SEPSIS Management - a quality indicator for acute care

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Sepsis recognition

- Triage
- EWS
- Communication
- Handover
- Infection prevention & control
- Antimicrobial stewardship
  - Affects all specialties & all services

Multidisciplinary management

- Pre-hospital
- ED
- Medicine
- Surgery
  - Source control
- Anaesthesia
- Radiology
  - Including interventional
- Laboratory
- Critical Care
- Clinical microbiology
- Pharmacy

Urgency

- Sepsis is a time-dependent medical emergency
- Defined as ‘A life-threatening organ dysfunction caused by a dysregulated host response to infection’
- Effective management depends on the successful functioning of a multidisciplinary team operating within the National Clinical Guidelines

Facts

- Trigger is infection
  - Up to 30% HCP did not know this!
- 70-80% arise in the Community
  - Present to ED
- 14,000 cases documented in 2016 (HIPE)
  - 6000 AMI
- 19% sepsis-associated hospital mortality
  - 6.4% AMI

Epidemiology

FIGURE 1: The trend in number of sepsis cases 2011-2016

Number of cases

- 2011
- 2012
- 2013
- 2014
- 2015
- 2016

0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
**Number of cases with age**

Figure 1: Number of inpatients with a diagnosis of sepsis (excluding SIRS of infectious origin & septic shock) and without admission to a critical care unit, 2016.

**Mortality with age**

Figure 2: In-hospital mortality for inpatients with a diagnosis of sepsis by age groups, 2016.

**With co-morbidities**

Figure 3: In-hospital mortality rate for inpatients with a diagnosis of sepsis and selected co-morbidities, 2016.

**Surgical DRG**

Table 4: Inpatients with a diagnosis of sepsis, by surgical / medical diagnosis related group, 2016.

<table>
<thead>
<tr>
<th>Surgical / Medical DRG</th>
<th>Number of Inpatients</th>
<th>Increase in cases 2015-2016</th>
<th>% of total cases 2016</th>
<th>Crude Mortality Rate</th>
<th>Change in Mortality Rate 2015-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical</td>
<td>2,428</td>
<td>10.9%</td>
<td>16.4%</td>
<td>24.1%</td>
<td>7.3%</td>
</tr>
<tr>
<td>Medical</td>
<td>12,375</td>
<td>7.6%</td>
<td>83.6%</td>
<td>17.4%</td>
<td>20.5%</td>
</tr>
<tr>
<td>Total</td>
<td>14,804</td>
<td>66.6%</td>
<td>100%</td>
<td>18.5%</td>
<td>18.8%*</td>
</tr>
</tbody>
</table>

* 18.4% reduction between 2015 and 2016 after adjusting for age differences.

Note: Surgical refers to inpatients with a surgical Diagnosis Related Group (DRG) which is assigned if there is at least one significant surgical procedure carried out in an operating room during that episode of care. Medical refers to inpatients with a medical DRG, which is assigned if there are no significant surgical procedures during that episode of care. The Medical group above also includes a small number of patients with a DRG classified as 'Other' that is they had a non-surgical operating room procedure.

**Seasonal variation**

Figure 5: In-hospital crude mortality for inpatients with a diagnosis of SIRS of infectious origin, sepsis, severe sepsis & septic shock, monthly data, 2014-2016.
Sepsis 6 bundle

1. **OXYGEN**: Titrate O₂ to saturations of 94-98% or 88-92% in chronic lung disease.

2. **FLUIDS**: Start IV fluid resuscitation if evidence of hypovolaemia. 500ml bolus of isotonic crystalloid over 15mins & give up to 30ml/kg, reassessing for signs of hypovolaemia, euvoaemia, or fluid overload.

3. **CULTURES**: Take blood cultures before giving antimicrobials (if no significant delay i.e. >45 minutes) and consider source control.

4. **FLUIDS**: Start IV fluid resuscitation if evidence of hypovolaemia. 500ml bolus of isotonic crystalloid over 15mins & give up to 30ml/kg, reassessing for signs of hypovolaemia, euvoaemia, or fluid overload.

5. **BLOODS**: Check point of care lactate, FBC, U&E, LFTS, +/- Coag. Other tests and investigations as per history and examination.

6. **ANTIMICROBIALS**: Give IV antimicrobials according to local antimicrobial guidelines.

7. **URINE OUTPUT**: Assess urine output and consider urinary catheterisation for accurate measurement in patients with severe sepsis/septic shock.

Sepsis diagnosis

**Practical Guidance**

- Re-assess the patient’s clinical response frequently. Re-evaluate and re-administer lactate, if the first is abnormal, by 6hrs. Achieve MAP >90 within 1hr and/or have decreased pressures. Achieve source control, if required, at the earliest opportunity. (Give clinical judgement if the patient is deteriorating, despite appropriate treatment, seek senior assistance and re-evaluate antimicrobial therapy.)

**Sepsis 3 Adult In-Patient Sepsis Management Algorithm**

1. **Prolonged Hypotension**
   - No response to fluid/vasopressor
   - Consider aortic dissection/blunt cardiac trauma or cardiac tamponade
   - Go to the Shock Track

2. **Uncontrolled Hypoglycaemia**
   - Consider adrenal insufficiency
   - Go to the Shock Track

3. **Uncontrolled Hyperglycaemia**
   - Consider hyperinsulinaemia or stress hyperglycaemia
   - Go to the Shock Track

4. **Hypothermia**
   - Consider hypothermia
   - Go to the Shock Track
**Audit results 2016 n= 1489**

<table>
<thead>
<tr>
<th>With form</th>
<th>Without form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosis made and documented</td>
<td>87%</td>
</tr>
<tr>
<td>Risk stratification correct</td>
<td>74%</td>
</tr>
<tr>
<td>1st dose antimicrobials within 1 hour</td>
<td>74.5%</td>
</tr>
</tbody>
</table>

Only 56% of sepsis cases were documented as sepsis in the case notes.

**Compliance with Sepsis 6 2017**

<table>
<thead>
<tr>
<th>Process audit</th>
<th>National Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sepsis documented correctly</td>
<td>60%</td>
</tr>
<tr>
<td>Antibiotics within the 1st hour</td>
<td>72%</td>
</tr>
<tr>
<td>Antibiotic as per guideline</td>
<td>64%</td>
</tr>
<tr>
<td>Blood cultures before antibiotic</td>
<td>80%</td>
</tr>
<tr>
<td>Lactate taken</td>
<td>75%</td>
</tr>
<tr>
<td>Repeat lactate (when indicated)</td>
<td>71%</td>
</tr>
<tr>
<td>Fluid bolus</td>
<td>42%</td>
</tr>
</tbody>
</table>

**Sepsis mortality prediction model & score**

- Predict a hospital's sepsis mortality
  - Age
  - Co-morbidity profile
- Measure the observed
- Published score
- Outlier intervention

**Thank you**

www.hse.ie/sepsis