

Surgical frontiers in war zones: perspectives and challenges of a humanitarian surgeon in conflict environments

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ABSTRACT

This opinion article delves into the complexities of surgical care in conflict zones, highlighting the challenges and ethical considerations faced by humanitarian surgeons. It emphasizes the importance of collaboration with local healthcare professionals and specialized training programs in preparing surgeons for the unique demands of conflict trauma and war surgery.

HUMANITARIAN ORGANIZATIONS AND SURGICAL CARE IN CONFLICT ZONES

War has detrimental effects on society and brings insecurity, disease, malnutrition, and disruption of basic services,¹ therefore posing a public health issue.² In low-income countries with limited financial and human resources, surgery on victims of armed conflicts is mainly conducted by humanitarian organizations under arduous conditions. Such a scenario is often exacerbated by the rapid and occasionally intentional degradation of the healthcare system in the affected regions with the primary casualties being the population and the overall healthcare infrastructure.³

Independent non-governmental humanitarian organizations such as the International Committee of the Red Cross and Doctors without Borders provide voluntary service and standard surgical care to those injured by war. Governed by International Humanitarian Law, including the fundamental tenet of impartiality, these organizations have a distinguished history of managing hospitals with unwavering neutrality and independence. The commitment to impartiality is not only a moral imperative but also a strategic necessity, fostering trust among all parties involved in conflict and facilitating access to populations in need. By adhering strictly to the principles of impartiality and universality, humanitarian organizations uphold their credibility and effectiveness in delivering essential medical services amid the chaos of war.

In the challenging environments of conflict areas, where the intensity and proximity of combat fluctuate unpredictably, surgical teams operate under immense pressure. Despite these challenges, they remain steadfast in their dedication to providing life-saving care to trauma and emergency patients. Collaborating closely with local healthcare professionals, when available, the surgical teams work tirelessly to ensure that every individual, regardless of their circumstances, receives the highest standard of surgical treatment possible.⁴

ETHICAL AND PRACTICAL CONSIDERATIONS IN HUMANITARIAN SURGERY

Medical staff working in conflict areas follow standard medical ethics in their clinical practice as well as a set of special rules, which include the International Humanitarian Law, the Geneva Convention created in 1949 or the laws of war (protection of the sick and of those who care for the wounded, as well as the rights and duties of medical staff). This is another specificity of this type of surgical care, which is extremely important for the safety of patients and the teams who work under dangerous circumstances and severe conditions due to the lack of clean water or electricity, physical exhaustion, safety concerns and uncertain communication channels. Importantly, international teams need to be flexible and have the ability to adapt to different people, cultures, politics, religions and socioeconomic conditions. All this while maintaining solid ethical and moral principles in their clinical practice. It is one of the humanitarian challenges.⁴

Surgical work on injured victims of war is often alternated with patients who emerge with non-war-related surgical conditions including abdominal, obstetric/gynecological, orthopedic, or pediatric emergencies.

In addition to the demands related to the nature of the surgical work on these missions, surgeons often also teach, tutor and train people in the field. Teaching and empowering local surgeons by transferring knowledge (capacity building) is one of the most important tasks throughout these missions. Sharing skills with local surgical teams helps them be better doctors and surgeons and be better prepared to help alleviate the suffering of their people, victims of war, building capacity in the host's healthcare system in the long term. This is an important legacy for the future of the local population.

In these difficult scenarios, the bidirectional benefits of humanitarian surgery exist, where we can all learn from each other. This two-way learning is a great advantage. This symbiosis forms bonds, improves the environment, and unequivocally benefits the victims of the conflict. The best outcomes are achieved through teamwork, professionalism and improvisation adapted to these challenging scenarios.

We and our local colleagues are all in the same boat in these complex scenarios. There is a lot of inspiration from those we help and those who help us. In these challenging situations, many attributes have been learned and cemented, such as mental toughness,

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humility, and compassion, as well as much of the specific surgical knowledge of war trauma surgery, due to the opportunity to work with these dedicated and experienced medical teams.

SPECIALIZED TRAINING FOR SURGEONS IN CONFLICT ENVIRONMENTS

War trauma surgery is the ultimate frontier of general surgery. It is significantly distinct from surgery practised in times of peace, where most operations are elective and most trauma is blunt. War trauma surgery has characteristics related to the special nature of armed conflict, namely the physiopathology of penetrating bullet wounds or blast trauma.⁴

War injuries are themselves a specific clinical entity. In this intricate physiopathology where emergency surgery is predominant, the extent of tissue destruction and contamination is quite different from the daily trauma practice in high-income countries, where the frequency of traumatic penetrating phenomena is much lower, and most cases have less shocking energy and consequently less severity of injury.

Until recently, projectiles were the main cause of penetrating injuries; however, in more recent conflicts, these have been replaced by weapons of fragmentation mechanisms such as bombs, explosives, grenades and landmines. Blast injuries are highly contaminating and entail a high risk of infection.² Basic knowledge of ballistic principles such as cavitation, low and high-speed projectiles, and post-blast energy waves, among others is useful for the surgeon to be able to visualize the potential extension of tissue damage. War wounds are usually much worse than they appear to be.

In their day-to-day practice, in industrialized countries, surgeons are accustomed to working in sophisticated hospitals, operating within a multidisciplinary environment with increasingly specialized and subspecialized surgical training.² However, to practice war surgery, the surgeon needs to change the professional mental software, whereas in theory, war surgery is based on classic surgical standards, differing working conditions and limited resources that lead humanitarian surgeons to improvise and commit themselves in their treatment decisions to provide patients with the best possible care. This adaptive approach, which we term ‘surgical utilitarianism’, reflects the pragmatic choices surgeons make when faced with the challenging circumstances of a conflict zone. In essence, surgical utilitarianism involves prioritizing interventions that maximize overall benefit and optimize the use of available resources, performing the right surgical task. In the dynamic context of war surgery, this concept underscores the importance of practicality and resource efficiency in achieving the best outcomes for patients amid the constraints imposed by the operational environment. One of the examples that illustrates this concept is that of the surgeon who often must perform the difficult task of triage in the face of the number of victims that occur every day in conflict scenarios.

In a conflict environment, a surgeon needs to be trained and confident to venture into any injured territory (skull, face, neck, chest, abdomen, pelvis, and limbs) regardless of any level of difficulty (for instance, massive hemorrhage). Experience, common sense and surgical expertise are requirements for the efficient management of the polytrauma patient, who is most often in shock.

The surgeon must be confident in the multidisciplinary practice of multiple interventions, both surgical and non-surgical skills, many of them life and limb-saving, including, for instance, surgical airway, fasciotomies, Extended Focused Assessment using Sonography in Trauma, debridement, abdominal packing,

patient triage, flaps, autotransfusion, and craniotomy, among others.⁵ Moreover, specific knowledge and training in pediatric situations, orthopedic trauma, burns, and reconstructive surgery are also crucial.⁶

Training for these complex trauma situations must be theory-intensive, in surgical laboratories, simulations and clinical exercises conducted in postgraduate and training courses in diverse surgical areas. A few such programs exist, such as the Definitive Surgical Trauma Care Program, which covers several surgical areas relevant to the management of polytrauma patients; and the Surgical Training in Austere Environment Program, which teaches surgeons to manage conflict trauma without the support of other specialties or the back-up of medical equipment.

In addition to the aforementioned programs, surgeons preparing for missions can bolster their proficiency in managing multitrauma patients through various essential training courses. These include Advanced Trauma Life Support, which offers a systematic approach to trauma care, emphasizing prioritization and rapid decision-making. The European Trauma Course provides comprehensive trauma management training, focusing on teamwork, effective communication, and evidence-based practices.

For enhanced exposure and surgical skills in trauma scenarios, the Advanced Surgical Skills for Exposure in Trauma course is valuable, whereas the Pediatric Advanced Life Support equips surgeons to address pediatric trauma, considering the unique physiological and anatomic aspects of children. The Medical Response to Major Incidents & Disasters course covers a broader spectrum, emphasizing coordination and collaboration in responding to mass casualties.

Furthermore, the Emergency War Surgery (EWS) course is specifically tailored to prepare surgeons for challenges in providing surgical care within war zones. Addressing topics such as field surgery techniques, triage in austere environments, and the management of war-related injuries, EWS contributes crucial knowledge for wartime trauma care.

Finally, surgeons can also acquire knowledge from non-governmental organizations and their expertise in clinical protocols and procedures with appropriate surgical techniques. These are based on solid scientific principles and make it possible to treat all war wounded in settings with scarce resources and precarious conditions. Collectively, these resources contribute to the surgeon’s readiness for the intricate demands of multitrauma patients during missions, undoubtedly entailing a steep learning curve.

However, beyond the theoretical and procedural aspects covered in training, it is a trauma surgeon’s obligation and responsibility to embody a genuine level of confidence and proficiency in trauma surgery, when facing conflict areas. In these challenging settings, a trauma surgeon’s competence is put to the test, requiring the ability to make critical decisions solely based on physical examination and clinical judgment, devoid of the support of cutting-edge medical technology. The goal is to be able to do what is utmost necessary for the patient’s well-being, leveraging the scarce available resources. Conflict settings inherently limit the diagnostic process, compelling humanitarian surgeons to rely on clinical practice grounded in their own senses—resorting to sight, hearing, smell, and palpation during physical examinations.⁷

As surgeons, we must create a better world, improving the lives of those around us and having the self-confidence and ability to change the lives of patients and their families. The surgical profession itself is a mission; every day we feel the call to heal, teach and help. In a conflict zone, this challenge is immense,



exciting, sometimes frightening, pushing us to the limit and is very rewarding daily. It is an experience with unique sensations, in which surgical passion is present in every act, making every moment count.

The practice of medicine demands commitment. At the end of each mission, surgeons may sometimes experience feelings of dismay when returning home and leaving their colleagues alone in the field. At the same time, surgeons experience deep recognition and gratitude from patients and people who work with them in the field, which is incredibly difficult to describe in words. It is this kind of commitment to others and ourselves that stimulates us and makes us want to be back in the field once again.

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