Sepsis Management - Adult

Disclaimer: *This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providersin the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.*

PRESENTATION

Patient exhibits at least <u>two</u> 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

EVALUATION

Is patient unresponsive?

- Yes → Call Code Blue Team[1]
- No → Is the patient unstable[2]?

TREATMENT

Is the patient unstable[2]?

- Yes →
  - MERIT team[1] 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

  → See Page 2: Sepsis Management
- No →
  - Notify Primary MD/APP
  - Sepsis APP[1,3] to evaluate
  - Assess for presence of infection (see Appendix A)
  - Assess for organ dysfunction (see Appendix B)

  → Sepsis?
    - Yes →
      - Sepsis APP[1,3] to notify Primary MD/APP
      - See Page 2: Sepsis Management
    - No →
      - For further work up, initiate Early Sepsis Order Set
      - Follow up evaluation by Sepsis APP[1,3] and/or MERIT team

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[3]
[2] The patient is considered unstable if any of the following is present:
- Systolic blood pressure < 90 mmHg
- Heart rate > 150 bpm
- Need for vasopressor support
- Cardiac arrhythmia
- Decline in baseline mental status

[3] Sepsis APP only available in pilot area of G20

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Approved by the Executive Committee of the Medical Staff on 03/24/2020

Sepsis Management - Adult

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TREATMENT

Sepsis Management →

- 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, lactic acid, point of care lactic acid (if available), ABG, basic metabolic panel, magnesium, 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
  - Monitor vital signs and neuro checks every 1 hour for 6 hours
  - Maintain SpO_2 > 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

→ See Page 3: EC/ICU Management

No →

Sepsis

- Reassess patient frequently
- Monitor and maintain respiratory/ hemodynamic status
- Request appropriate team consults
- Follow up evaluation by Sepsis APP[1] and/or MERIT team
- Continue broad spectrum antibiotics
- Assess IV fluid provision
- Review stat labs
- If elevated, repeat lactic acid level within 6 hours

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

[1] Sepsis APP only available in pilot area of G20

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Sepsis Management - Adult

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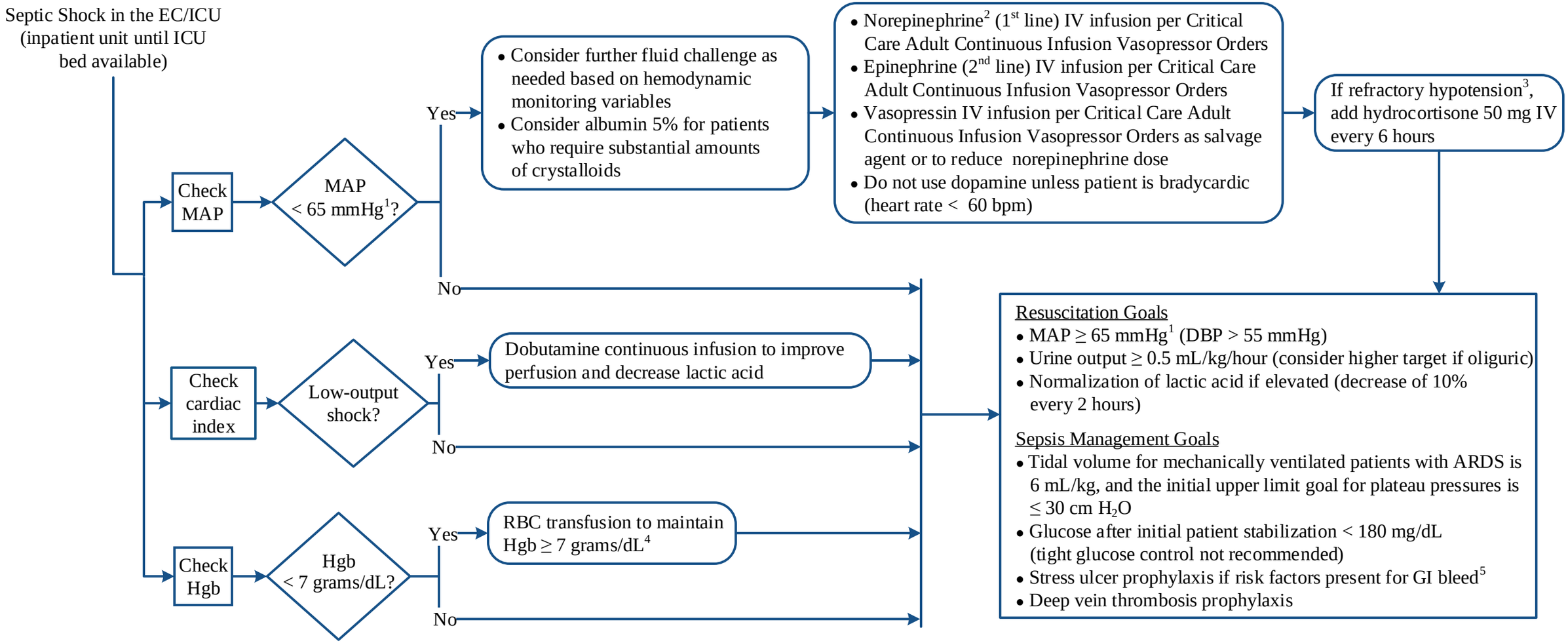

ARDS = acute respiratory distress syndrome

[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

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Sepsis Management - Adult

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[1]

Variables	0	1	2	3	4
Respiratory PaO_2/FiO_2 (mmHg)	≥ 400	300 - 399	200 - 299	100 - 199	< 100
Coagulation Platelets (K/microliter)	≥ 150	100 - 149	50 - 99	20 - 49	< 20
Liver Bilirubin (mg/dL)	< 1.2	1.2 - 1.9	2 - 5.9	6 - 11.9	> 12
Cardiovascular Hypotension	MAP ≥ 70 mmHg	MAP < 70 mmHg	Dopamine < 5 mcg/kg/minute or dobutamine (any dose)	Dopamine 5.1 - 15 mcg/kg/minute, or epinephrine ≤ 0.1 mcg/kg/minute, or norepinephrine ≤ 0.1 mcg/kg/minute	Dopamine > 15 mcg/kg/minute, or epinephrine > 0.1 mcg/kg/minute, or norepinephrine > 0.1 mcg/kg/minute
Central nervous system Glasgow Coma Scale	15	13 - 14	10 - 12	6 - 9	< 6
Renal Creatinine (mg/dL) or Urine Output (mL/day)	< 1.2 -	1.2 - 1.9 -	2 - 3.4 -	3.5 - 4.9 or < 500 mL/day	≥ 5.0 or < 200 mL/day

PaO_2 = partial pressure of oxygen
FiO_2 = 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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