



Sepsis and septic shock

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Special Communication | CARING FOR THE CRITICALLY ILL PATIENT

The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)

Mervyn Singer, JAMA 2016

Surviving Sepsis Campaign: International Guidelines for Management of Severe Sepsis and Septic Shock: 2012

R. Phillip Dellinger, Crit Care Med 2012

Definition I.

- **Sepsis** = life-threatening **organ dysfunction** caused by a dysregulated host response to infection
- **organ dysfunction**
 - SOFA ≥ 2
 - Quick SOFA (qSOFA) ≥ 2
 - Respiratory rate $> 22/\text{min}$
 - Altered mentation (GCS < 15)
 - Systolic blood pressure $< 100 \text{ mmHg}$
- mortality $> 10 \%$

SOFA = Sequential [Sepsis-Related] Organ Failure Assessment Score

Table 1. Sequential [Sepsis-Related] Organ Failure Assessment Score^a

System	Score				
	0	1	2	3	4
Respiration					
PaO ₂ /FIO ₂ , mm Hg (kPa)	≥400 (53.3)	<400 (53.3)	<300 (40)	<200 (26.7) with respiratory support	<100 (13.3) with respiratory support
Coagulation					
Platelets, ×10 ³ /μL	≥150	<150	<100	<50	<20
Liver					
Bilirubin, mg/dL (μmol/L)	<1.2 (20)	1.2-1.9 (20-32)	2.0-5.9 (33-101)	6.0-11.9 (102-204)	>12.0 (204)
Cardiovascular					
	MAP ≥70 mm Hg	MAP <70 mm Hg	Dopamine <5 or dobutamine (any dose) ^b	Dopamine 5.1-15 or epinephrine ≤0.1 or norepinephrine ≤0.1 ^b	Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1 ^b
Central nervous system					
Glasgow Coma Scale score ^c	15	13-14	10-12	6-9	<6
Renal					
Creatinine, mg/dL (μmol/L)	<1.2 (110)	1.2-1.9 (110-170)	2.0-3.4 (171-299)	3.5-4.9 (300-440)	>5.0 (440)
Urine output, mL/d				<500	<200

Abbreviations: FIO₂, fraction of inspired oxygen; MAP, mean arterial pressure; PaO₂, partial pressure of oxygen.

^a Adapted from Vincent et al.²⁷

^b Catecholamine doses are given as μg/kg/min for at least 1 hour.

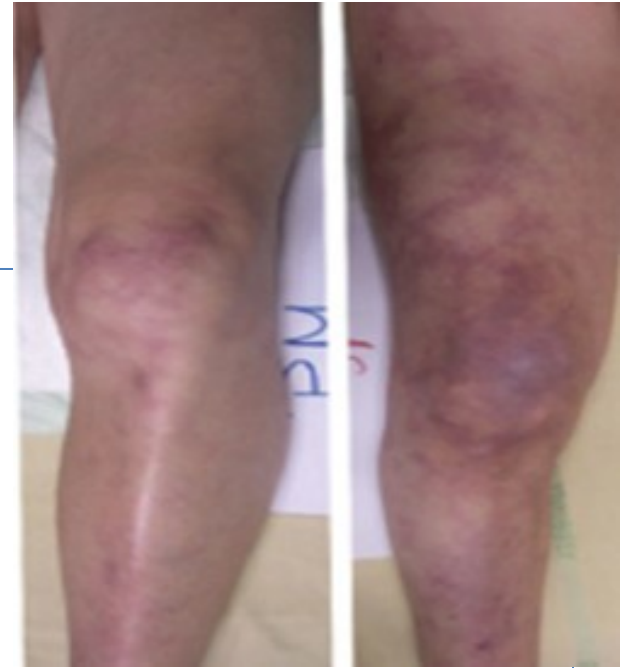
^c Glasgow Coma Scale scores range from 3-15; higher score indicates better neurological function.

Definition II.

- **Septic shock**
 - hypotension despite adequate fluid resuscitation
 - vasopressors to maintain MAP > 65mmHg
 - serum lactate level > 2 mmol/L
 - mortality > 40 %

Initial Resuscitation

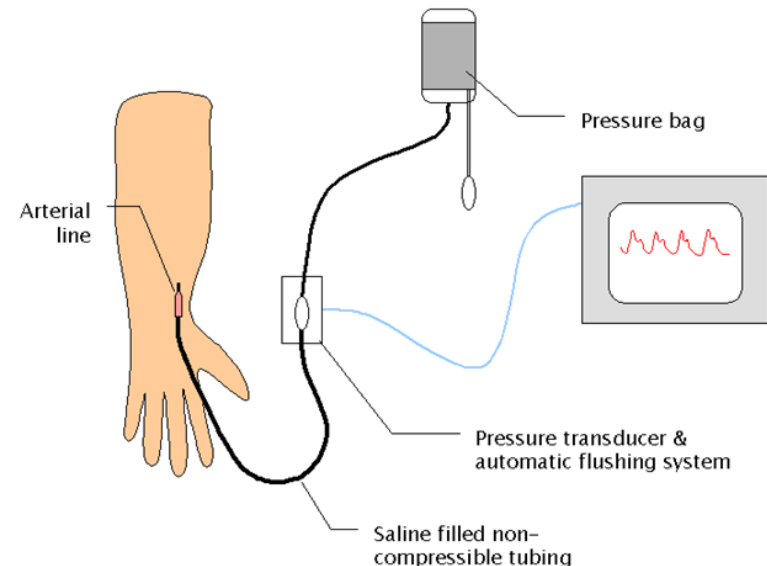
- haemodynamics - signs
 - tachycardia
 - hypotension
 - tissue hypoperfusion
 - elevated lactate (> 2 mmol/l)
 - low SvO_2 / $ScvO_2$
 - skin mottling
 - low urine output
 - altered mental status



- hemodynamics - monitoring
 - clinical signs
 - urine output
 - lactate dynamics, $SvO_2/ScvO_2$
 - echocardiography
 - cardiac output measurement
 - invasive blood pressure

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 Sample Type: _____ ART
 ON AIR

At 37 C
 pH _____ 7.20
 PO2 _____ 13.1 kPa
 PCO2 _____ 2.5 kPa
 BE _____ -9.0 mEq/L
 HCO3 _____ 15.0 mEq/L
 Lactate _____ 3.1 mmol/L
 Glucose _____ 25.1 mmol/L



- haemodynamics – therapy
 - correct hypovolaemia
 - rapid crystalloid infusion (fluid challenge)
 - maintain MAP > 65 mmHg
 - vasopressors – titrate norepinephrine
 - serial lactate levels / ScvO₂ trend monitoring
 - inotropic support
 - transfusion trigger as usual

Microbial diagnostics

- cultures from relevant sites (urine, throat, sputum, tracheal aspirate, wounds, abscess, bile,...)
- at least 2 sets of blood cultures
(aerobic/anaerobic)
- all before administration of AB



Antimicrobial therapy

- intravenous antimicrobials within the 1st hour
- activity against all likely pathogens (based on [likely] source of sepsis)
 - usually broad-spectrum antibiotics
- daily reassessment (change, de-escalation)
- duration of therapy typically 7 to 10 days
 - based on clinical course, PCT

Source control

- diagnostics (imaging, puncture, surgery) to diagnose and control source of sepsis (ASAP, within 12 hrs)
- mini-invasive approach preferred (CT guided drainage)
- if catheters are possible source → remove/exchange

