

**Tishk International
University Science
Faculty
Medical Analysis Department**



Pathology

Hemodynamic disorders - 5, Shock

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Dr. Jalal A. Jalal

Assistant Professor of Pathology

Objectives

- 1. To define the term “shock”.**
- 2. To describe the different types of shock and the etiology of each.**
- 3. To explain how the process of shock occurs.**
- 4. To clarify stages of shock.**
- 5. To describe the clinical course and prognosis of shock.**

Contents

Shock:

1. Definition

2. Classification

3. Pathophysiology

4. Stages

5. Clinical course and Prognosis

SHOCK

Shock is a state in which diminished cardiac output or reduced effective circulating blood volume impairs tissue perfusion and leads to cellular hypoxia.

- The end results are *hypotension, followed by impaired tissue perfusion and cellular hypoxia.*
- Initially the cellular injury is reversible, persistence of shock eventually causes irreversible tissue injury.

Types of shock.

1. *Cardiogenic shock:*

results from myocardial pump failure.

This can be due to intrinsic myocardial damage (infarction), or outflow obstruction (e.g., pulmonary embolism).

2. *Hypovolemic shock :*

results from loss of blood or plasma volume e.g. hemorrhage, fluid loss from severe burns.

3. Septic Shock

- **Currently, septic shock is most frequently triggered by gram-positive bacterial infections, followed by gram-negative bacteria and fungi.**

Less common types of shock.

4. Neurogenic shock:

anesthetic accident or spinal cord injury can lead to loss of vascular tone and peripheral pooling of blood.

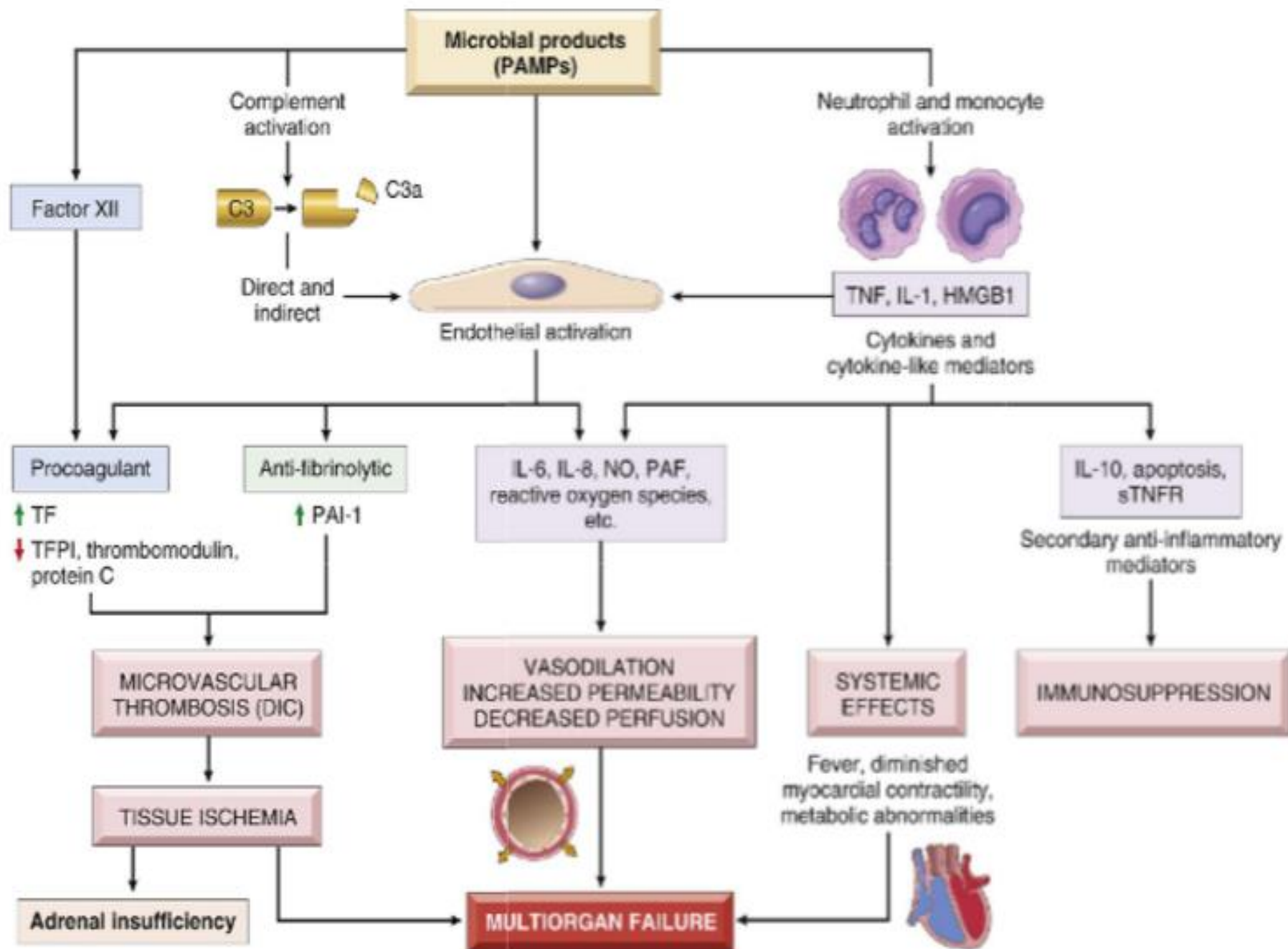
5. Anaphylactic shock:

initiated by a generalized IgE-mediated hypersensitivity response, is associated with systemic vasodilation and increased vascular permeability.

PATHOGENESIS OF SEPTIC SHOCK

- **In septic shock, systemic vasodilation and pooling of blood in the periphery leads to tissue hypoperfusion, even though cardiac output may be preserved.**
- **This is accompanied by widespread endothelial cell activation and injury, often leading to a hypercoagulable state that can manifest as DIC.**

- **In addition, septic shock is associated with changes in metabolism that directly suppress cellular function.**
- **The net effect of these abnormalities is hypoperfusion and dysfunction of multiple organs.**



Stages of Shock

Unless insult is massive and lethal (e.g. a massive hemorrhage), shock tends to evolve through three general phases.

1. *A nonprogressive phase:*

**reflex compensatory mechanisms are activated
and perfusion of vital organs is maintained.**

2. *A progressive stage:*

tissue hypoperfusion and onset of worsening circulatory and metabolic imbalances, including acidosis.

3. *An irreversible stage:*

sets in after body has incurred cellular and tissue injury so severe that even if the hemodynamic defects are corrected, survival is not possible.

Morphology

The cellular and tissue changes induced by shock are essentially those of hypoxic injury, since shock is characterized by failure of multiple organ systems, the cellular changes may appear in any tissue.

They are particularly evident in brain, heart, lungs, kidneys, adrenals, and gastrointestinal tract.

Clinical Course.

In hypovolemic and cardiogenic shock, the patient presents with hypotension; a weak, rapid pulse; tachypnea; and cool, clammy, cyanotic skin.

As shock progresses, electrolyte disturbances and metabolic acidosis (lactic acidosis) complicate the situation followed by progressive fall in urine output.

Prognosis

- **The prognosis varies with the origin of shock and its duration.**
- **Greater than 90% of young, otherwise healthy patients with hypovolemic shock survive with appropriate management.**
- **Cardiogenic shock associated with extensive myocardial infarction and septic shock carry high mortality rates even with the best care currently available.**

Summary

- **Shock causes systemic hypoperfusion due to either reduced cardiac output or reduced circulating blood volume.**
- **The most common causes of shock are cardiogenic (for example myocardial infarction), hypovolemic (due, for example, to blood loss), and shock associated with systemic inflammatory responses (e.g., in the setting of severe infections)**

Summary

- **Septic shock is caused by the host response to bacterial, viral or fungal infections; it is a systemic inflammatory condition characterized by endothelial cell activation, tissue edema, disseminated intravascular coagulation, and metabolic derangements that often lead to organ failure and death.**
- **Shock of any form can lead to hypoxic tissue injury if not corrected.**

Q ????

A 54 years woman has had fever & felt faint for the past 2 days, on physical examination her temperature is 38.5 C, pulse 100 /minute, with blood pressure 85/40 mm Hg, the serum lactic acid level is 6.8 mg/dl .She has marked peripheral vasodilatation, which of the following forms of shock is most likely occurred?

- A. Septic shock.**
- B. Anaphylactic shock**
- C. Cardiogenic shock**
- D. Hypovolemic shock**
- E. Neurogenic shock**

**THANK YOU SO MUCH
FOR YOUR ATTENDANCE
AND ATTENTION**