Military innovations in trauma care translated into civilian practice

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DOI: 10.24911/SJEMed.12-2531

Introduction: The history of traumatic injury treatment is a progression from crude ancient practices to modern trauma systems, marked by significant developments in military medicine, surgery, and understanding of physiology. Key milestones include early documentation in ancient Egypt, the extensive but primitive record-keeping of the American Civil War, the introduction of antisepsis, the development of trauma centers, and advancements in casualty evacuation and the treatment of shock. There is a direct link between military and civilian trauma care that starts during the Civil War and continues until the current conflict in Ukraine. The wars of the last two decades have changed the nature of injuries seen on the battlefield, leading to further trauma management innovation. Trauma is a global burden of disease that is responsible for 5 million deaths around the world annually. Lessons learned in these hostile environments have guided many developments in trauma care in high-income countries, resulting in improved casualty outcomes and a lower mortality rate; an objective shared by the civilian and military trauma doctrine. With numerous small-scale, globally dispersed operations currently underway and large-scale operations on the horizon, a plan of action to provide trauma care for serious injuries is of paramount importance.

Aim: Through decades of war and conflict, there have been lifesaving techniques developed to manage trauma patients. This analysis examines advancements in military trauma systems and their potential transferability to civilian healthcare systems.

Methods: A literature search was conducted on PubMed. The key search MESH terms were: 'military medicine', 'civilian', 'trauma systems', 'innovation /advances/ evolving /developments', 'collaboration', 'lessons learned', 'Iraq, Ukraine, and Afghanistan', and 'global application'. The inclusion criteria for studies were those examining military medical advancements.

Discussion: The history of trauma care in America parallels our history of caring for injured military personnel during war. Lessons learned from combat casualty care have challenged the existing paradigms for trauma care in a civilian setting, promoting the importance of hemostasis, widespread use of tourniquets, transport, massive transfusions, trauma systems, and damage control surgery. Systems of care for injured service members were first implemented during the American Civil War (1861-1865). Triage, aid stations, and rapid transport to field hospitals or general hospitals would be considered rudimentary by today's standards. Still, this system was a significant achievement of its time and set the stage for injury management during World War I, World War II, and the Korean War. During Operations Iraqi Freedom and Enduring Freedom, the Joint Trauma System (JTS) was developed. The JTS concentrated its attention on the reduction of morbidity/mortality and increased survivability for all trauma patients in combat and peacetime operations. Damage Control Resuscitation is one of the clinical practice guidelines adopted in civilian medicine to improve patient outcomes.

Conclusion: The evidence in this review illustrates the military medical advances that have a tremendous impact on the management of civilian trauma patients. Systemic, individual, and contextual barriers exist in the implementation of successful military techniques in the civilian trauma care system. The continued progression of trauma capabilities will require an improved flow of information between the military and the civilian sector. A unanimous understanding and commitment from the leadership of both groups are needed to address the gap and ensure the implementation of optimal trauma care. This commitment and dedication will maximize the lives of both military and civilian patients

Keywords: Military medicine, trauma, combat medicine.