More than 2,000 cases of severe sepsis occur daily in the US.

Severe Sepsis Epidemiology: Updated

- 846,000 cases of severe sepsis in the United States annually¹
  - Mortality: 28% to 50%
  - Daily: 650 – 1,160 deaths
- Risk greatest in men, nonwhites and the elderly²
- Microbiology²
  - Gram-positive spp are predominant pathogens
  - Fungal sepsis increased over 200% in past 20 years

Case 1: 56-Year-Old Man With an Abdominal Abscess

- 56 y/o with coronary and peripheral atherosclerotic vascular disease
- Steady improvement over a 2-month hospitalization for pancreatitis
- New onset abdominal pain, distention, fever, ↑HR, ↑RR, ↓mental status
- CT Abdomen performed and patient transferred to MICU
Case 1: 56-Year-Old Man With an Abdominal Abscess (cont)

- Temperature 102.7°F, Pulse 126/min, BP 99/48 mm Hg, RR =28/min
- Examination
  - Ill appearing and confused
  - Bilateral crackles and rhonchi on auscultation
  - Abdomen distended and tense; bowel sounds absent
- Labs / Data
  - WBC increased from 9,000 mm$^3$ to 32,000 mm$^3$ over 48 hours
  - Creatinine 0.6 mg/dL
  - Amylase, lipase within normal limits
  - $\text{SaO}_2 \downarrow$ 90% on 60% face mask
Case 1: 56-Year-Old Man With an Abdominal Abscess (cont)
Discussion Points

• Does this patient have severe sepsis?
  – SIRS criteria?
  – Presumed infection?
  – Organ dysfunction?
Case 1: 56-Year-Old Man With an Abdominal Abscess (cont)

- The first 12 hours in the MICU
  - Diagnosis: Severe sepsis from an intraabdominal source of infection with impending shock and respiratory failure
  - Aggressive intravenous fluid resuscitation
  - Placed on vancomycin, piperacillin/tazobactam, sulfasoxazole/trimethoprim and fluconazole
  - Taken to the operating room for an exploratory laparotomy
Cornerstones of Sepsis Management and Recent Advances

- Source Control
- Antimicrobial agents
- Support for dysfunctional organs
- Disease specific therapies such as antiinflammatory and anti-thrombotic agents
Case 1: 56-Year-Old Man With an Abdominal Abscess (cont)

• In the operating room:
  – Large abscess visualized between stomach and spleen
  – Tense gall bladder
  – Abscess drained surgically with removal of purulent material
  – Drains placed in abscess and gall bladder
Case 1: 56-Year-Old Man With an Abdominal Abscess (cont)

- The first 24-36 hours after surgery:
  - Continued broad spectrum antibiotics
  - WBC ↓ 32,000 cells/mm³ to 19,000 cells/mm³
  - Radiographic infiltrates progress
  - Patient remains on the ventilator
  - Low-dose norepinephrine infusion
  - Urine output adequate
  - Blood glucose in the 300 mg/dL range
  - Hematocrit ↓ from 28% to 24%

Discussion Points

• Is this patient at high-risk of death?
  – Are additional therapies for severe sepsis indicated?
Evidence: The Number of Dysfunctional Organs Predicts Mortality

<table>
<thead>
<tr>
<th>Number of dysfunctional organ systems</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>≥4</th>
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</thead>
<tbody>
<tr>
<td>Mortality rate (%)</td>
<td>21.2</td>
<td>44.3</td>
<td>64.5</td>
<td>76.2</td>
</tr>
</tbody>
</table>

Clinical Surrogates for High Risk of Death

- **Infection**
  - **HR/RR** ↑
  - **Oxygenation** ↓
  - **Dead space** ↑
  - **Supplemental O₂**
  - **Fluids**
  - **Vasopressors**

- **Severe Sepsis**
  - MAP ≤ 70 mm Hg
  - PaO₂ < 55 mm Hg despite fluids
  - RR > 30

- **MODS**
  - RR > 30
  - PaO₂ < 55 mm Hg despite supplemental oxygen
  - Death

Risk of death 30% to 50% or higher

**Symptoms**

**DEATH**