Sepsis Management - Adult

Patient exhibits at least two of the following modified SIRS criteria:

- Temperature < 36 or ≥ 38.5°C
- Heart rate ≥ 110 bpm
- Respiratory rate > 24 bpm
- WBC count < 3 or ≥ 15 K/microliter

SIRS = systemic inflammatory response syndrome
APP = advanced practice provider

1 For patients in the EC, only those with an inpatient status will be evaluated by the Code Blue Team, MERIT team and/or Sepsis APP

2 For patients in the EC, only those with an inpatient status will be evaluated by the Code Blue Team, MERIT team and/or Sepsis APP

3 Sepsis APP only available in pilot area of G20

Is the patient unresponsive?

Yes: Call Code Blue Team

No: Is the patient unstable?

Yes: MERIT team to evaluate and notify Primary MD/APP STAT
- Prepare transfer to ICU
- Assess for presence of infection (see Appendix A)
- Assess for organ dysfunction (see Appendix B)
- Primary team to consider goals of care discussion if appropriate

No: Sepsis?

Yes: Sepsis APP to notify Primary MD/APP

No: For further work up, initiate Early Sepsis Order Set

Follow up evaluation by Sepsis APP and/or MERIT team

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Sepsis Management - Adult

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TREATMENT

- Initiate sepsis orders
  - Blood cultures blood x2. *Do not delay antibiotic therapy if cultures cannot be obtained within 45 minutes.*
  - Give Broad spectrum antibiotics – first dose STAT.
  - Cultures from sputum, urine, and other sources as indicated
  - CBC with differential, phosphorus, calcium, PT, PTT, D-dimer, fibrinogen, total bilirubin, direct bilirubin, AST, ALT, alkaline phosphatase, LDH, albumin, and lipase
  - Verify adequate IV access
  - Give fluid challenge of 30 mL/kg crystalloids [e.g., plasmalyte, Lactated Ringer’s, sodium chloride 0.9% (NS)]; each liter should be given over 30-60 minutes
    - Reduce volume of fluid challenge if patient has history of LVEF < 40%
    - Do not use hetastarch fluids
  - Note vital signs and neuro checks every 1 hour for 6 hours
  - Maintain SpO₂ > 93% during fluid challenge
  - Obtain transthoracic echocardiogram

MAP < 65 mmHg despite fluid resuscitation?

Yes → Septic Shock
  - Transfer to ICU for further management
  - If elevated, repeat lactic acid level within 6 hours
  - Consider placement of arterial line and central venous access
  - Monitor and maintain respiratory/hemodynamic status
  - May repeat fluid bolus if indicated
  - Consider norepinephrine for persistent hypotension
  - Primary team to consider goals of care discussion if appropriate

No → Sepsis
  - Reassess patient frequently
  - Monitor and maintain respiratory/hemodynamic status
  - Request appropriate team consults
  - Follow up evaluation by Sepsis APP¹ and/or MERIT team
  - Continue broad spectrum antibiotics
  - Assess IV fluid provision
  - Review stat labs
  - If elevated, repeat lactic acid level within 6 hours

See Page 3: EC/ICU Management

LVEF = left ventricular ejection fraction
MAP = mean arterial pressure = 1/3 (SBP - DBP) + DBP

¹ Sepsis APP only available in pilot area of G20

Department of Clinical Effectiveness V9
Approved by the Executive Committee of the Medical Staff on 03/24/2020
Septic Shock in the EC/ICU (inpatient unit until ICU bed available)

- Check MAP
  - MAP < 65 mmHg?
    - Yes: Consider further fluid challenge as needed based on hemodynamic monitoring variables
    - Yes: Consider albumin 5% for patients who require substantial amounts of crystalloids
    - No: Norepinephrine (1st line) IV infusion per Critical Care Adult Continuous Infusion Vasopressor Orders
    - No: Epinephrine (2nd line) IV infusion per Critical Care Adult Continuous Infusion Vasopressor Orders
    - No: Vasopressin IV infusion per Critical Care Adult Continuous Infusion Vasopressor Orders as salvage agent or to reduce norepinephrine dose
    - No: Do not use dopamine unless patient is bradycardic (heart rate < 60 bpm)

- Check cardiac index
  - Low-output shock?
    - Yes: Dobutamine continuous infusion to improve perfusion and decrease lactic acid
    - No: RBC transfusion to maintain Hgb ≥ 7 grams/dL

- Check Hgb
  - Hgb < 7 grams/dL?
    - Yes: MAP ≥ 65 mmHg° (DBP > 55 mmHg)
    - Yes: Urine output ≥ 0.5 mL/kg/hour (consider higher target if oliguric)
    - Yes: Normalization of lactic acid if elevated (decrease of 10% every 2 hours)
    - No: Refractory hypotension, add hydrocortisone 50 mg IV every 6 hours

ARDS = acute respiratory distress syndrome

1. Consider higher target if patient has history of hypertension, diabetes mellitus, vasculopathy, increased abdominal pressure, ensuing renal failure, or pulmonary hypertension
2. If inpatient, may start norepinephrine as listed above while awaiting transfer to ICU (notify MERIT and prepare for immediate transfer to ICU)
3. Refractory hypotension is defined as MAP < 65 mmHg despite adequate fluid resuscitation and vasopressors
4. Surviving Sepsis Guidelines recommend that RBC transfusions occur only when hemoglobin concentration decreases to < 7 grams/dL in adults in the absence of extenuating circumstances, such as myocardial ischemia, severe hypoxemia, or acute hemorrhage (strong recommendation, high quality of evidence). For the extenuating circumstances, the goal is > 8 grams/dL.
5. Risk factors for GI bleed: mechanical ventilation > 48 hours, coagulopathy, preexisting liver disease, renal replacement therapy, higher organ failure scores

Resuscitation Goals
- MAP ≥ 65 mmHg° (DBP > 55 mmHg)
- Urine output ≥ 0.5 mL/kg/hour (consider higher target if oliguric)
- Normalization of lactic acid if elevated (decrease of 10% every 2 hours)

Sepsis Management Goals
- Tidal volume for mechanically ventilated patients with ARDS is 6 mL/kg, and the initial upper limit goal for plateau pressures is ≤ 30 cm H₂O
- Glucose after initial patient stabilization < 180 mg/dL (tight glucose control not recommended)
- Stress ulcer prophylaxis if risk factors present for GI bleed
- Deep vein thrombosis prophylaxis

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APPENDIX A: Suspicion of Infection

- Fever or hypothermia
- Recent surgical procedure
- Immunocompromised
  - Chemotherapy
  - Steroids/immunosuppressed
  - Loss of skin integrity
  - HIV/suspected HIV
- Skin wound
- Invasive device
  - Central line
  - Foley catheter
- Infiltrate on chest x-ray
- Cough with sputum production
- Diarrhea with or without abdominal pain
- History of diabetes mellitus
- Cirrhosis
- Unilateral sinusitis (and/or facial swelling)

APPENDIX B: SOFA Score to Assess for Organ Dysfunction

<table>
<thead>
<tr>
<th>Variables</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
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<tbody>
<tr>
<td>Respiratory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PaO2/FiO2 (mmHg)</td>
<td>≥ 400</td>
<td>300 - 399</td>
<td>200 - 299</td>
<td>100 - 199</td>
<td>&lt; 100</td>
</tr>
<tr>
<td>Coagulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platelets (K/microliter)</td>
<td>≥ 150</td>
<td>100 - 149</td>
<td>50 - 99</td>
<td>20 - 49</td>
<td>&lt; 20</td>
</tr>
<tr>
<td>Liver</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bilirubin (mg/dL)</td>
<td>&lt; 1.2</td>
<td>1.2 - 1.9</td>
<td>2 - 5.9</td>
<td>6 - 11.9</td>
<td>&gt; 12</td>
</tr>
<tr>
<td>Cardiovascular Hypotension</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAP ≥ 70 mmHg</td>
<td></td>
<td>MAP &lt; 70 mmHg</td>
<td>Dopamine &lt; 5 mcg/kg/minute or dobutamine (any dose)</td>
<td>Dopamine 5.1 - 15 mcg/kg/minute, or epinephrine ≤ 0.1 mcg/kg/minute, or norepinephrine ≤ 0.1 mcg/kg/minute</td>
<td>Dopamine &gt; 15 mcg/kg/minute, or epinephrine &gt; 0.1 mcg/kg/minute, or norepinephrine &gt; 0.1 mcg/kg/minute</td>
</tr>
<tr>
<td>Central nervous system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glasgow Coma Scale</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>15</td>
<td>13 - 14</td>
<td>10 - 12</td>
<td>6 - 9</td>
<td>&lt; 6</td>
<td></td>
</tr>
<tr>
<td>Renal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creatinine (mg/dL) or Urine Output (mL/day)</td>
<td>&lt; 1.2</td>
<td>1.2 - 1.9</td>
<td>2 - 3.4</td>
<td>3.5 - 4.9 or</td>
<td>≥ 5.0 or</td>
</tr>
</tbody>
</table>
| PaO2 = partial pressure of oxygen
| FiO2 = fraction of inspired oxygen

1 Increase in SOFA score by 2 or more points from baseline is indicative of organ dysfunction

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SUGGESTED READINGS


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DEVELOPMENT CREDITS

This practice consensus algorithm is based on majority expert opinion of the Sepsis work group at the University of Texas MD Anderson Cancer Center for the patient population. These experts included:

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