Ahead of the curve: Sustained innovation for future combat casualty care

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The figure on the cover of this issue of the Journal of Trauma and Acute Care Surgery illustrates concluding casualty statistics from the wars in Afghanistan and Iraq. While various reports on morbidity and mortality among US service personnel have been provided during earlier phases of the wars, this analysis represents the first since the conclusion of combat operations in December 2014.1–4 The percentage of died of wounds, killed in action, and overall case-fatality rate are based on data from the Defense Casualty Analysis System and calculated using accepted definitions of each of these percentages.1 The percentage of died of wounds, killed in action, and case-fatality rate of 2.4%, 7.1%, and 9.3%, respectively, provide important information for the Department of Defense Combat Casualty Care Research Program (CCCRP) and offer compelling context for the nation and its volunteer force.

Results from this analysis also show that, as a percentage of all combat-related deaths during the course of the wars, 76% were in the prehospital setting. Although substantial, this value is less than the burden of prehospital mortality in Korea (91% of combat deaths) and Vietnam (88% of combat deaths) as well as that reported by Eastridge et al.4 in a 2011 analysis (87%). These new findings provide evidence that efforts to research and develop knowledge and materiel solutions, combined with an appropriately postured force structure and an integrated Joint Trauma System, are having an effect on mitigating prehospital mortality. These data also show that the work is not done—the gaps in combat casualty care are not resolved—and further progress must be made to improve prehospital care and alleviate the burden of survivorship (i.e., in-hospital morbidity and mortality), resulting from effective lifesaving efforts.5

As the analysis of concluding statistics from the recent wars continues, the Department of Defense CCCR enters a new era, one that has it endeavoring to stay ahead of the curve and spur innovation to support future and more complex operational scenarios.6 Even with the end of combat operations in Afghanistan, the United States maintains a significant number of troops in the country to participate in Operation Resolute Support, a North Atlantic Treaty Organization–led mission to provide training and support to local institutions and forces. Simultaneously, the United States and partner nations have initiated Operation Inherent Resolve in northern Iraq and Syria, while continuing small-unit surveillance and targeted operations in parts of Africa. Finally, strategic guidance—including the so-called pivot or rebalance of policy toward the Asia Pacific region as well as the Army Operating Concept “Force 2025 and Beyond” (AOC 2025B)—informs the research program working to develop solutions to support combat scenarios over large-distance operations in the Pacific and in highly populated urban areas (i.e., megacities).7–9 Although the scale and conduct of these operations are likely to be different from those of the past 14 years, US personnel will continue to serve in hostile and unpredictable environments around the world. In many ways, future operational scenarios may present greater challenges to casualty care than those of the past.

In this context, future combat casualty care may be tested by longer prehospital times requiring a reappraisal of the traditional “Golden Hour.”6 During the past decade, the Golden Hour has existed as a lifesaving and resuscitation capability based on predictable and enabled levels of care. However, future scenarios, including prolonged field care (PFC) and long-distance air-, land- or sea-based...
5. Sedation and pain control to accomplish Tasks 1–4
   • Minimum: provide iatile analgesics titrated via intravenous route
   • Better: trained to sedate with ketamine and adjunctive midazolam
   • Best: experienced/current in practice of longer-term sedation

6. Physical examination/diagnostic measures to gain awareness of potential problems
   • Minimum: assessment and physical examination without advanced diagnostics
   • Better: assessment and physical examination enabled by advanced diagnostics
   • Best: experienced with physical examination enabled by use of advanced diagnostics

7. Provide nursing/hygiene/comfort measures
   • Minimum: ensure patient is clean, warm, dry, padded, catheterized
   • Minimum: ensure basic wound care
   • Better: elevate head of bed, debride, washout and dress wounds
   • Best: decompress stomach as indicated
   • Best: experienced and current in the above

8. Perform advanced surgical procedures
   • Minimum: chest tube, cricothyrotomy
   • Better: fasciotomy, wound debridement, amputation, etc.
   • Best: experienced and current in the above

9. Perform telemedicine consult
   • Minimum: reliably communicate and present patient and key vital sign trends
   • Best: add laboratory values and ultrasound images
   • Best: add video teleconference

10. Prepare the patient for flight
    • Minimum: familiarity with physiologic stressors of eventual mode of transport
    • Best: trained in critical care transport
    • Best: experienced/current in critical care transport

relevant topic in the domain of PFC. Finally, this issue features special reports on the potential of simulator training in the preparation for battlefield scenarios (Tien et al.), new ways by which to interface with the Food and Drug Administration (Kumar et al.), and the Fifth Annual Joint Theater Trauma System Trauma Conference (Gross et al.). With this publication it is highly appropriate to consider the concluding combat casualty statistics reported on the cover and to pause for deliberation of lessons learned from the recent wars. However, with a clear-eyed view of current and future operational scenarios and the limited federal commitment to military-relevant trauma research, the CCCRP should rest on neither accomplishment nor regress. As a clarion military mission, the program should remain ahead of the curve and spur innovation for future and possibly more complex casualty care scenarios. To best embolden the volunteer force of the future, the research program must continue to endeavor toward solutions that not only improve statistical survival (prehospital and in-hospital) but also enhance quality and functional recovery.

DISCLOSURE

The authors declare no conflicts of interest.

REFERENCES