**HEmodynamic Resuscitation and Monitoring in Early Sepsis (HERMES Study)**

An ISCCM research project

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APPENDIX

Definitions


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 ≥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 ≤ 65mmhg OR Systolic BP > 90 mmhg or MAP ≥ 65mmhg on vasopressors

3. **Septic Shock** - sepsis with persisting hypotension requiring vasopressors to maintain MAP ≥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 ≥ 4 mmol/L and
5. Use of vasopressors for hypotensive during or after fluid resuscitation to maintain MAP ≥ 65 mm Hg.
## List of abbreviations

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

**Lung: Respiration**

- PaO2/FiO2 > 400 (0 point)
- PaO2/FiO2 301 to 400 (1 point)
- PaO2/FiO2 ≤ 300 (2 points)
- PaO2/FiO2 101 to 200 with ventilator support (3 points)
- PaO2/FiO2 ≤ 100 with ventilator support (4 points)

**Coagulation: platelets**

- >150x10^3/mm³ (0 point)
- >101 to 150x10^3/mm³ (1 point)
- >51 to 150x10^3/mm³ (2 point)
- >21 to 50x10^3/mm³ (3 point)
- >150x10^3/mm³ (4 point)
- ≤20x10^3/mm³ (0 point)

**Liver: Bilirubin**

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

**Cardiovascular: Blood pressure**

- Hypotension (0 points)
- Mean Arterial Pressure, 70 mmHg (1 point)
- On dopamine ≤ 5 mcg/Kg/min or any dobutamine (2 points)
- On dopamine > 5 mcg/Kg/min, epinephrine ≤ 0.1 mcg/Kg/min, or norepinephrine ≤ 0.1 mcg/Kg/min (3 points)
- On dopamine > 15 mcg/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 4.9 mg/dl (300 to 440 mcmol/L) or urine output 200 to 500 ml/day (3 points)
- Creatinine > 5 mg/dl (440 mcmol/L) or urine output < 200 ml/day (4 points)

**SOFA Score Calculator Link** - [http://www.mdcalc.com](http://www.mdcalc.com)
**APACHE II SCORE**

**Rectal Temperature**
- >41°C [105.8] (4)
- 39-40.9°C [102.9-105.7°F] (3)
- 38.5-38.9°C [101.3-102.1°F] (1)
- 36-38.4°C [96.8-101.2°F] (0)
- 34-35.9°C [93.2-96.1°F] (1)
- 32-33.9°C [89.6-93.1°F] (2)
- 30-31.9°C [85.9-89.5°F] (3)
- ≤29.9°C [85.8°F] (4)

**MAP**
- ≥160mmHg (4)
- 130-159mmHg (3)
- 110-129mmHg (2)
- 70-109mmHg (0)
- 50-69mmHg (2)
- ≤49 mmHg (4)

**HR**
- ≥180 bpm (4)
- 140-179 bpm (3)
- 110-139 bpm (2)
- 70-109 bpm (0)
- 55-69 bpm (2)
- 40-54 bpm (3)
- ≤39 bpm (4)

**Respiratory Rate**
- ≥50bpm (4)
- 35-49 (3)
- 25-34 (1)
- 12-24bpm (0)
- 10-11bpm (1)
- 6-9bpm (2)
- ≤5 bpm (4)
A-a gradient or PaO2

- >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

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

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

- ≥75 years(6)
- 65-74 years(5)
- 55-64 years(3)
- 45-54 years(2)
- ≤44 years(0)

Chronic Diagnosis

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

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