

# Hypovolemic shock (pediatrics)

## Pathogenesis and characteristics

**Hypovolemic shock** is *the most common shock condition in children*. Hypovolemic shock is an absolute loss of effective circulating volume. Hypovolemia leads to a reduction in preload, subsequently stroke volume and cardiac output. Activation of peripheral and central baroreceptors results in the release of catecholamines, vasoconstriction and tachycardia. These compensatory mechanisms are effective for an acute loss of 10-15% blood volume. If the loss exceeds 20-25%, these mechanisms cease to be effective, the CO/CI decreases. Blood pressure is often normal due to an extensive increase in peripheral vascular resistance. The extraction of oxygen in the tissues increases, i.e. the arteriovenous difference expands. When compensatory mechanisms fail, tissue hypoxia and lactate MAC develop. hypotension, impaired consciousness, oligoanuria occurs. The terminal phase is characterized by myocardial dysfunction and cell death.

From a practical point of view, it is important to emphasize that blood pressure decreases only in the pre-terminal phase, after all compensatory mechanisms have been exhausted, so hypotension is in no case an early marker of the severity of the condition. On the contrary, attention should be paid from the beginning to clinical signs such as tachycardia, cold akra with weakened pulsations and prolonged capillary return, reduced diuresis.

Uncomplicated and timely treated hypovolemic shock does not lead to the development of capillary leak syndrome. However, patients with burns, with trauma of soft tissues are at risk. Also, severe and prolonged hypovolemic shock leads to capillary wall damage.

*Hypovolemic shock is characterized by: a high systemic vascular resistance index (SVRI), a decrease in CVP and CI, widening of the AV difference, and late-onset hypotension. Tachycardia, low systolic pressure, and its increase with liver compression predict a good response to volume expansion.*

## Etiology

- dehydration
- bleeding
- sequestration ECT: paralytic ileus, burns

## Therapy

The primary goal is to replenish fluids - crystalloids, colloids or blood. The total amount of fluids administered usually exceeds the absolute volume loss, as the capacity of the vascular space increases and cell membrane dysfunction occurs. As part of the treatment of hemorrhagic shock, administration of a greater proportion of colloids compared to crystalloids, especially plasmas and sufficient substitution with erysma is again in the forefront of interest. A recent recommendation that is already appearing for pediatric patients is the tactic of permissive hypotension, i.e. giving just enough fluid to ensure sufficient tissue perfusion, no more.

## Links

## Source

- HAVRÁNEK, Jiří: *Šok*. (edited)

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