Staged operations on the thoracic and abdominal part of the aorta in case of penetrating shrapnel injuries

Objective: to analyze the early and mid-term results of urgent surgical procedures for shrapnell penetrating injuries of the thoracic and abdominal cavities with damage to the thoracic or abdominal part of the aorta. To analyze the early results of endoprosthesis of the descending thoracic aorta in case of shrapnels pseudoaneurysms of the thoracic aorta.

Methods: patients with shrapnel penetrating wounds of the thoracic and abdominal cavity with damage to the thoracic or abdominal sections of the aorta, with profuse bleeding were studied in detail. Patients were brought to the operating room in the first two hours from the moment of the injury. Urgent surgical procedures^ thoracotomies and laparotomies were performed in patients with ongoing bleeding with an attempt to sew up damage to the thoracic or abdominal aorta. Mainly suturing of damage to the aorta on the lateral impression was performed with the help of U-shaped sutures on teflon pads. If necessary, the aorta was wrapped externally with a vascular prosthesis to achieve stable hemostasis. REBOA endovascular balloon was used during operations for damage to the abdominal part of the aorta to reduce bleeding and centralize blood circulation. Urgent thoracotomies and laparotomies were performed only under the condition of relative stabilization of the patient's condition and adequate replenishment of the volume of circulating blood.

Results: intraoperative and early postoperative mortality (during first 6 hours) was 59% in patients with srapnel injuries of the thoracic or abdominal part of the aorta who underwent emergency surgery. Patients with small aortic injuries (2-3 mm) or tangential injuries made up the majority of patients who successfully underwent surgical interventions. Among the patients who successfully underwent life-saving operations, 25% had complications in the form of pseudoaneurysms of the aorta and required endoprosthesis of the aorta in a timely manner.

Conclusions: gunshot penetrating shrapnel injuries with damage to the thoracic or abdominal aorta are life-threatening injuries and are accompanied by high mortality. Emergency thoracotomies and laparotomies with subsequent suturing of aortic injuries enable about 41% of patients to survive. In the future, patients need dynamic monitoring for 6 months for the purpose of timely diagnosis and hybrid or endovascular treatment of pseudoaneurysms of the aorta.

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Additional Resources

- https://files.aievolution.com/prd/aat2101/abstracts/abs_9088/Shrapnelinjuries_Beshley_2023.pptx