Kazakh National Medical University
named after S.D. Asfendiyarov

Traumatic Shock

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Plan

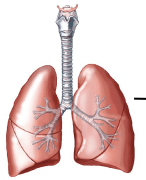
1. Etiology
2. Pathogenesis
3. Clinical picture
4. Diagnostics
5. Treatment

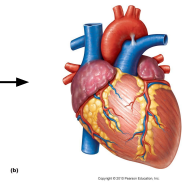
What is traumatic shock and It's etiology

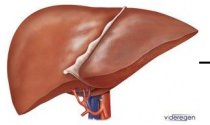
Shock is a systemic disease caused by failure of oxygen delivery or utilization at the cellular level.

Shock as a result of traumatic injury occurs due to *hemorrhage with decreased cardiac output*, but may also be exacerbated by hypoxemia, mechanical disturbance of blood flow (tension pneumothorax or tamponade), poisoning, cardiac ischemia, or acute spinal cord injury.

Pain, anxiety, and hemorrhage combine to *trigger* systemic compensatory mechanisms designed to preserve perfusion of the most oxygen-sensitive organs: ***the brain and heart.***

Pain impulses → CNS → Irritation of cortical and subcortical centers of the brain → SAS activ. → Vaso-con str. → Vaso-dila tion → Plasma & Blood transfer to injured tissue → ↓ VCB & Hyper-co ag. → ↑ Intravasc. aggreg. of PLT and RBC → Disorders in micro-circul ation → Stasis → ↓ O_2 in tissues → Hypoxemic damage of tissue parenchyma → ↓ Func. of organs →  → Hypoxia → Acidosis

↓ Func. of organs → 

↓ Func. of organs →  → ↓ Detoxi-fic ation

Shortly about causes and pathophysiology

Cause	Pathophysiology
Lost airway or pulmonary injury	Inability of oxygen to reach the circulation
Tension pneumothorax	Diminished blood return to the heart
Cardiac tamponade	Diminished blood return to the heart
Hemorrhage	Inadequate oxygen-carrying capacity
	Inadequate intravascular volume
Cardiac injury	Inadequate pump function
Spinal cord injury	Inappropriate vasodilatation
	Inadequate pump function
Poisoning	Direct failure of cellular metabolism
	Inappropriate vasodilatation
Sepsis	Direct failure of cellular metabolism
	Inappropriate vasodilatation

Clinical features

Post-traumatic stress disorder symptoms may start within one month of a traumatic event, but sometimes symptoms may not appear until years after the event.

PTSD symptoms are generally grouped into four types:

- ✔ intrusive memories, avoidance
- ✔ negative changes in thinking and mood
- ✔ changes in physical and emotional reactions.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Intrusive memories

Symptoms of intrusive memories may include:

- ✔ Recurrent, unwanted distressing memories of the traumatic event
- ✔ Reliving the traumatic event as if it were happening again (flashbacks)
- ✔ Upsetting dreams or nightmares about the traumatic event
- ✔ Severe emotional distress or physical reactions to something that reminds you of the traumatic event

Avoidance

Symptoms of avoidance may include:

- ✔ Trying to avoid thinking or talking about the traumatic event
- ✔ Avoiding places, activities or people that remind you of the traumatic event

Negative changes in thinking and mood

Symptoms of negative changes in thinking and mood may include:

- ✔ Negative thoughts about yourself, other people or the world
- ✔ Hopelessness about the future
- ✔ Memory problems, including not remembering important aspects of the traumatic event
- ✔ Difficulty maintaining close relationships
- ✔ Feeling detached from family and friends
- ✔ Lack of interest in activities you once enjoyed
- ✔ Difficulty experiencing positive emotions
- ✔ Feeling emotionally numb

Changes in physical and emotional reactions

Symptoms of changes in physical and emotional reactions (also called arousal symptoms) may include:

- ✔ Being easily startled or frightened
- ✔ Always being on guard for danger
- ✔ Self-destructive behavior, such as drinking too much or driving too fast
- ✔ Trouble sleeping
- ✔ Trouble concentrating
- ✔ Irritability, angry outbursts or aggressive behavior
- ✔ Overwhelming guilt or shame

Tactics of treatment:

Non-drug treatment:

- ✔ assess the severity of the patient's condition (it is necessary to focus on complaints patient, level of consciousness, color and moisture of the skin, nature respiration and pulse, blood pressure level);
- ✔ Ensure the patency of the upper respiratory tract (if necessaryAVL);
- ✔ to stop external bleeding. At the pre-hospital stage,temporary methods (tight tamponade, the imposition of a pressure bandage, finger pressing directly into the wound or distal to it, applying a tourniquet, etc.).
- ✔ Continuing internal bleeding at the prehospital stage to stop is almost impossible, therefore the actions of an emergency physician should be are directed to the prompt, careful delivery of the patient to a hospital;

- ✔ put the patient with a raised leg at 10-45%, the position of Trendelenburg;
- ✔ bandage application, transport immobilization (after the introduction analgesics!), with intense pneumothorax - pleural puncture, with open pneumothorax - transfer to the closed one. (Caution: Foreign bodies from wounds are not removed, the fallen internal organs are not corrected!);
- ✔ Delivery to a hospital with monitoring of heart rate, breathing, blood pressure. When insufficient perfusion of tissues using pulse oximeter is ineffective.

Medication

- ✔ inhalation of oxygen;
- ✔ maintain or provide venous access - catheterization of veins;
- ✔ **interrupt the shockogenic impulses (adequate anesthesia):**
- ✔ Diazepam [A] 0.5% 2-4 ml + Tramadol [A] 5% 1-2 ml;
- ✔ Diazepam [A] 0.5% 2-4 ml + Trimeperidine [A] 1% 1ml;
- ✔ Diazepam [A] 0.5% 2-4 ml + Fentanyl [B] 0.005% 2 ml.

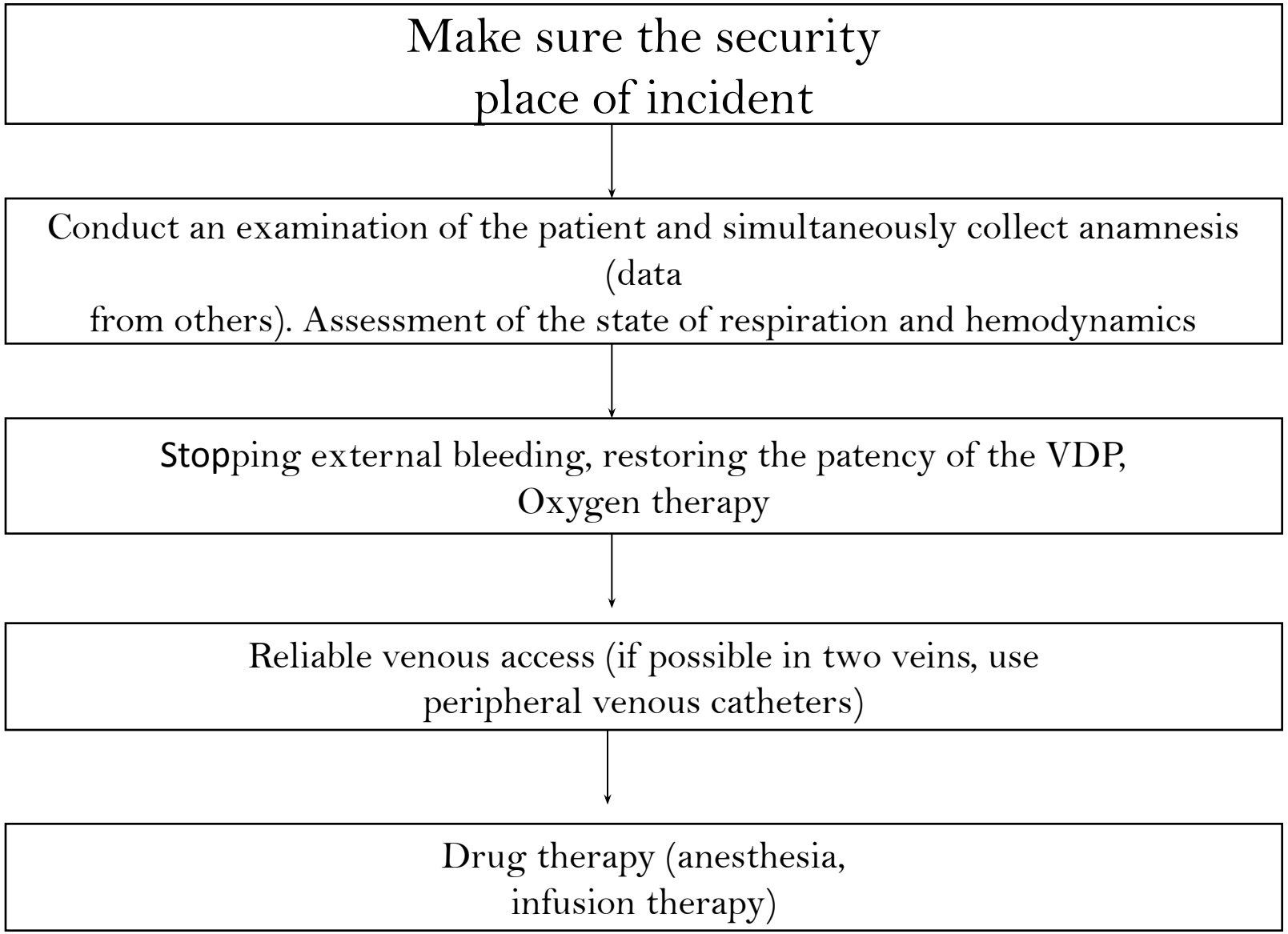
Normalization of BCC, correction of metabolic disorders:

with an undetectable level of blood pressure, the infusion rate should make 250-500 ml per minute. Intravenously injected 6% solution of dextran [C]. If the choice is possible, 10% or 6% solutions are preferred hydroxyethyl starch [A]. One moment can be poured no more than 1 liter like solutions. Signs of the adequacy of infusion therapy is that, that in 5-7 minutes there are the first signs of the determination of blood pressure, which in The next 15 minutes increase to a critical level (SBP 90 mm Hg). With shock of light and medium degree, preference is given to crystalloid solutions whose volume should be higher than the volume of lost blood, since they quickly leave the vascular bed. Enter 0.9% solution of sodium chloride [B], 5% glucose solution [B], polyionic solutions - disol [B] or trisol [B] oracesol [B]. If the infusion therapy is ineffective, 200 mg of dopamine [C] for every 400 ml of crystalloid solution at a rate of 8 to 10 drops in 1 minute (to the level of SBP 80-90 mm Hg). Attention! Using vasopressors (dopamine) with traumatic shock without replenished blood loss is a gross medical error, as this can lead to still greater disturbance of microcirculation and enhancement of metabolic violations. In order to increase the venous return of blood to the heart and stabilization of cell membranes intravenously injected imultaneously to 250 mg prednisolone.

The list of essential medicines:

- ✔ oxygen (medical gas);
- ✔ Diazepam 0.5%;
- ✔ tramadol 5%;
- ✔ trimiperidine 1%;
- ✔ Fentanyl 0.005%;
- ✔ dopamine 4%;
- ✔ Prednisolone 30 mg;
- ✔ sodium chloride 0.9%

Algorithm of actions in emergency situations:



Imposition of dressings, transport immobilization, with intense pneumothorax -
pleural puncture, with open pneumothorax - transfer to closed.
(Attention!
Foreign bodies from wounds are not removed, the fallen internal organs are not corrected)!

Hospitalization in the profile hospital (with refractory shock - in the nearest hospital
after an urgent call)

Indicators of treatment effectiveness:

- ✔ stabilization of blood pressure;
- ✔ stop bleeding;
- ✔ improvement of the patient's condition.