

Infection Management in Sepsis and Septic Shock

- Putu andrika
- BaliMed hospital, 19122021

Out line

- Sepsis global health problem
- Sepsis management
- Infection control sepsis
- summary

Introduction

- Sepsis is a life-threatening condition and a global disease burden.
- Despite best efforts at protocol-based care pathways, mortality from septic shock remains high at nearly 35% to 40%. Vincent JL, et al. Frequency and mortality of septic shock in Europe and North America: a systematic review and meta-analysis. Crit Care 2019. <https://doi.org/10.1186/s13054-019-2478-6>.
- Global estimates that about 49 million people are affected by sepsis, contributing potentially to 11 million deaths annually. Rudd KE et al. Global, regional, and national sepsis incidence and mortality, 1990-2017: analysis for the Global Burden of Disease Study. Lancet (2020) 395:200–11. doi: 10.1016/S0140-6736(19)32989-7



Register as a
Supporter of
World Sepsis
Day



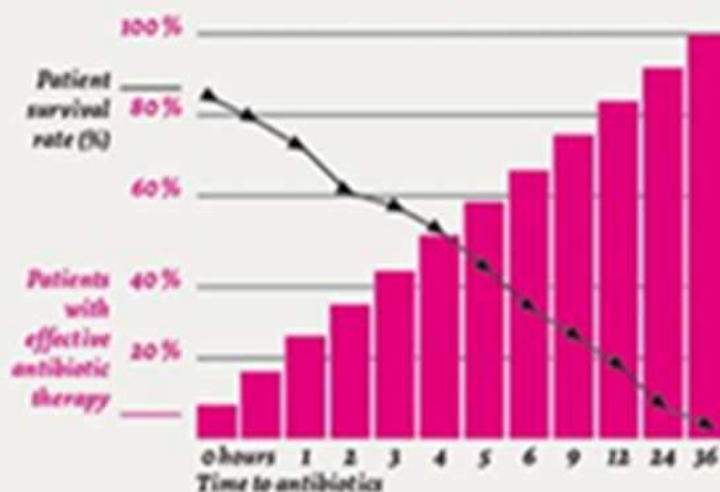
Shop for good



Sepsis is an emergency – act fast

If you suspect sepsis, it is an emergency, like a heart attack, stroke, or multiple trauma. The patient requires immediate medical attention in a hospital with an intensive care unit.

Sepsis is a medical emergency



His or her chances of survival depend to a large extent on receiving successful treatment for the infection that led to sepsis, including broad-range antibiotics and any other treatment necessary to eliminate the cause of infection. This treatment must also be supported by suitable steps to stabilize blood circulation, like infusions and medicine.

Every minute counts!

- Give high flow oxygen (via non-rebreather mask)
- Take blood cultures
- Give IV antibiotics
- Start IV fluid resuscitation
- Check hemoglobin and lactate Monitor hourly urine output accurately

Every minute counts !

- Immediate medical attention with ICU

COVID 19

- In December 2019, a novel pneumonia condition termed coronavirus disease 2019 (COVID-19), caused by SARS-CoV-2.
- COVID 19 spread rapidly and was declared a global pandemic by WHO on 11th March 2020.
- Delta variants, Omicron.....
- This year's World Sepsis Day occurs at a stage where, among 210 million COVID-19 survivors, a large proportion of them have developed or are at risk of developing long-Covid symptoms.

Parallels in Sepsis and COVID-19 Conditions: Implications for Managing Severe COVID-19

Charles Ochieng' Olwal^{1,2}, Nora Nghuchuzie Nganyewo^{1,2}, Kesego Tapela^{1,2}, Alexandra Lindsey Djomkam Zune^{1,2}, Oloche Owoicho^{1,2}, Yaw Bediako¹ and Samuel Duodu^{1,2}*

- These two conditions share many pathophysiological and clinical features.
- Notably, both sepsis and COVID-19 patients experience consumptive thrombocytopenia, haemolytic anaemia, vascular microthrombosis, multi-organ dysfunction syndrome, coagulopathy, septic shock, respiratory failure, fever, leukopenia, hypotension, leukocytosis, high cytokine production and high predisposition to opportunistic infections.

PERSPECTIVE article

Front. Immunol., 03 February 2021

| <https://doi.org/10.3389/fimmu.2021.602848>

Impact of the COVID-19 Pandemic on Survival in the Patients With the Intra-Abdominal Infections

Lydia Gálvez-Benítez^{1,2†}, Ángel Rodríguez-Villodres^{1,2†}, Rocío Álvarez-Marín^{1,2}, Rosa Jiménez-Rodríguez³, José Antonio Lepe-Jiménez^{1,2}, Jerónimo Pachón^{2,4} and Younes Smani^{1,2*}

BRIEF RESEARCH REPORT

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doi: 10.3389/fmed.2021.687415

- the time intervals between the symptoms onset (SO) to the first medical contact or surgical intervention (SI) and between the first medical contact to the admission or SI were significantly higher.
- The death rates during the COVID-19 and the pre-COVID-19 were 16.7 and 6.5%, respectively ($p = 0.02$).
- Finally, the multivariate analysis in both the cohorts together identified the patients diagnosed during the COVID-19, the longer period from SO to SI, septic shock, and the Charlson comorbidity index as the independent factors associated with death.

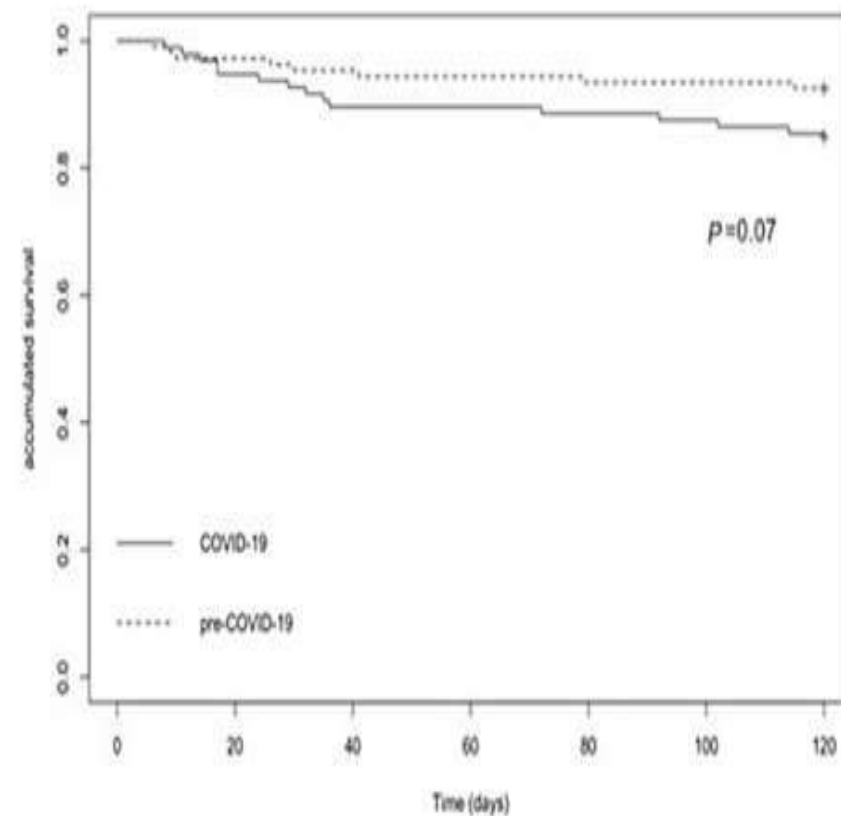


FIGURE 1 | The Kaplan-Meier plots among the patients with the intra-abdominal infections (IAI) during the pre-coronavirus disease 2019 (COVID-19) pandemic period and the COVID-19 pandemic period.



Global
Sepsis
Alliance

PRESS RELEASE
For immediate release

Berlin, September 12th, 2021

World Sepsis Day 2021, September 13th: COVID-19 exacerbates the burden of sepsis, but solutions to mitigate it are there, and must be urgently embraced by health systems.

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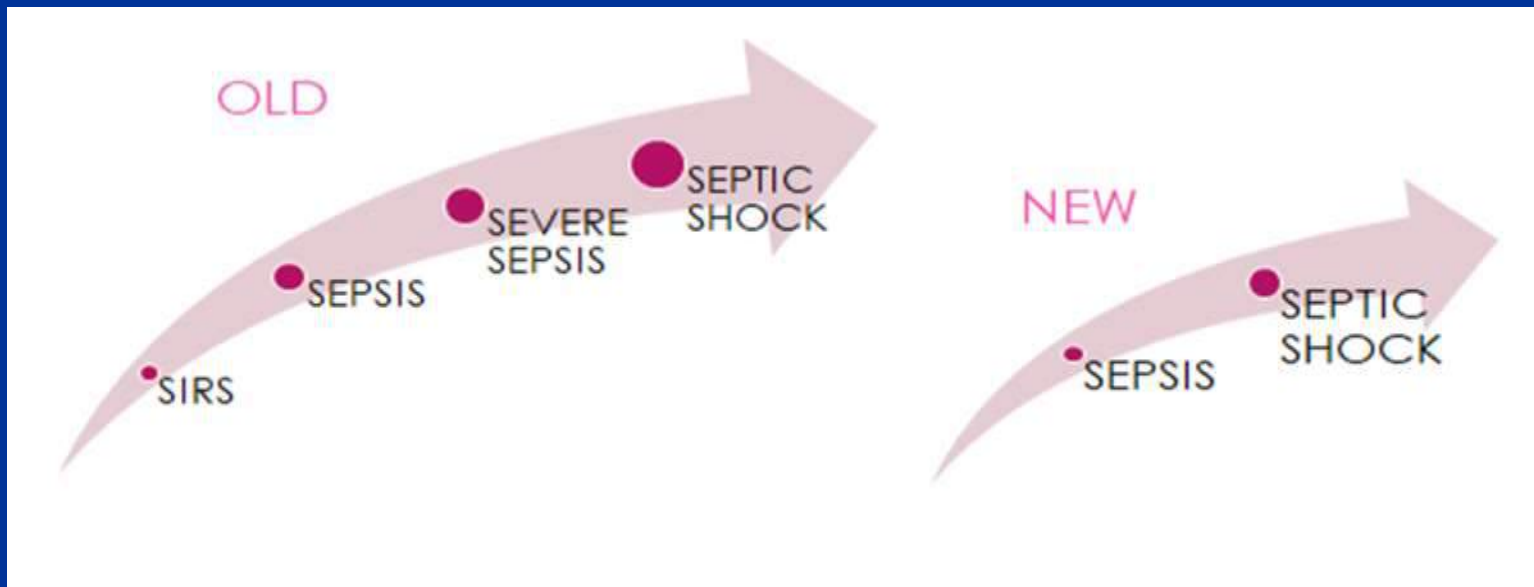
Founding President
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- “This is the second World Sepsis Day that is celebrated during a pandemic that is only increasing exponentially the already heavy toll of sepsis globally. We call on national governments to urgently take on concrete actions such as setting up national action plans on sepsis.
- Sepsis affects 52% of hospitalized COVID-19 patients and 78% of those in ICU. (Karakike et al, Coronavirus Disease 2019 as Cause of Viral Sepsis, Critical Care Medicine: July 12, 2021 - Volume - Issue - doi: 10.1097/CCM.0000000000005195)

- Sepsis as life-threatening organ dysfunction caused by a dysregulated host response to infection

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



Sepsis—Pathophysiology and Therapeutic Concepts

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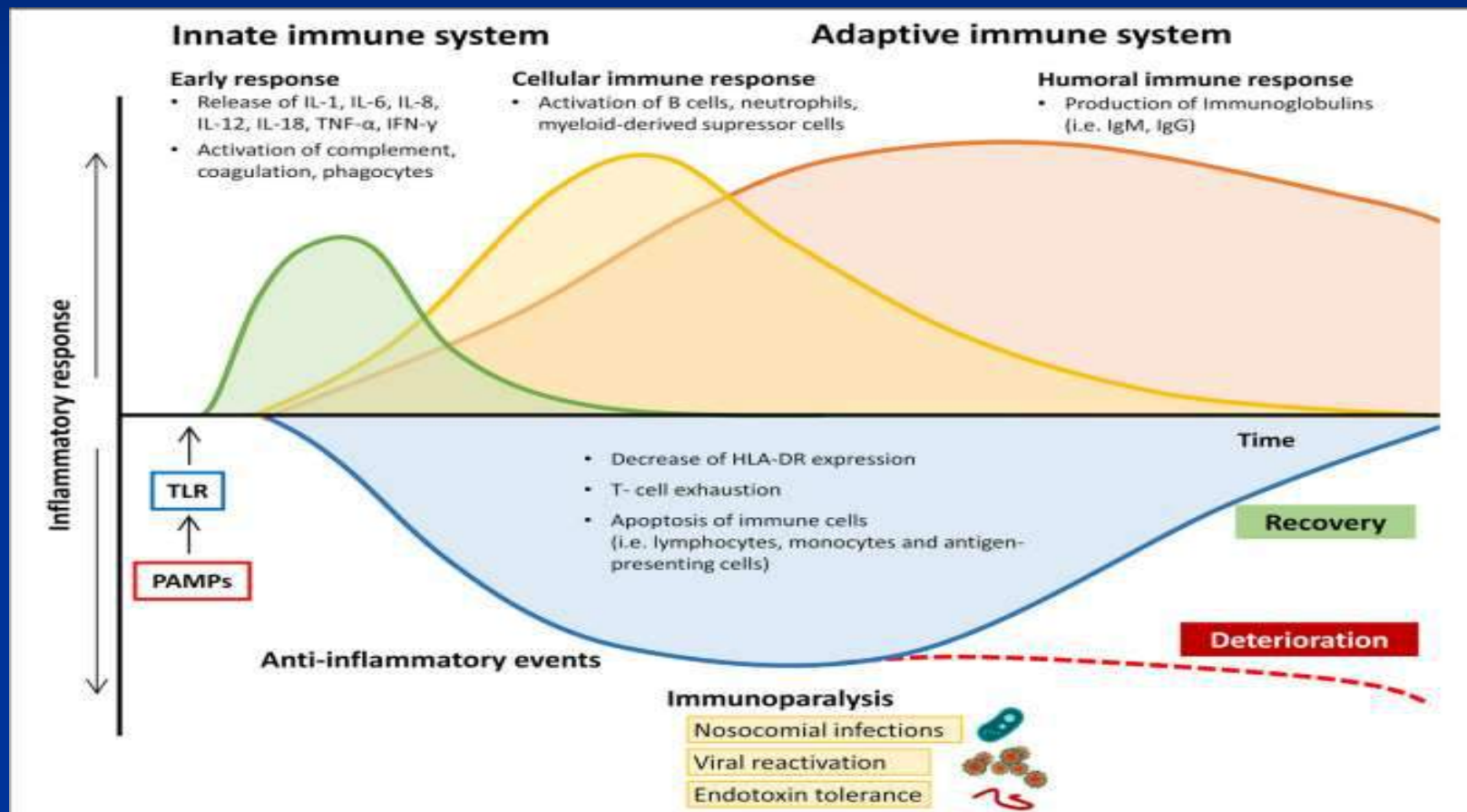


FIGURE 1 | Changes in pro- and anti-inflammatory response of the immune system during the course of sepsis and septic shock. HLA-DR, human leukocyte antigen-D related; IgM/G, immunoglobulin M/G; IL, interleukin; IFN- γ , Interferon γ ; PAMPs, pathogen-associated molecular patterns; TNF- α , tumor necrosis factor alpha; TLR, toll-like receptor.

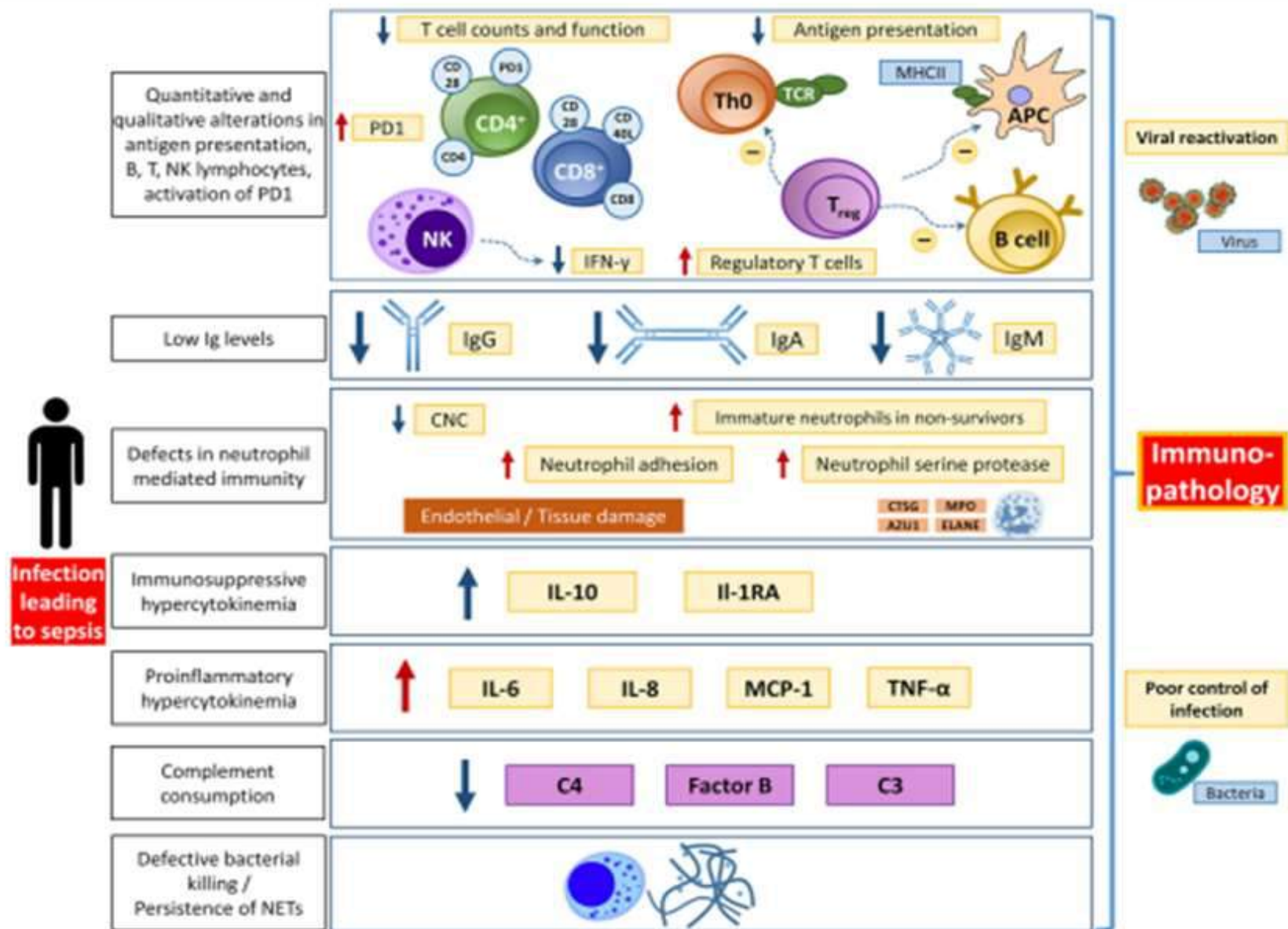


FIGURE 2 | Overview of different aspects of immunological dysfunction with details of the affected entities. APC, antigen presenting cell; AZU1, azurocidine 1; CNC, circulating neutrophils count; CTSG, cathepsin G; ELANE, elastase; IFN- γ , interferon γ ; Ig, immunoglobulin; MHCII, major histocompatibility complex II; MPO, myeloperoxidase; PD1, programmed death protein 1; TCR, T cell receptor. Adapted from Bermejo-Martin JF (12) with permission.

ORGAN DYSFUNCTION

- Acute change in total SOFA score ≥ 2 point consequent to the infection
- the baseline SOFA score can be assumed to be zero in patients not known to have preexisting organ dysfunction.
- SOFA score ≥ 2 reflects an overall mortality risk of approximately 10% in a general hospital population with suspected infection.

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.

- the task force developed a simpler clinical screening tool that performed very well in identifying adult patients with suspected infection who were likely to have poor outcomes

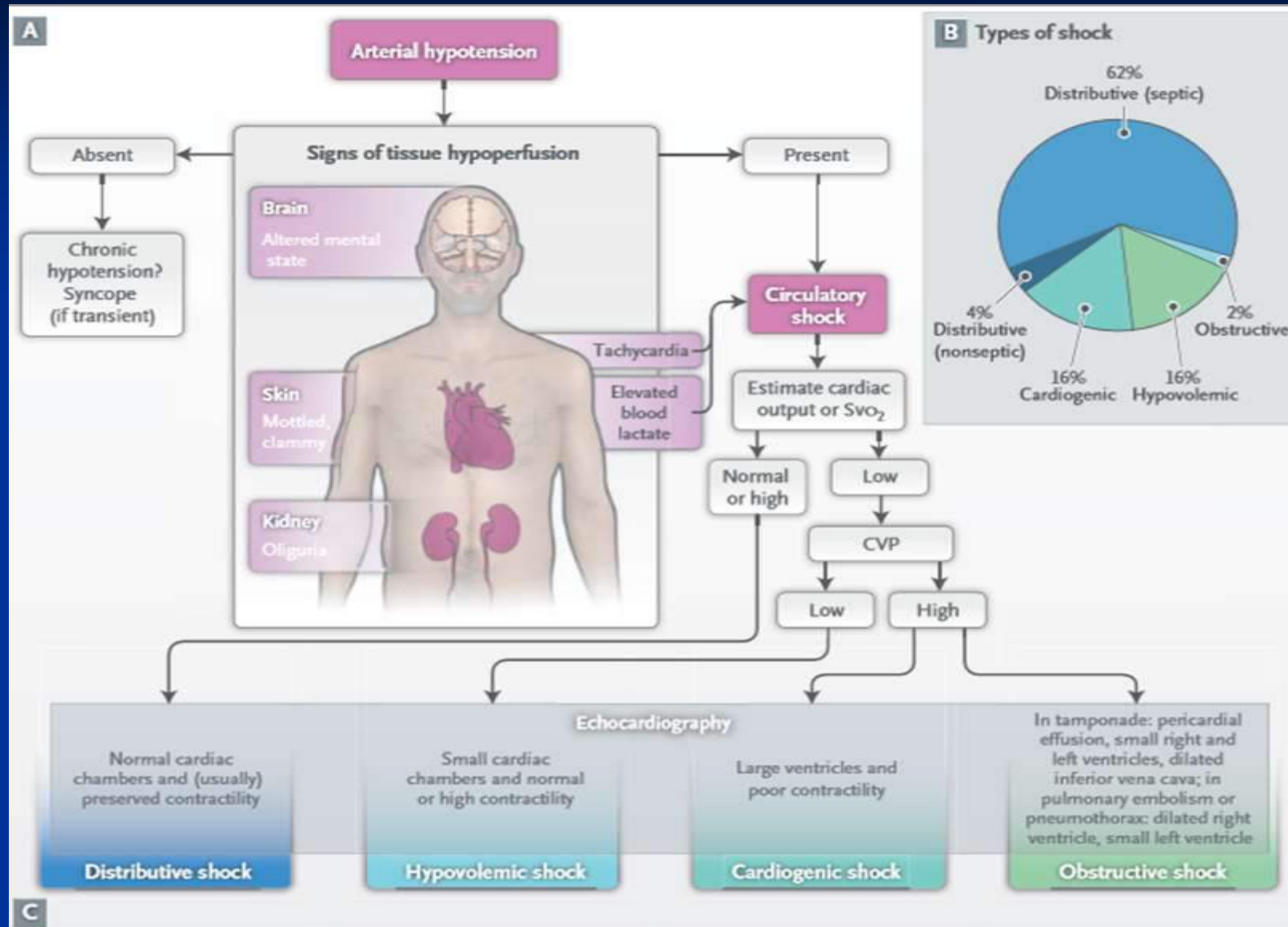
Box 4. qSOFA (Quick SOFA) Criteria

Respiratory rate $\geq 22/\text{min}$

Altered mentation

Systolic blood pressure ≤ 100 mm Hg

Initial Assessment of Shock States



- Sepsis is characterized by the heterogeneous pattern of blood flow in microcirculation,
by tissue hypoperfusion and
by incapacity of the cells to extract and adequately use oxygen,
which compromises the aerobic cell metabolism.
- Imbalance between oxygen delivery (DO_2) and the metabolic cell demand.