Education of staff
• Education of patients & carers on S/S of infection and presentation of alert cards in AED; and need for early treatment
• Distribution of alert card to eligible patients
• Demonstration and workshops for AED colleagues
Pharmacy

- Distinctive colored requisition form labeled ‘ultra-urgent’ to facilitate identification by pharmacy colleague
- AED supporting staff to collect medication in person
CND - Case Manager

- Review & develop SOP & Care Maps
- Root cause analysis of variances (↑ Door to antibiotic time)
- Monitor patient delivery logistic (the AED → Pharmacy ward → Drug administration → admission)
- Case manager: data acquisition, analysis & variance
## Our Result – Door to Antibiotic Time

<table>
<thead>
<tr>
<th>Period</th>
<th>No. of patients</th>
<th>Mean door to antibiotic time</th>
</tr>
</thead>
<tbody>
<tr>
<td>September to December 2013</td>
<td>18</td>
<td>54.4 minutes</td>
</tr>
<tr>
<td>January to April 2014</td>
<td>31</td>
<td>40.6 minutes</td>
</tr>
</tbody>
</table>

**Door to Antibiotics time**

- **2013 (Sept - Dec)**
- **2014 (Jan - Apr)**
Our Result – Triage to AED Doctor’s attendance

<table>
<thead>
<tr>
<th>Period</th>
<th>No. of patients</th>
<th>Mean door to AED Doctor attendance time</th>
</tr>
</thead>
<tbody>
<tr>
<td>September to December 2013</td>
<td>18</td>
<td>12.2 minutes</td>
</tr>
<tr>
<td>January to April 2014</td>
<td>31</td>
<td>7.4 minutes</td>
</tr>
</tbody>
</table>

![Graph showing the percentage of Triage to AED Dr. attendance time](chart.png)
## Our Result - Doctor’s attendance to Administration of Antibiotics

<table>
<thead>
<tr>
<th>Period</th>
<th>No. of patients</th>
<th>Mean AED Dr. attendance to administration of antibiotic time</th>
</tr>
</thead>
<tbody>
<tr>
<td>September to December 2013</td>
<td>18</td>
<td>39.4 minutes</td>
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<tr>
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<td>31</td>
<td>28.6 minutes</td>
</tr>
</tbody>
</table>

### AED Dr. attendance to Antibiotic administration time

- **2013 (Sept - Dec)**
- **2014 (Jan - Apr)**
### System Changes within different disciplines

#### AED

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of patient</td>
<td>No robust system</td>
<td>An alert card (fast pass)</td>
</tr>
<tr>
<td>Workflow / care map</td>
<td>Not structured</td>
<td>Agreed protocol of care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Standardized workflow</td>
</tr>
<tr>
<td>Medication administration</td>
<td>Not given</td>
<td>Administered within 1 hour in AED</td>
</tr>
</tbody>
</table>

#### Department of Medicine

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment, investigations and administration of 1(^{st}) dose of antibiotics for potential neutropenic patients</td>
<td>After admission in ward</td>
<td>In AED</td>
</tr>
</tbody>
</table>

#### Pharmacy

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dispensing of medication</td>
<td>Normal procedure</td>
<td>Fast track dispensing of medication with the designated colored form</td>
</tr>
</tbody>
</table>
Challenges encountered during

1. Buy in and engage frontline staff
2. Manipulate patients’ central line for blood taking
3. Familiarize and optimize workflow logistics
4. Identify non-compliance
Conclusion

**Key Drivers to survival of this Program:**
- Well planned and Interdisciplinary Collaboration
- Staff engagement
- Independent case review
- Regular communication between stakeholders

**Future Perspectives:**
- Study the effect on patients’ outcome
- Extension of the care path for non-hematological malignancy patients
Acknowledgment

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- Ms. Ritchie Kwok, Cl. Pharmacist, QMH
- Ms. Sin-ting Wong, WM, Dept. of Clinical Oncology, QMH
- Ms. Alta Kan, WM, Dept. of Medicine, QMH
- Ms. Teresa Kwan, RN, CND, QMH
- Colleagues of AED, QMH
- Colleagues of Dept. of Medicine, QMH,
- Colleagues of Pharmacy, QMH
Supplementary slide
Our Result – Door to Triage Time

<table>
<thead>
<tr>
<th>Period</th>
<th>No. of patients</th>
<th>Mean door to triage time</th>
</tr>
</thead>
<tbody>
<tr>
<td>September to December 2013</td>
<td>18</td>
<td>5.5 minutes</td>
</tr>
<tr>
<td>January to April 2014</td>
<td>31</td>
<td>4.6 minutes</td>
</tr>
</tbody>
</table>

Door to Triage Time

- 2013 (Sept - Dec)
- 2014 (Jan - Apr)