

HISTORICAL NOTES

The origins of critical care: the legacy of the Vietnam war in emergency medicine

Los orígenes de la atención al paciente crítico: la herencia de la guerra de Vietnam en la medicina de urgencias

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Part of the history of emergency medicine and critical care was forged in the extreme environments of armed conflicts. Yet few periods have left as transformative a legacy on clinical practice as the Vietnam War. While the Korean War laid the foundations, in Vietnam the protocols were systematized and institutionalized on a large scale—especially aeromedical evacuation and advanced medical care near the front line—establishing a model that would later be successfully transferred to the civilian setting.

During these conflicts, the U.S. Armed Forces had to confront the combination of high-energy trauma caused by modern weapons, long transports across hostile terrain, and limitations to providing care in the field. This context forced a rethinking of the fundamental principles of initial care and medical evacuation, adopting innovative solutions that would forever transform the concept of emergency medicine.^{1,2} The figures reflect this evolution: whereas during World War II approximately 1 in 4 soldiers wounded in combat died, in Vietnam this figure dropped to 1 in 7, with more than 97% survival among those who reached the surgical hospital alive². Never before had medicine been so effective at saving lives in such hostile environments. Beyond its impact on reducing combat mortality, these wartime experiences laid the foundations for concepts that today are pillars of contemporary emergency medicine.

The Korean War marked the first major advance in modern combat medicine. It was here that MASH (Mobile Army Surgical Hospital) units—mobile surgical hospitals that brought specialized surgery closer to the battlefield—were first systematically implemented. These hospitals, later immortalized in popular culture by the TV show MASH, represented a conceptual revolution by bringing the operating room to the patient instead of waiting for the patient to reach the operating room. Colonel Spurgeon Neel, a pioneer of evacuation medicine, documented how the introduction of H-13 Sioux helicopters for medical evacuation transformed response times.³ Although these aircraft were

primitive compared with those used in Vietnam, they allowed, for the first time, the evacuation of wounded soldiers directly from the front to surgical facilities in under an hour. The results were evident in reduced mortality among casualties who arrived alive at medical facilities. But the technical limitations of the time—including limited helicopter capacity, lack of specialized medical personnel on board, and basic equipment—made clear that much progress was still needed. Korea thus established the conceptual foundations of aerial evacuation, mobile surgery, and echeloned care. Vietnam would build upon these foundations to create a true medical revolution born in the skies of Southeast Asia.

During the Vietnam War, aeromedical evacuation reached an unprecedented level of systematization and efficiency thanks to the “DUSTOFF” protocol (acronym for Dedicated Unhesitating Service To Our Fighting Forces). This call sign, created by the 57th Medical Detachment stationed in Soc Trang in 1963,¹ became a symbol of hope for soldiers. Modified UH-1 Huey helicopters equipped for medical transport and staffed by experienced pilots and trained medical personnel carried out more than 900,000 medical evacuations during the conflict¹. This systematization drastically reduced the critical interval between injury and surgical care, and for the first time materialized the concept later known as the “golden hour.” Although R. Adams Cowley popularized the term golden hour in the civilian context during the 1970s, its roots lie in the lessons learned from twentieth-century armed conflicts—and particularly from the Vietnam War. The DUSTOFF model demonstrated that time is a therapeutic factor per se.²

Parallel to this revolution in transport, the war forced the systematization of decision-making under pressure. Faced with the massive and unpredictable flow of casualties, structured triage protocols were developed to optimize the allocation of limited resources. The systematic implementation of triage categories maximized overall survival, increasing survival rates among wounded soldiers who reached medical facilities

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Figure 1. Dust Off evacuation. A UH-1 “Huey” helicopter carries out a medical evacuation during the Vietnam War. Source: U.S. Army Military History Institute (USAMHI), public domain.

alive, despite the growing complexity of injuries. This system—based on probability of survival and required resources—transformed the approach to mass casualty care and laid the groundwork for the triage protocols used today in civilian emergencies.²

This structured way of thinking was complemented by the consolidation of an orderly method of action amid the chaos of war. In Vietnam, the early outline of the ABCD protocol (Airway, Breathing, Circulation, Disability) emerged—a logical framework to prioritize interventions and avoid fatal errors in critical situations. This methodology transformed initial trauma care from an art based on individual experience into a replicable science rooted in standardized protocols, laying the groundwork for what would later become Advanced Trauma Life Support (ATLS).²

But systematization was not the only dimension that evolved; specific techniques also experienced fundamental advances. Complex craniofacial trauma and injuries compromising airway patency necessitated refinements in advanced airway management techniques on the battlefield.⁴ The magnitude of the challenge was evident in the fact that such injuries, although representing only 14% of total wounds, accounted for 39% of fatal injuries.² The presence of these patients—whose evacuation without airway support would have been fatal—drove the development of new concepts and specialized devices for respiratory support, forming the basis of future advanced airway management protocols in emergency medicine.²

At the same time, the management of hypovolemic shock was revolutionized. Massive blood loss was one of the leading preventable causes of death among wounded soldiers. Early administration of crystalloids and blood products dramatically changed the prognosis of hypovolemic shock, and mortality decreased after the systematic implementation of aggressive resuscitation protocols.⁵ Although this strategy of massive volume replacement has since been replaced by the con-

cept of “controlled resuscitation,” its historical importance in establishing the value of early fluid therapy is undeniable.

However, beyond these technical advances, the most important lesson was conceptual: critical care does not begin in the intensive care unit, but at the first medical contact, when the therapeutic window is already open. This understanding revolutionized emergency medicine and established that in urgent care every decision counts—and that the difference between life and death is often determined in the first minutes, not in the operating room. Time revealed itself as the most powerful therapeutic factor available.

The return home: from the jungle to the cities

When the helicopters stopped flying over the jungles of Vietnam, many military physicians returned home with a revolutionary idea etched in their minds: time can save lives. However, they found an archaic civilian reality, where ambulances were little more than stretcher-bearing vehicles rooted in a nineteenth-century logic of transporting bodies without medical intervention.

The 1966 publication of *Accidental Death and Disability: The Neglected Disease of Modern Society* exposed the deficiencies of U.S. prehospital care and explicitly recognized the positive impact of medical organization during the Vietnam conflict as a model applicable to civilian settings.⁶ One year later, in 1967, Dr. Farrington published *Death in a Ditch* in the *Bulletin of the American College of Surgeons*, issuing a devastating critique. He argued that more young people were dying exsanguinated on American roads than on modern battlefields, and that wounded soldiers had a greater chance of survival than civilians injured on national territory.⁷ This comparison struck the public and medical conscience and catalyzed the creation and modernization of Emergency Medical Services (EMS) during the following decade. The military evacuation and care model used in Vietnam began to migrate into American cities in the form of civilian paramedic services.

After the U.S. rapidly adapted wartime lessons to civilian medicine, Europe began to develop its own models. France implemented the physician-staffed SAMU system, whereas the Anglo-Saxon model chose highly trained paramedics. Both systems, however, drew from the same roots forged in the Asian conflicts.

The late development of the Spanish emergency system

In Spain, adaptation was significantly slower, and structured systems such as Madrid’s SAMUR and Catalonia’s SEM did not emerge until the early 1990s.

These services introduced models of on-scene medical intervention inspired by international experience, but operated with limited resources and without a stable regulatory framework. And although professionals had long been practicing fully developed emergency medicine in the field, the medical specialty of emergency medicine was not officially recognized until 2024.^{8,9} The military legacy that transformed critical care in Vietnam took decades to crystallize in U.S. civilian medicine, but in Spain the process lagged nearly half a century behind. This delay left, for far too long, professionals without formal recognition despite practicing a true form of peacetime combat medicine.

Epilogue

The Vietnam War represented a definitive turning point in the evolution of critical care and consolidated a principle that remains essential in modern emergency medicine: time as a therapeutic factor. The need to provide rapid, effective, and adaptable medical attention in hostile environments forced the transformation of fundamental concepts that underpin contemporary emergency medicine. What began as practical solutions born from wartime urgency ultimately became the scientific foundations of critical care, forever redefining the man-

agement of severely injured patients and the practice of modern emergency medicine.

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