

# Appendix

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## HemodynamicResuscitation and Monitoring in Early Sepsis (HERMES Study)

An ISCCM research project



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## APPENDIX

### Definitions

The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)  
*JAMA*. 2016; 315(8):801-810.

1. **Sepsis** - Sepsis is defined as life-threatening organ dysfunction caused by a dysregulated host response to infection. Organ dysfunction can be identified as an acute change in total SOFA score  $\geq 2$  points consequent to the infection. The baseline SOFA score can be assumed to be zero in patients not known to have preexisting organ dysfunction.  
(See SOFA Score below)
2. **Hypotension** - Systolic BP  $< 90$  mmhg or MAP  $\leq 65$  mmhg **OR** Systolic BP  $> 90$  mmhg or MAP  $\geq 65$  mmhg on vasopressors
3. **Septic Shock** - sepsis with persisting hypotension requiring vasopressors to maintain MAP  $\geq 65$  mm Hg and having a serum lactate level  $> 2$  mmol/L despite adequate volume resuscitation.

### Elements of the One Hour Resuscitation Bundle by the Surviving Sepsis Campaign

1. Measuring lactate levels
2. Obtaining blood cultures before administering antibiotics
3. Administering broad-spectrum antibiotics
4. Fluid resuscitation for hypotension or lactate level  $\geq 4$  mmol/L and
5. Use of vasopressors for hypotensive during or after fluid resuscitation to maintain MAP  $\geq 65$  mm Hg.

## List of abbreviations

AC	Assist Control
APACHE II	Acute Physiological AGE Chronic Health Evaluation II
BAL	Broncho Alveolar Lavage
BAMS	Bachelor of Ayurveda, Medicine and Surgery
BHMS	Bachelor of Homeopathic Medicine and Surgery
CMV	Control Mandatory Ventilation
Co	Cardiac Output
CSF	Cerebrospinal Fluid
CVP	Central Venous Pressure
EEOT	End Expiratory Occlusion Test
EVLWI	Extra Vascular Lung Water Index
FTc	Flow track
GEDV	Global End Diastolic Volume
HFNC	High Frequency Nasal Cannula
HR	Heart Rate
ICU	Inferior Vena Cava
IVC	Intensive Care Unit
MAP	Mean Arterial Pressure
MBBS	Bachelor of Medicine and Bachelor of Surgery
NIV	NonInvasive Ventilation
PAOP	Pulmonary Arterial occlusion pressure
PA	Pulmonary Arterial
PLRT	Passive Leg Rising Test
PPV	Pulse Pressure Variation
PS	Pressure Support
PVI	Plethysmography Variability Index
PVPI	Pulmonary Vascular Permeability Index
RL	Ringer Lactate
SIMV	Synchronised Mandatory Intermittent Ventilation
SOFA	Sequential Organ Failure Assessment
SVC	Superior Vena Cava
SVV	Stroke Volume Variation
TVC	Tidal Volume Challenge
TV	Tidal Volume
Vasoactive drugs	Vasopressors or inotropic drugs

## SOFA Score

### Lung: Respiration

- PaO<sub>2</sub>/FiO<sub>2</sub> > 400 (0 point)
- PaO<sub>2</sub>/FiO<sub>2</sub> 301 to 400 (1 point)
- PaO<sub>2</sub>/FiO<sub>2</sub> ≤ 300 (2 points)
- PaO<sub>2</sub>/FiO<sub>2</sub> 101 to 200 with ventilator support (3 points)
- PaO<sub>2</sub>/FiO<sub>2</sub> ≤ 100 with ventilator support (4 points)

### Coagulation: platelets

- >150x10<sup>3</sup>/mm<sup>3</sup> (0 point)
- >101 to 150x10<sup>3</sup>/mm<sup>3</sup> (1 point)
- >51 to 150x10<sup>3</sup>/mm<sup>3</sup> (2 point)
- >21 to 50x10<sup>3</sup>/mm<sup>3</sup> (3 point)
- >150x10<sup>3</sup>/mm<sup>3</sup> (4 point)
- ≤20x10<sup>3</sup>/mm<sup>3</sup> (0 point)

### Liver: Bilirubin

- <1.2mg/dl (20 μmol/L) (0 points)
- 1.2 to 1.9 mg/dl (20 to 30 μmol/L) (1 point)
- 2 to 5.9 mg/dl (33 to 101 μmol/L) (2 points)
- 6 to 11.9 mg/dl (102 to 204 μmol/L) (3 points)
- >12 mg/dl (204 μmol/L) (4 points)

### Cardiovascular: Blood pressure

- Hypotension (0 points)
- Mean Arterial Pressure, 70mmHg (1 point)
- On dopamine ≤ 5mcg/Kg/min or any dobutamine (2 points)
- On dopamine > 5mcg/Kg/min, epinephrine ≤ 0.1 mcg/Kg/min, or norepinephrine ≤ 0.1 mcg/Kg/min (3 points)
- On dopamine > 15mcg/Kg/min, epinephrine > 0.1 mcg/Kg/min, or norepinephrine > 0.1 mcg/Kg/min (4 points)

**Brain: Glasgow coma score**

- 15(0 point)
- 13 to 14(1 point)
- 10 to 12(2 point)
- 6 to 9(3 point)
- <6(4 point)

**Kidney: Renal Function**

- Creatinine<1.2 mg/dl (110 mcmol/L)(0 points)
- Creatinine 1.2 to 1.9 mg/dl( 110 to 170 mcmol/L)(1 point)
- Creatinine 2 to 3.4 mg/dl(171 to 299)(2 points)(2 points)
- Creatinine 3.5 to 4.9mg/dl(300 to 440mcmol/L) or urineput 200 to 500ml/day(3 points)
- Creatinine>5mg/dl(440mcmol/L) or urine output <200ml/day(4points)

SOFA Score Calculator Link- <http://www.mdcalc.com>

## **APACHE II SCORE**

### **Rectal Temperature**

- $>41^{\circ}\text{C}$ [105.8] (4)
- $39-40.9^{\circ}\text{C}$ [102.-105.7 $^{\circ}\text{F}$ ] (3)
- $38.5-38.9^{\circ}\text{C}$ [101.3-102.1 $^{\circ}\text{F}$ ] (1)
- $36-38.4^{\circ}\text{C}$ [96.8-101.2 $^{\circ}\text{F}$ ] (0)
- $34-35.9^{\circ}\text{C}$ [93.2-96.1 $^{\circ}\text{F}$ ](1)
- $32-33.9^{\circ}\text{C}$ [89.6-93.1 $^{\circ}\text{F}$ ](2)
- $30-31.9^{\circ}\text{C}$ [85.9-89.5](3)
- $\leq 29.9^{\circ}\text{C}$ [85.8 $^{\circ}\text{F}$ ](4)

### **MAP**

- $\geq 160\text{mmHg}$ (4)
- $130-159\text{mmHg}$ (3)
- $110-129\text{mmHg}$ (2)
- $70-109\text{mmHg}$ (0)
- $50-69\text{mmHg}$ (2)
- $\leq 49\text{ mmHg}$ (4)

### **HR**

- $\geq 180\text{ bpm}$ (4)
- $140-179\text{ bpm}$ (3)
- $110-139\text{ bpm}$  (2)
- $70-109\text{ bpm}$  (0)
- $55-69\text{ bpm}$  (2)
- $40-54\text{ bpm}$  (3)
- $\leq 39\text{ bpm}$ (4)

### **Respiratory Rate**

- $\geq 50\text{bpm}$ (4)
- $35-49$ (3)
- $25-34$ (1)
- $12-24\text{bpm}$ (0)
- $10-11\text{bpm}$ (1)
- $6-9\text{bpm}$ (2)
- $\leq 5\text{ bpm}$ (4)

## **A-a gradient or PaO<sub>2</sub>**

- >500mmHg[66.6Kpa] (4)
- 350-499mmHg[46.6-66.6KPa](3)
- 200-349mmHg[26.7-66.4 KPa](2)
- <200mmHg[<26.6KPa](0)

## **ABG**

- pH >7.7(4)
- pH 7.6-7.69(3)
- pH 7.5-7.59(1)
- pH 7.33-7.49(0)
- pH 7.25-7.32(2)
- pH 7.15-7.24(3)
- <7.15(4)

## **Na**

- ≥180mEq/L(4)
- 160-179mEq/L(3)
- 155-159mEq/L(2)
- 150-154mEq/L(1)
- 130-149mEq/L(0)
- 120-129mEq/L(2)
- 111-119mEq/L(3)
- ≤110mEq/L(4)

## **K**

- ≥7mEq/L(4)
- 6-6.9mEq/L(3)
- 5.5-5.9mEq/L(1)
- 3.5-5.4mEq/L(0)
- 3-3.4mEq/L(1)
- 2.5-2.9mEq/L(2)
- <2.5mEq/L(4)

## Creatinine

- $\geq 3.5\text{mg/dl}$  [ $>309\text{mcmol/L}$ ](4)
- $\geq 3.5\text{mg/dl}$  [ $>309\text{mcmol/L}$ ] in ARF (8)
- $2-3.4\text{mg/dl}$  [ $177-301\text{mcmol/L}$ ](3)
- $2-3.4\text{mg/dl}$  [ $177-301\text{mcmol/L}$ ] in ARF (6)
- $1.5-1.9\text{mg/dl}$  [ $133-168\text{mcmol/L}$ ](2)
- $1.5-1.9\text{mg/dl}$  [ $133-168\text{mcmol/L}$ ] in ARF(4)
- $0.6-1.4\text{mg/dl}$  [ $53-124\text{mcmol/L}$ ](0)
- $<0.6\text{mg/dl}$  [ $<52\text{mcmol/L}$ ](2)
- $<0.6\text{mg/dl}$  [ $<52\text{mcmol/L}$ ] in ARF(4)

## Hematocrit

- $>60\%$ (4)
- $50-59.9\%$ (2)
- $46-49.9\%$ (1)
- $30-45.9\%$ (0)
- $20-29.9\%$ (2)
- $<20\%$ (4)

## WBC

- $\geq 40 \times 10^3\text{cells/mm}^3$ (4)
- $20-39.9 \times 10^3\text{cells/mm}^3$ (2)
- $15-19.9 \times 10^3\text{cells/mm}^3$ (1)
- $3-14.9 \times 10^3\text{cells/mm}^3$ (0)
- $1-2.9 \times 10^3\text{cells/mm}^3$ (2)
- $\leq 1 \times 10^3\text{cells/mm}^3$ (4)

## Glasgow

- 15(0)
- 14(1)
- 13(2)
- 12(3)
- 11(4)
- 10(5)
- 9(6)
- 8(7)
- 7(8)



- 6(9)
- 5(10)
- 4(11)
- 3(12)

### **Age**

- $\geq 75$  years(6)
- 65-74 years(5)
- 55-64 years(3)
- 45-54 years(2)
- $\leq 44$ years(0)

### **Chronic Diagnosis**

- No(0)
- Nonsurgical(5)
- Emergent operation(5)
- Elective operation(2)

APACHE II Calculator Link- <http://www.mdcalc.com>