Management of Sepsis and Septic Shock

About the Guideline
- The Surviving Sepsis Campaign (SSC) has developed and updated its evidence-based guidelines for sepsis quality improvement since 2004.
- The SSC has been adopted by multiple national organizations including the Centers for Medicare and Medicaid Services (CMS).
- Sepsis is a medical emergency and should be treated as such. Outcomes are improved with early identification and immediate intervention in patients with sepsis or septic shock.
- Patients with sepsis and septic shock require initial and ongoing assessment and reevaluation of their response to treatment.

Key Clinical Considerations
Become familiar with the recommendations and best-practice statements provided in this guideline, especially if you work in an acute care setting.

Diagnosis
- “Time zero” is the triage time in the emergency department or the earliest time of sepsis assessment for patients referred from another facility.
- Obtain blood cultures (aerobic and anaerobic) prior to the initiation of antibiotics; however, this should not delay antibiotics being initiated within the first 60 minutes of presentation.
- Initial resuscitation and treatment should begin immediately and include lactate levels, blood cultures, fluid administration, antimicrobial agents, and vasopressors to treat hypotension. This is recognized as the “hour-1 bundle.” Resuscitation may extend longer than 1 hour but should be managed immediately.

Lactate Levels
- Resuscitation must be focused on normalizing lactate levels. Elevated lactate levels (greater than 2 mmol/L) are indicative of tissue hypoperfusion.
- Lactate levels greater than 2 mmol/L should be remeasured within 2 to 4 hours to ensure the level is decreasing.

Antibiotics
- Intravenous broad-spectrum antibiotics should be initiated within 1 hour of recognition of sepsis or septic shock.
- Once sensitivities and pathogen are identified, de-escalate to the narrowest, most effective agent. If no infection is found, antibiotics should be stopped to reduce the risk of resistance and drug-related adverse reactions.
- Procalcitonin levels may be obtained to determine if antibiotics can be de-escalated or discontinued.
Fluid Therapy
- Administration of 30 mL/kg of intravenous crystalloid fluid within the first 3 hours of recognition is recommended for hypotension or lactate greater than or equal to 4 mmol/L.
- Following the initial fluid resuscitation, consider the risk of ongoing fluid administration against the benefit of keeping the patient fluid responsive.
- When patients require substantially more crystalloids, the addition of albumin is suggested.
- For mechanically ventilated patients, consider conservative fluid management if signs of hypoperfusion are absent.

Vasoactive Medications
- Initiate vasopressors if hypotension continues during or after fluid resuscitation to maintain a mean arterial pressure (MAP) greater than or equal to 65 mmHg and to ensure adequate perfusion to the vital organs.
- Norepinephrine is the first-choice vasopressor. If ineffective, consider the addition of vasopressin or EPINEPHrine.
- DOPamine may be added for specific patient populations but is not typically a first-choice vasopressor.
- DOBUTamine may be used for continued hypoperfusion after fluid resuscitation and vasopressors.
- Sodium bicarbonate is not recommended to improve stability or decrease the use of vasopressors.

Corticosteroids
- Intravenous hydrocortisone is not recommended to treat septic shock in patients who are considered hemodynamically stable following fluids and vasopressor therapy.

Blood Products
- Transfusions of red blood cells are recommended in adult patients with hemoglobin levels less than 7 g/dL, and in those who do not have evidence of acute hemorrhage, myocardial ischemia, or severe hypoxemia.
- Consider platelet transfusions in patients with platelet counts less than 10,000/mm³.

Mechanical Ventilation
- Recommended ventilator settings for patients include a target volume of 6 mL/kg, an upper limit for plateau pressures of 30 cm H₂O, and higher positive end-expiratory pressure (PEEP) for patients with sepsis-induced acute respiratory distress syndrome (ARDS).
- The prone position is preferred over supine position for patients with sepsis-induced ARDS.
- Consider neuromuscular blocking agents for short-term use (less than 48 hours) in patients with sepsis-induced ARDS.
- Maintain the head-of-bed elevation at 30° to 45° to decrease aspiration risk and prevent ventilator associated pneumonia.
- Spontaneous breathing trials and a weaning protocol are recommended.
- Minimize sedation and analgesia.
Glucose Monitoring
- Insulin may be initiated in patients with two consecutive glucose levels greater than 180 mg/dL.
- Goal glucose levels for patients are 110 to 180 mg/dL.
- Arterial blood is favored over capillary blood due to the risk of hypoperfusion leading to inaccurate results.

Renal Replacement Therapy
- In patients with signs of sepsis and acute kidney injury, consider continuous or intermittent renal replacement therapy to manage fluid balance.
- In septic patients who are hemodynamically unstable, the use of continuous renal replacement to manage fluid balance should be considered.

Venous Thromboembolism (VTE) Prophylaxis
- Low-molecular-weight heparin (LMWH) is recommended over unfractionated heparin (UFH) for venous thromboembolism prophylaxis, unless contraindications are known.
- For the prevention of VTE, the combination of pharmacological and mechanical methods is recommended.

Stress Ulcer Prophylaxis
- If the patient is at risk for gastrointestinal ulcers, provide prophylactic treatment for stress ulcers with proton pump inhibitors (PPIs) or histamine-2 receptor antagonists.

Nutrition
- Early initiation of enteral feeding is preferred over parenteral nutrition.
- In patients unable to tolerate oral intake, consider the placement of feeding tubes in those who are critically ill.
- Prokinetic agents are recommended for critically ill patients with a feeding intolerance.

Goals of Care
- Family-centered care is recommended to discuss the patient's prognosis and to determine the patient's wishes during end-of-life care and the incorporation of palliative care.
- The goals of care should be discussed within 72 hours of admission.

References: