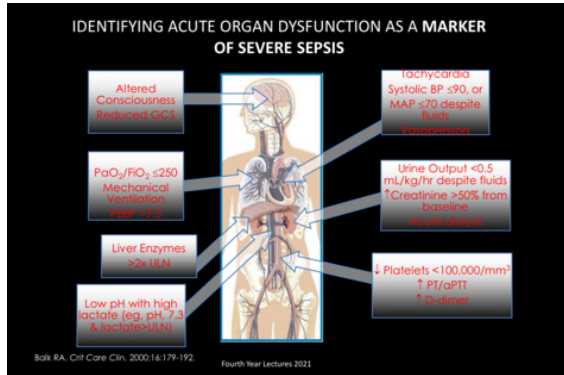


Sepsis:

Sepsis is deadly and the leading cause of mortality and critical illness worldwide.

Tissue injury with inadequate resuscitation and excessive inflammatory response lead to SIRS.

Ability to regulate inflammation is lost in sepsis



30 of 81

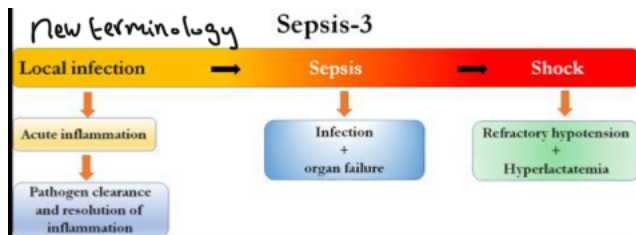
Terminology

O/d Terminology

- Systemic Inflammatory Response Syndrome (SIRS)**
 - Temp > 38 or < 36
 - HR > 90
 - RR > 20 or PaCO₂ < 32
 - WBC > 12 or < 4 or Bands > 10%

TWO out of four criteria acute change from baseline
- Sepsis**
 - The systemic inflammatory response to infection.
- Severe Sepsis**
 - Organ dysfunction secondary to Sepsis.
 - e.g. hypoperfusion, hypotension, acute lung injury, encephalopathy, acute kidney injury, coagulopathy.
- Septic Shock**
 - Hypotension secondary to Sepsis that is resistant to adequate fluid administration and associated with hypoperfusion.

12/22/2023 Balk RA, Balk R, Carrs J, Dellinger R, Finn A, Jones W, Schen R, et al. (1992). Definitions for sepsis and organ failure and guidelines for the use of intensive therapies in sepsis. The ACCP/SCCM "Sepsis Task Force". American College of Chest Physicians/Society of Critical Care Medicine. Chest, 101(6), 1644-1654.



A new definition adopted in 2016 (sepsis-3):

- Sepsis; organ dysfunction with dysregulated host response to infection.
- Septic shock: severe subset of sepsis with greater risk of mortality (hypotension)

Clinical criteria for sepsis:

- Organ failure assessment score (SOFA) : Used to assess ICU pt

DEPENDING ON:

- Respiration
- Coagulation
- Liver bilirubin
- Cardiovascular (MAP)
- GCS score
- Renal, creatinine and urine output.

Infection + 2 or more SOFA points above baseline means sepsis.

Sequential [Sepsis-Related] Organ Failure Assessment (SOFA) Score

System	0	1	2	3	4
Respiration PaO ₂ /FIO ₂ , mmHg (kPa)	≥400 (53.3)	<400 (53.3)	<300 (40)	<200 (26.7) with respiratory support	<100 (13.3) with respiratory support
Coagulation Platelets, x10 ³ /μL	≥160	<160	<100	<50	<20
Liver Bilirubin, mg/dL (μmol/L)	<1.2 (20)	1.2 - 1.9 (20 - 32)	2.0 - 5.9 (33 - 100)	6.0 - 8.9 (102 - 204)	>8.0 (204)
Cardiovascular	MAP ≥70mmHg	MAP <70mmHg	Dopamine ≤5 or Dobutamine (any dose)	Dopamine 5.1 - 15 or Epinephrine ≥0.1 or Norepinephrine ≥0.1	Dopamine >15 or Epinephrine >0.1 or Norepinephrine >0.1
CNS GCS Score	15	13 - 14	10 - 12	6 - 9	<6
Renal Creatinine, mg/dL (μmol/L) Urine Output, mL/d	<1.2 (10) >0.5	1.2 - 1.9 (10 - 170) >0.4	2.0 - 3.4 (171 - 299) >0.3	3.5 - 4.9 (300 - 410) >0.2	>5.0 (440) >0.1

*Catecholamine Doses = ug/kg/min for at least 1hr

Don't believe we are required to know full details, maybe just the components,

Patients with a SOFA score of 2 or more had an overall mortality risk of approximately 10% in a general hospital population with presumed infection.

To assess ptn out of icu for sepsis we use quick SOFA (qSOFA);

Components:



There is direct correlation bw number of organs failed and mortality

Failure in 3 organs can mean 95% mortality!!

Sepsis care depend mainly on core principles:

- Source of infection Control
- More Antibiotics
- Faster Resuscitation
- Better Supportive Care.

There are multiple management plans out there but the important 2 are:

- 1- 1 hour bundle; which simple mean that we should do everything in picture within the 1st hour of presentation
- 2- The sepsis six (uk); they add o2 therapy + measure urine output.

SOFA Score

The European Society of Intensive Care Medicine

SOFA score	0	1	2	3	4
Mortality	<10%	15-20%	40-50%	50-60%	>80%
SOFA score	0-6	7-9	10-12	13-14	15
			<300 117-135	<200 71-111	<100 1-10
			>50%	27-35%	<27%
			Increasing	Unchanged	Decreasing
			2.0-3.4	3.5-4.9 or <5.00	>5.0 or <200

2016 Septic Shock Criteria

Despite adequate fluid resuscitation

- vasopressors needed to maintain MAP \geq 65 mmHg

AND

- lactate $>$ 2 mmol/l

mortality $>$ 40%

12/22/2013 Fourth Year Lectures 2013

How do we manage sepsis and septic shock?

- 1) Investigate and treat sepsis
 - Try and find and treat source
 - Early blood cultures
 - Start antibiotics asap ideally within 1 hour and after cultures taken
- 2) Assess extent of end organ hypoperfusion and improve oxygen delivery

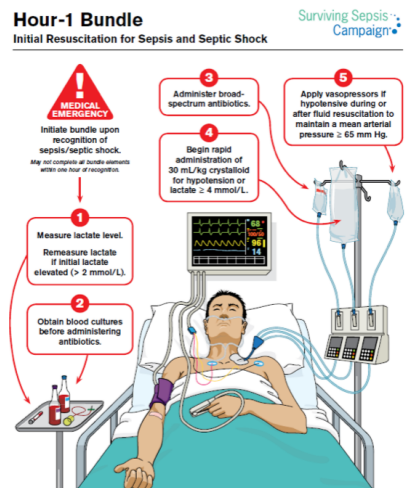
12/22/2013 Fourth Year Lectures 2013

WWW.SEPSISTRUST.ORG DESIGN BY NUOVO BEAUMONT

THE SEPSIS SIX

1. GIVE O₂ TO KEEP SATS ABOVE 94%
2. TAKE BLOOD CULTURES
3. GIVE IV ANTIBIOTICS
4. GIVE A FLUID CHALLENGE
5. MEASURE LACTATE
6. MEASURE URINE OUTPUT

THE UK SEPSIS TRUST



2018

1-hour Bundle

- Measure serum lactate. Re-measure if initial $>$ 2 mmol/L
- Obtain blood cultures prior to antibiotics
- Administer broad spectrum antibiotics
- Begin rapid crystalloid 30 ml/kg
- Apply vasopressors if hypotension remains after fluid resuscitation to MAP \geq 65 mm Hg

Fluid resuscitation should achieve the following:

- SBP > 90
- MAP > 65
- CVP 8 - 12
- U/o > 0.5 ml/kg/hr
- Lactate < 1
- ScvO2 >70
- Hct > 30

Markers of good perfusion;

- Clinical signs
 - Warm skin, conscious level, u/o
- Haemodynamic variables
 - CVP (if low strongly suggests hypovolemia)
- Bloods
 - Serum Lactate; the higher the less the perfusion (> 2 bad, > 4 very bad)
 - ScvO2 ; balance bw o2 delivery and consumption. (target >70%)
- Vasoactive agents can be used; 1st choice is norepinephrine.
- Glucose control should be less or equal to 180
- Steroids have a role in management.

ScvO2

What can I do if it's low?

Delivery = $[Hb] \times SpO_2 \times 1.34 \times HR \times SV$

Fluid optimise

Transfuse packet cells

Hct > 30%

Inotropes

12/22/2021 Fourth Year Lectures 2021

Antibiotic therapy

- intravenous antimicrobial therapy as early as possible and within the first hour of recognition
- empiric broad-spectrum therapy with one or more antimicrobials to cover all likely pathogens (including bacterial and potentially fungal or viral coverage)
- antimicrobial therapy to be narrowed once pathogen identification and sensitivities are established and/or adequate clinical improvement is noted .

The earlier given then Higher the survival

12/22/2021 Fourth Year Lectures 2021

CORTICOSTEROIDS

intravenous hydrocortisone to treat septic shock patients if adequate fluid resuscitation and vasopressor therapy are UNABLE to restore hemodynamic stability.