Training in Trauma Management

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Abstract

Considerable improvements have occurred in the care of injured patients since the times of World War I and II. This has been brought about not only by technological advances but also due to improved training of doctors and nurses in providing trauma care. Important elements of combat trauma training are realism, human-specific injuries and treatments, volume of trauma exposure, and team building. In all modern armies training is imparted using human simulators and mannequins, human cadavers, occasionally live animals but more often using animal tissues. Worldwide trauma training courses are mandatory for both paramedics and medical officers. There is a need to set up an organised system of trauma training in India and we, in the Armed Forces have to capitalize on the wealth of combat and non-combat trauma experience, in setting up such courses.

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Introduction

With the "Global War on terror" the trauma victim need not be a young soldier alone. Swift in onset and slow in recovery, trauma is the most common cause of death in the productive population worldwide. Trauma response techniques are ever changing, as are the ways and mechanics of trauma causation. Enormous strides have been made in recent years in the initial treatment and stabilization of trauma patients. Technological advances alone cannot improve outcome, it is the medical responder's training which will ensure that the trauma victim gets adequate and updated treatment.

It was Adams Cowley who first introduced organized approach for trauma patients in the civilian setting [1]. USA has the most well established systems of regional trauma service with centers classified as Level I to Level IV. Level I trauma centers provide services, from initial resuscitation to rehabilitation, and have educational and research capabilities. By contrast, level IV centers are geared only for immediate resuscitation of trauma victims and their rapid transfer to higher-level centers as necessary [2]. In India, we do not have organized national or regional trauma service.

Trauma Training

Trauma care is a subject neglected by the medical curriculum planners. A number of studies recently have addressed this issue and worldwide steps are being taken to impart training to medical students prior to internship through courses like the Emergency Trauma Training Course (ETTC) [3,4].

Trauma training aims at providing the essential information and skills that the doctor may then apply to identify and treat life threatening or potentially life threatening injuries. The ABCDE approach of Advanced Trauma Life Support (ATLS) course clearly emphasizes that injury kills in reproducible time frames. Loss of airway kills quicker than difficulty in breathing. Loss of circulating volume kills earlier than an expanding intra-cranial haematoma [5].

The American College of Surgeons recognising that trauma is a surgical disease adopted the Advanced Trauma Life support course. ATLS today is accepted as a standard of first hour trauma care the world over. ATLS aims to prepare doctors and paramedics so trained to exercise a quantum of basic knowledge and skills to save lives, reduce morbidity and avoid unnecessary harm. The overriding principle is *primum non nocere*, that is first do no harm. Implementation of ATLS protocols and training of doctors worldwide has led to a significant decrease in mortality and morbidity [6]. The use of regionalized trauma centers too has been shown to decrease in trauma-related morbidity and mortality [7,8].

Training Methodology

Worldwide, various models are in use to provide training in trauma response techniques, ranging from lecture demonstrations to live animal training, training on realistic simulators as well as training on cadavers.

Animal-Based Training

The US army has been using pigs and goats for trauma casualty training exercises inspite of protests from the

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animal rights activists. Their rationale is to provide actual and realistic training on principles of gunshot wounds management for troops going to war. They do this by inflicting injuries on anesthetized pigs in a controlled environment. The paramedics and medics learn to manage critically injured patients within the first few hours of injury and the soldiers learn emergency life trauma saving skills needed on the battlefield when there are no medics, doctors or facility nearby. Similar training is imparted worldwide through their Surgical Trauma Response Techniques (STRT) courses. Animal tissue based training using sheep gut/tendon, Goat larynx or chest wall is also a popular training medium used worldwide with fewer restrictions and objections.

Human Simulator Training

High-tech life-like human simulators have been available for a while now to teach trauma life support techniques. The ATLS training is conducted with the use of anatomical human simulator like the SIMULAB TraumaMan®. Use of advanced simulation technology in the training of military resuscitation teams has been used routinely by members of the Australian Defence Force [9]. Simulated training is also available online.

Human Cadaver-based Trauma Training

Use of human cadavers to demonstrate and allow development of invasive trauma skills in emergency care enhances learning experience because of the identical scenarios, landmarks, and the hands-on experience. The Royal College of Surgeons of England conducts the Definitive Surgical Trauma Skills course-a hands-on practical cadaveric workshop course.

Hybrid Model Trauma Training

They combine the advantages of all the above and include interactive surgical human simulators training combined with live tissue lab and human cadaveric skill stations. US Army's Tactical Combat Casualty Care (TC3) course is a prime example of a Hybrid training model.

Combat Trauma Training

Training of health care workers in trauma care, whether in combat or in peacetime can never be adequately realistic. Providing adequate proficiency in combat support training is essential for any Armed Forces more so for the Indian Armed Forces which are engaged in hostilities in adverse environmental conditions. Medical officers and paramedics assigned to combat medical units in the Indian Army today are assigned without any certified pre-deployment training.

Different approaches to combat trauma training are necessary because different types of skills and levels of knowledge are required of three distinct groups-Medical officers, Paramedical staff and infantry soldier. In the absence of a paramedic it is the infantryman's job to control hemorrhage by tying a tourniquet, stabilize a buddy who has sustained injuries at the scene of the injury while still under hostile fire. Optimal first responder training for infantry is something that the Indian Armed Forces need to strengthen by incorporating it as apart of basic military training at the level of regimental centers. The ongoing training of Battle Field Nursing Assistants (BFNA) too may be upgraded to certification courses in specific skills.

The existing trauma-training program for the Indian Armed Forces medical officers consists of a 2-day capsule in Trauma Life Support at Officers Training College, during Medical Officer's Basic Course. For those posted to Northern sector, there is a combat care capsule course at the Command Hospital. Three to five years later, during Medical Officers Junior Command Course at Armed Forced Medical College, a one-week ATLS course is conducted. For the paramedics there was no organized trauma care teaching, however with the establishment of Institute of paramedical sciences courses like Emergency and trauma care assistant courses have been started. The existing tiered referral and evacuation system covers up for the lack of training among many personnel at the various echelons in the present system.

The US Army has a very well organized combat training schedule. The combat medics receive a mandatory 3-day training called 'Combat Medic Advanced Skills training' and an additional 4-5 Day training under the Tactical Combat Casualty course (TC3) up to six months before induction into the combat zone. TC3 course consists of the following five phases: (a) One and one-half-day didactic session; (b) Half-day simulation portion with interactive human surgical simulators for anatomical correlation of procedures and team building; (c) Half-day of case presentations and triage scenarios from Iraq/Afghanistan and associated skills stations; (d) Half-day live tissue lab where procedures were performed on live anesthetized animals in a controlled environment; and (e) One-day field phase where live anesthetized animals and surgical simulators were combined in a real-time, field-training event to simulate realistic combat injuries, evacuation problems, and mass casualty scenarios [10].

For all deploying surgeons, a 3-day Emergency War Surgery course involving didactic sessions and practical exercises in cadavers or live tissue models exists. To maintain trauma skills during peacetime 2-4 weeks collaborative training is done in civilian Level I trauma centers regularly [3,11]. Defense Medical Readiness Training Institute (DMRTI), a tri service institute runs a

number of these courses for the US troops.

The future for all military physicians is to be wartime proficient. The present day role is to fix forward but have a smaller footprint. The stress is on improved en-route care through better trained first responders and paramedics. There is therefore a need to provide intense trauma courses and regular refresher training courses. The benefits of systematic training are that everybody speaks and understands the same language. Courses can also be designed to meet specific requirements of different groups like First responder, Aero-medical evacuation, Critical care transport etc.

Establishment of an Armed Forces Trauma Registry (AFTR) would be another step in right direction if we want to learn from the conflicts of today for better care for victims of tomorrow's wars. With our Armed Forces engaged in combat related roles through the year we have a wealth of experience that has been acquired over the years but this experience needs to be converted from individual experience to institutional experience, which will benefit the organisation and lead to improved outcomes in trauma patients.

Conclusion

Today, trauma care itself is in need for resuscitation and revitalization. There is a need to address on priority, the "Emergency medical care deficiency" in training of both paramedics and medical officers. Initiation of structured regular trauma support courses for all, along with establishment of trauma registry will help the Indian Armed Forces to derive optimal benefit from the extensive combat experience that we have at an individual level.

Conflict of Interest

None identified

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