Acta Scientific Orthopaedics (ISSN: 2581-8635)

Volume 5 Issue 8 August 2022

Editorial

Principles of Surgical Treatment of Gunshot Wounds of Extremities

Nosivets DS*

Oles Honchar Dnipro National University, Dnipro, Ukraine

***Corresponding Author:** Nosivets D, Oles Honchar Dnipro National University, Dnipro, Ukraine.

Received: June 15, 2022

Published: July 01, 2022

The beginning of the 21st century is characterized by the emergence of a number of military local conflicts around the world. The peculiarities of combat trauma in modern conditions include a high frequency of blast and gunshot wounds of extremities, which account for up to 80% of all musculoskeletal injuries [1]. In general, a gunshot wound is tissue damage with a violation of the integrity of their cover, caused by a firearm and characterized by a zone of primary necrosis and changes resulting in the formation of areas of secondary necrosis in the surrounding tissues, as well as the inevitable primary risk of developing wound infection [1,2]. The desire to preserve the lethality of explosive weapons and to increase their radius of action, despite modern means of armor protection, has led to the emergence of severe, combined, and multifactorial explosive injuries. Four main factors play a major role in the mechanism of gunshot wound formation: the impact of the shock wave, the impact of the wounding projectile, the impact of the lateral impact energy, and the impact of the turbulent flow. The direct action of the wounding shot results in a wound canal, which is an irregularly shaped slit. The wound canal is filled with detritus, blood clots, foreign bodies, or bone fragments. The consequence of all impact factors is primary necrosis of tissue areas belonging to the wound canal zone. These tissues immediately lose viability and must be completely excised. Tissues that received molecular concussion due to the cavitation effect are included in the potential area of secondary necrosis development. These tissues have numerous microbleeds and intracellular deformities. The extent of the area of secondary necrosis depends on many factors, primarily on the amount of projectile side impact energy transmitted to the tissues and the nature of the temporary pulsatile cavity resulting from the cavitation effect in the tissues. Secondary tissue necrosis is a dynamically developing process over time, the extent of which depends on the adequacy of surgical treatment of the wound and subsequent treatment. Differences between gunshot wounds from other types of wounds (stabbed, cut, chopped) consist in the presence of dead tissue zone around the wound channel (primary necrosis), irregular extent and direction of the wound channel, presence of large exit wound opening, presence of foreign bodies in the wound, drawn inside by a high speed of wounding projectile, formation within hours and days after the wound of new necrosis foci, in the area much larger than the wound channel area (secondary necrosis) [1-3]. For adequate surgical management of limb gunshot wounds, we apply the following principles. First, an examination of the injured limb is performed to the determination of the entry and exit holes. The skin of the injured limb segment is disinfected with an antiseptic solution. We perform wound tamponade and excision of non-viable tissues of the entrance wound. Then the wound is enlarged proximally and distally for a more detailed examination. The hematoma clot is removed, and we perform revision of the fracture with mandatory removal of all free fragments. Bony edges of the proximal and distal fragments are treated with wire cutters and curettes. After that non-viable fat and muscular tissue are dissected. At all stages of surgical treatment, the wound is abundantly washed with a sterile solution of up to 8-10 liters. Then the wound is dried and revision of the wound canal cavity is repeated to reveal nonviable tissues. We actively apply "aggressive debridement" tactics. We perform stabilization of the fracture using a tubular external

fixation device. Anatomical reduction is neglected, we try to close the skin defect as much as possible. After the fracture stabilization, if necessary, a vascular suture is performed, after which a fasciotomy is always performed. We put spacers with antibiotics in the wound. On the next day after surgical treatment, we perform a secondary examination under general anesthesia during which we assess tissue viability and quality of the performed primary surgery. If there is no necrosis or signs of infection during the secondary examination, we use the VAC system. After the soft tissue wound is healed, we address the bone wound by reassembly of the external device and use of bilocal osteosynthesis.

Bibliography

1. Janak JC., *et al*. "Patterns of Anatomic Injury in Critically Injured Combat Casualties: A Network Analysis". *Scientific Reports* 9.1 (2019): 13767.

2. Stewart L., *et al*. "Combat-Related Extremity Wounds: Injury Factors Predicting Early Onset Infections". *Military Medicine* 184.1 (2019): 83-91.

3. Franke A., *et al*. "The First Aid and Hospital Treatment of Gunshot and Blast Injuries". *Deutsches Ärzteblatt International* 114.14 (2017): 237-243.