Presentation title: Sepsis in Heart Failure Patients

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Conflicts of interest: None

Presentation slide distribution:
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Sepsis in Heart Failure Patients

Chris Young
Objectives

● Definition of Sepsis
● Physiology of Sepsis
● Interaction between sepsis and heart failure
● Suggestions on management

● Outside of Scope of talk: Sepsis induced myocardial dysfunction.
Definition of Sepsis

Continuum from...

SEPSIS

‘Sepsis is a clinical syndrome caused by the body’s immune and coagulation systems being switched on by the presence of infection (bacteria or viruses) in the blood.’

SEVERE SEPSIS

Severe sepsis is defined as organ dysfunction or tissue hypoperfusion (decreased blood flow) in addition to sepsis, requiring a stay in an intensive care unit (ICU).

SEPTIC SHOCK

Septic shock is a life-threatening condition that is characterised by low blood pressure despite adequate fluid replacement in addition to organ dysfunction and sepsis.
Definition unchanged for 20 years until...

The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3) 2016

Severe Sepsis - Definition removed

SIRS (Temperature, Heart rate, Respiratory Rate and WCC) has been replaced with qSOFA.

Sepsis: life-threatening organ dysfunction due to a dysregulated host response to infection.

Septic shock is defined as a subset of sepsis in which particularly profound circulatory, cellular, and metabolic abnormalities substantially increase mortality.
Three Comparisons

1. Adults not currently hospitalized

2. BACTEREMIA
   - Fungi
   - Viruses
   - Toxin

3. SIRS
   - OTHER
   - TRAUMA
   - BURNS
   - PANCREATITIS

Non Sepsis Infection
Sterile Inflammation

Adapted from Bone, et al. Chest. 1992
Your patient with suspected infection not in the intensive care unit has a 6% risk of a bad outcome. This is a prompt to consider that sepsis is likely.
JUST ASK
"COULD IT BE SEPSIS?"

IT'S A SIMPLE QUESTION, BUT IT COULD SAVE LIVES.

Sepsis is a potentially life-threatening condition, often triggered by infection or injury.
It's hard to spot, but it kills 44,000 people a year in the UK.
If your pharmacist says you should go to A&E, then always ask the doctor or nurse if it could be sepsis.
It's easy to treat if caught early.

www.sepsistrust.org
Pathophysiology of Sepsis

- Inciting microbe
- Inflammatory immune response
- Tachycardia
- Vasodilation, NO mediated
- Lactate production
- Coagulopathy
- Endothelial dysfunction
- Hypoalbuminaemia
- Hyperglycaemia
**Challenge to determine cause of shock**

### Hemodynamics of Shock

<table>
<thead>
<tr>
<th>Red arrow indicates primary abnormality</th>
<th>PCWP (preload)</th>
<th>Cardiac Output</th>
<th>SVR (afterload)</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypovolemic shock</td>
<td>↓</td>
<td>↑</td>
<td>↑</td>
<td>IV fluids</td>
</tr>
<tr>
<td>Cardiogenic shock</td>
<td>↑</td>
<td>↓</td>
<td>↑</td>
<td>Inotropes Revascularization</td>
</tr>
<tr>
<td>Distributive shock (septic, neurogenic)</td>
<td>↓</td>
<td>↑</td>
<td>↓</td>
<td>Pressors IV fluids</td>
</tr>
</tbody>
</table>

PCWP = pulmonary capillary wedge pressure  
SVR = systemic vascular resistance
Figure 1
Organ blood flow and blood pressure relationships in healthy individuals, individuals with chronic hypertension, and patients with septic shock. The third linear relationship is theoretical.
Target BP in Sepsis

MAP 60-65 widely considered minimum to preserve renal and cerebral blood flow.

Below this threshold Vasopressors need to be considered.

A history of longstanding arterial hypertension or advanced age may necessitate a higher MAP of 75-85 mmHG.
Treating sepsis: the latest evidence

- **Antibiotics**: Early administration
- **Fluids**: Several liters initially
  - **Colloids**
  - **Crystalloid**
  - **Starches**
  - **High chloride**
- **Vasopressors**: 1–6 hours after onset
  - Norepinephrine
  - Epinephrine
  - Vasopressin
  - **Dopamine**
  - **Phenylephrine**
- **Enteral feeding**
- **Insulin therapy**
- **Deep sedation**
- **Molecular targeted therapies**
- **Lung protective ventilation**
- **Goal oriented therapy**
- **EGDT**: Early goal directed therapy
- **Urinary catheter**

Designed by: Will Stahl-Timmins
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Impact of congestive heart failure on severe sepsis and septic shock survivors: outcomes and performance status after 1-year hospital discharge

M Alkhalaif, N Abd-Aziz, Y Arabi, and B Tangiisuran

Author information ► Article notes ► Copyright and License information ►

Retrospective cohort study of 195 survivors

Headline: 70% mortality at 1 year

70% of deaths within 3 months.

Weakness: Definition of CHF unclear
Reterospective cohort study

Clinical or radiological evidence of fluid overload on Day 1 of EGDT doubles in hospital mortality
Severe Sepsis / Shock - Limits Generalisability

Reterospective cohort study of 1010 Patients (333 with Heart Failure)

Increased mortality in patients who received <30ml/kg and were hypotensive. (43% vs 23%), less likely to be intubated.

No difference in normotensive patients.
Summary

Cardiac failure increases mortality from sepsis 2-3 fold.

Heart failure should not be a barrier to 30mls/kg of fluid resuscitation if hypotensive with severe sepsis.

Prompt recognition and accurate diagnosis critical.
Final Thoughts

Assess physiological response following fluid challenge

Consider early discussion with intensive care for vasopressors

Patients are likely to leave the ITU fluid overloaded and ‘not out of the woods’

Remember to restart prognostically important drugs
Any Questions?