PHARM.D • YEAR 2

Pathophysiology

CHAPTER 5

Shock

PPT CHAPTER COVER



Shock: failure of tissue perfusion

Shock is life-threatening circulatory failure with inadequate tissue perfusion and oxygen utilisation.

Hypovolaemic: insufficient circulating volume.

Cardiogenic: inadequate pumping by the heart.

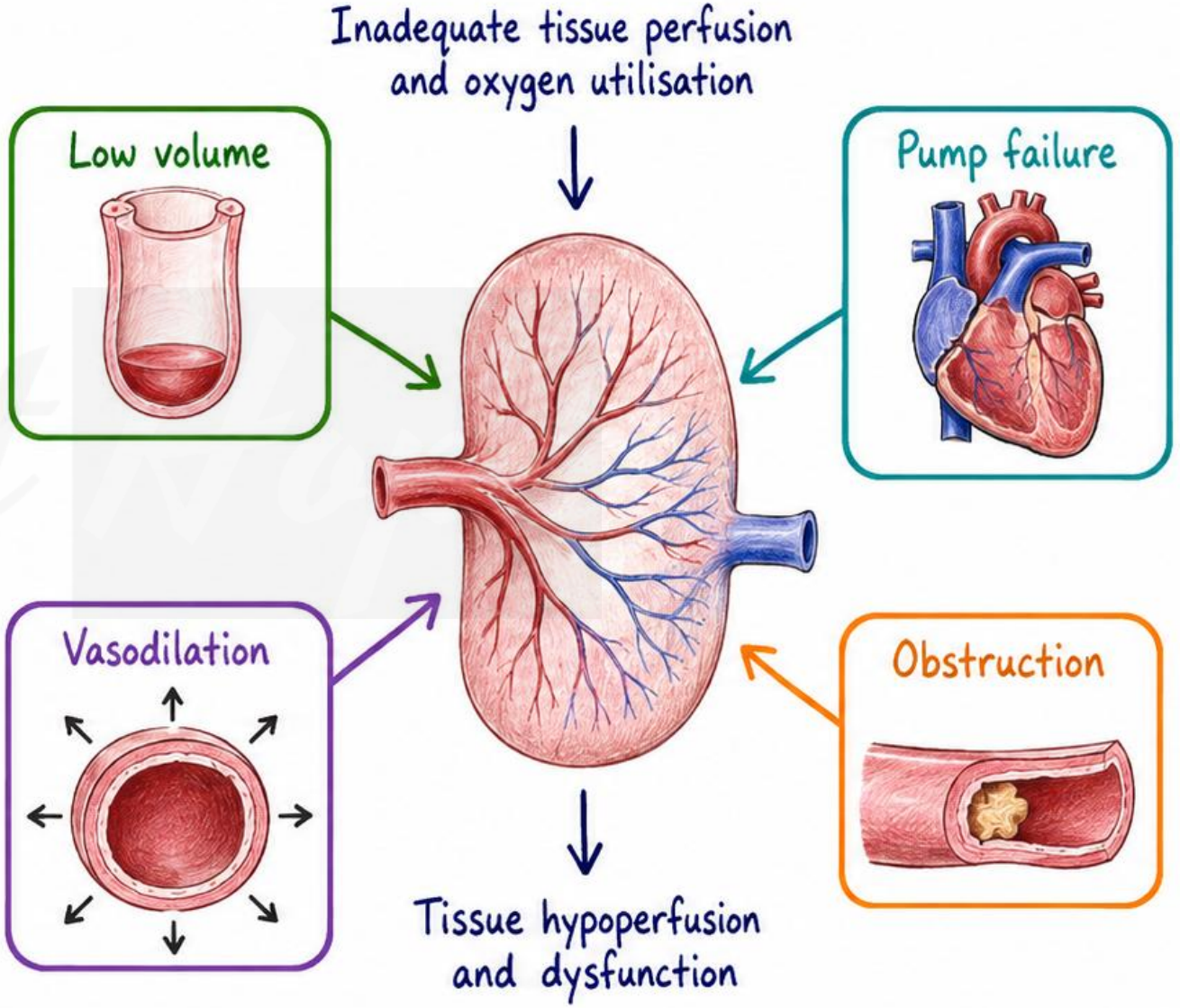
Distributive: abnormal vascular tone and blood distribution.

Obstructive: mechanical interference with filling or forward flow.

More than one mechanism may coexist.

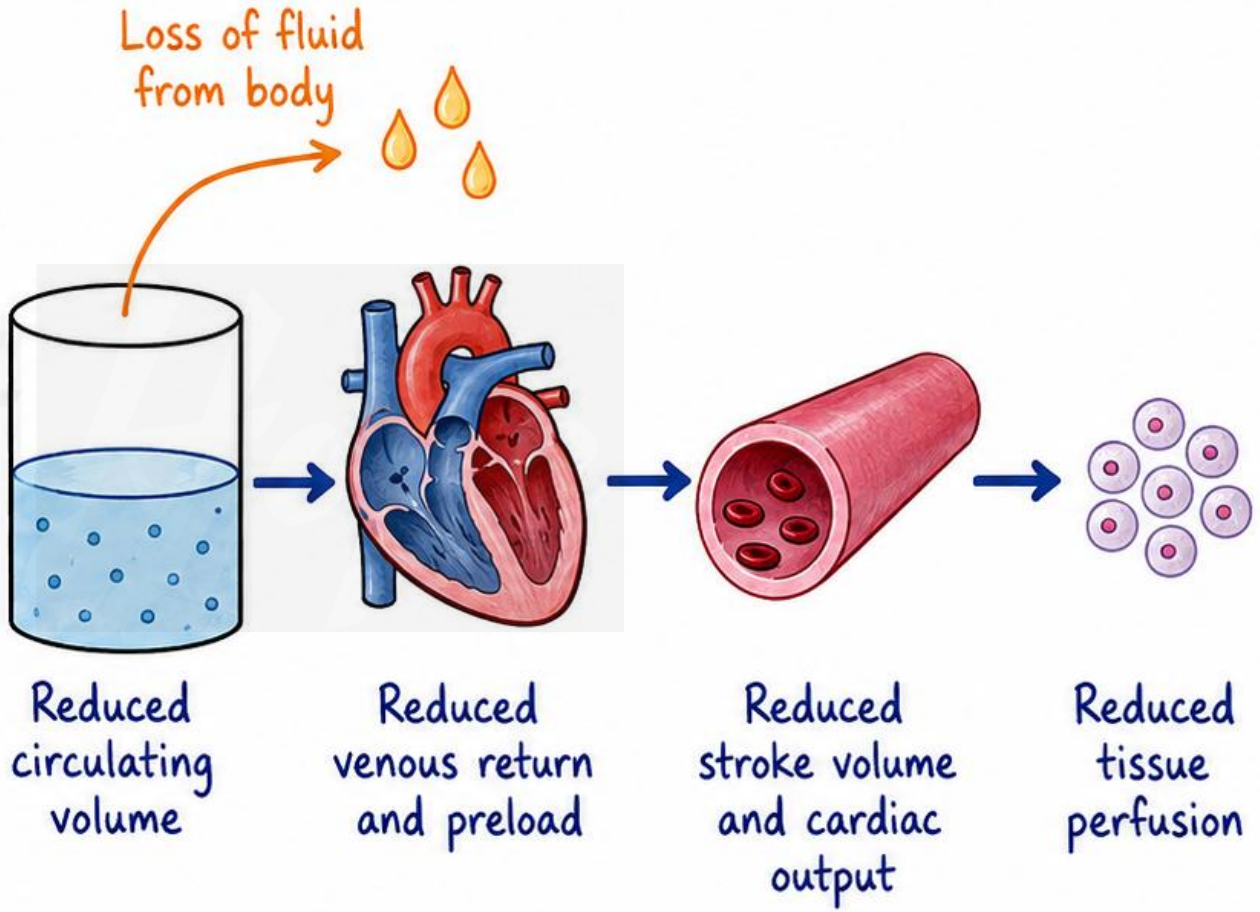
Hypotension is common but can be absent early; blood pressure alone does not exclude shock.

Persistent cellular dysfunction can progress to organ failure.



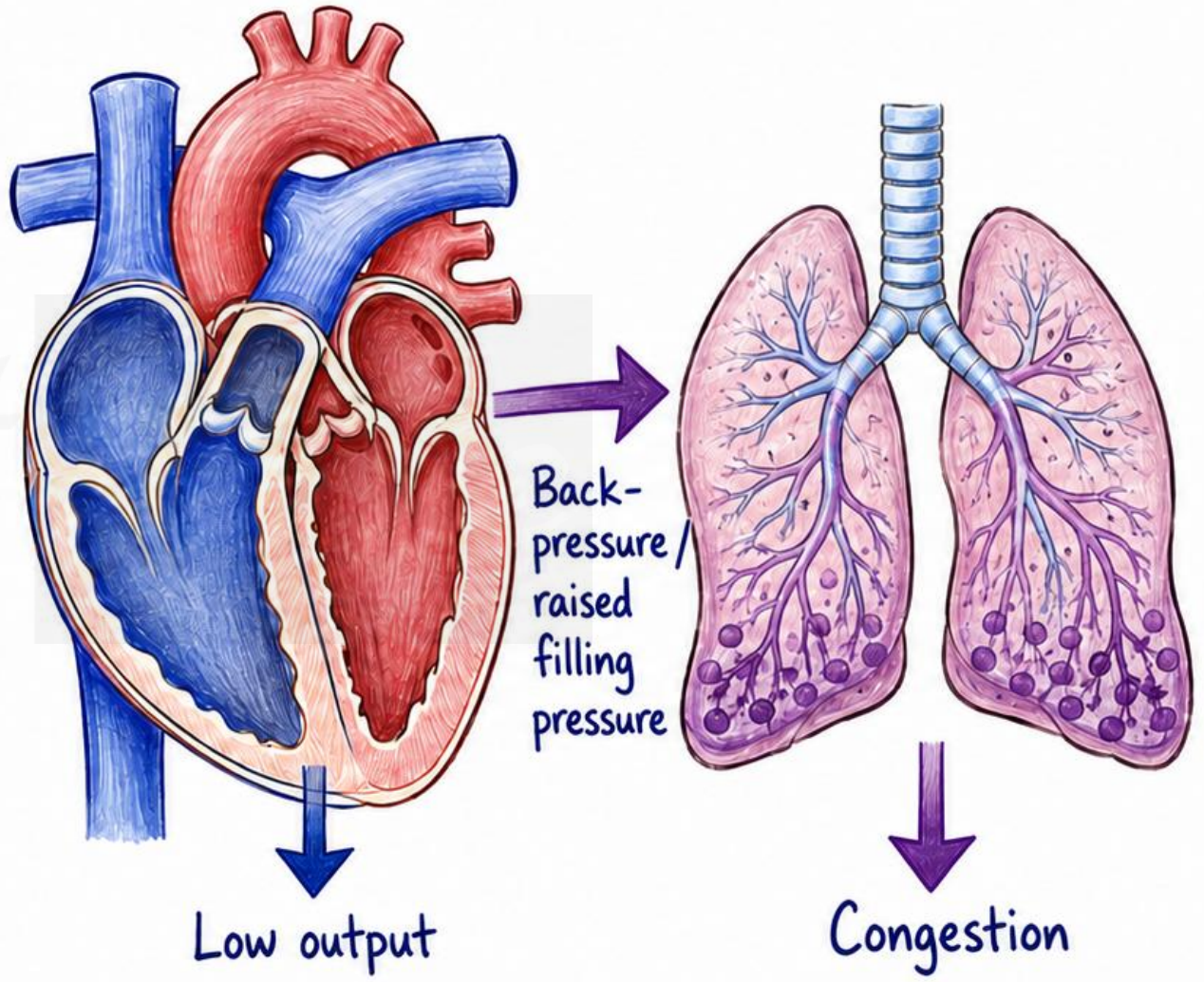
Hypovolaemic shock

- Loss of effective circulating volume reduces venous return and ventricular preload.
- Stroke volume falls, lowering cardiac output and tissue perfusion.
- Causes include haemorrhage, severe fluid loss and fluid sequestration outside the circulation.
- Bleeding, vomiting, diarrhoea and major burns are examples.
- Compensatory tachycardia and vasoconstriction may produce cool, clammy skin.
- Pulse pressure can narrow and filling pressures are often low.
- Clinical findings depend on severity and the underlying cause.



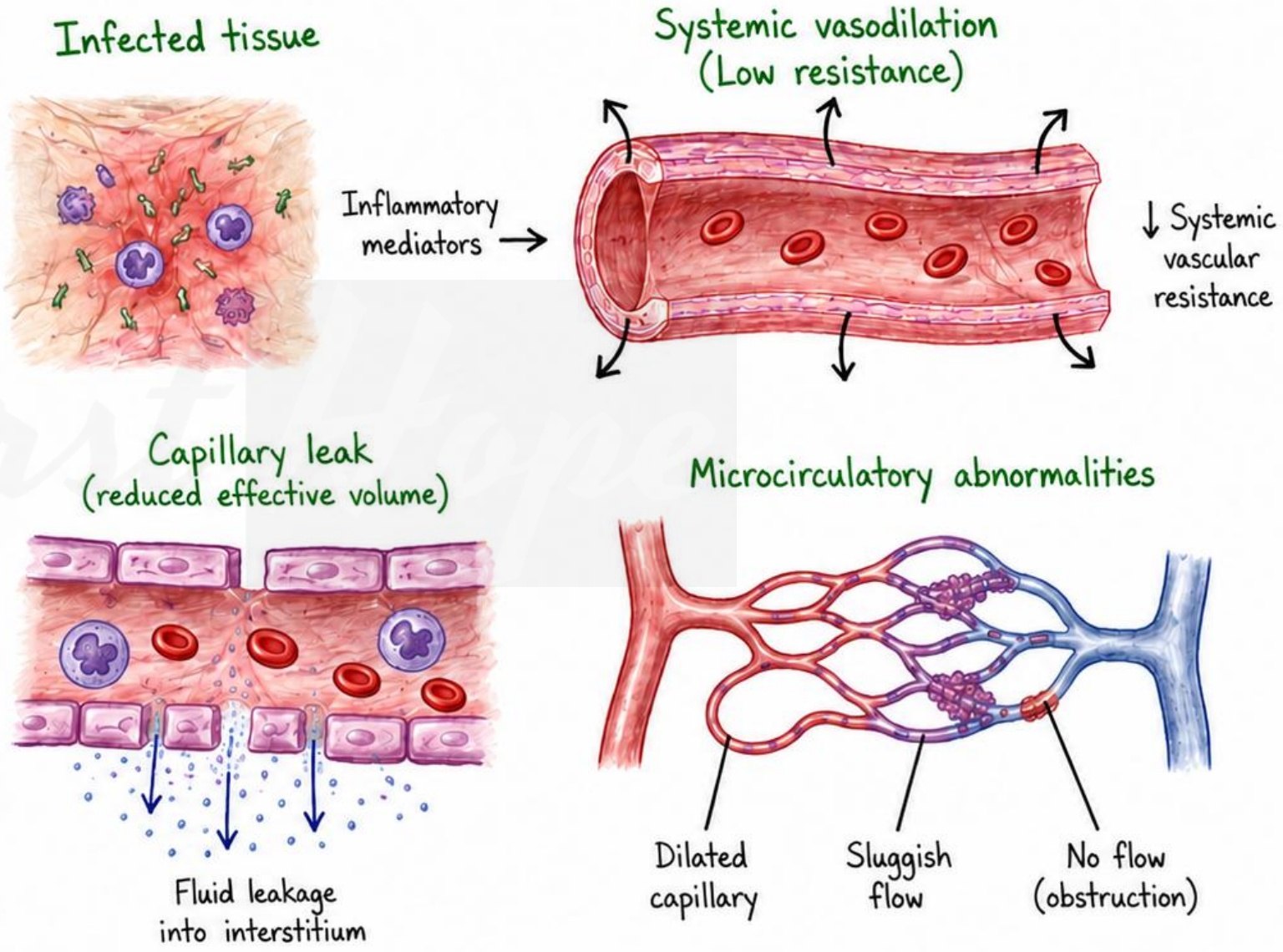
Cardiogenic shock

- The heart fails to generate adequate output despite sufficient available circulating volume.
- Causes include severe myocardial infarction, major arrhythmias, cardiomyopathy and acute valve dysfunction.
- Reduced output causes tissue hypoperfusion.
- Back-pressure may increase cardiac filling pressures and produce pulmonary or systemic congestion.
- Hypotension, cool extremities, raised jugular venous pressure and lung crackles may occur.
- The pattern varies with the ventricle and mechanism involved.
- Extra fluid is not automatically beneficial when pump failure dominates.



Septic and distributive shock

- Distributive shock involves reduced vascular tone and abnormal distribution of blood flow.
- In sepsis, a dysregulated response to infection produces endothelial and cellular dysfunction.
- Vasodilation lowers systemic vascular resistance.
- Capillary leakage reduces effective circulating volume.
- Microcirculatory abnormalities, inflammation and coagulopathy impair tissue function.
- Cardiac output may be high early, but myocardial dysfunction can lower it.
- Warm skin can occur, yet it is not present in every phase or patient.



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