TITLE: Dr. James Styner and the development of the Advanced Trauma Life Support program

AUTHORS: Wesley Tin

This article is a pre-print. The final version can be found in issue 90(1).

ABSTRACT

The Advanced Trauma Life Support program is a training program on acute trauma management designed to be applicable to practitioners in a diverse array of resource settings. It was created by Dr. James Styner, who suffered a horrific aviation accident with his family and was subsequently treated in a rural hospital. Styner recognized that the health care workers were overwhelmed and sought to develop a concise and systematic approach to trauma care that could be easily followed in the management of emergent cases. Today, ATLS is the global standard of care for trauma management. Drawing directly from personal experience and collaborating with physicians and nurses across a wide array of specialties, Styner developed a training course that has since evolved into an essential part of medical training worldwide. In reviewing his family's tragic accident, the fundamentals of ATLS are easily observable and one can identify areas where ATLS principles could have been applied to improve care.

COMMENTARY

The Advanced Trauma Life Support program (ATLS) is a training program that has become the standard of care for initial management of trauma in emergent settings. Trauma is responsible for 10% of the world's mortality and survivors often experience significant morbidity requiring intensive rehabilitation¹. ATLS provides an organized language and approach to the trauma patient which can be communicated globally and has been shown to significantly decrease mortality in the first hour following admission². Furthermore, areas with more ATLS certified physicians have lower trauma deaths per capita.³ ATLS was developed by Dr. James Styner following a devastating accident with his family in a remote setting. The shortcomings in care that his family received spurred him to create an educational system that could be applied to any site regardless of resource availability.

Dr. James Styner is an orthopaedic surgeon who was living in Lincoln, Nebraska in the 1970s. After attending a wedding in Los Angeles, Styner was piloting a small 6-seater plane home with his wife and four children when deteriorating weather and poor visibility caused him to crash in the forests of rural Nebraska, at approximately 6:00 PM. On impact, his wife Charlene was thrown three hundred feet from the plane and killed instantly. Styner, while injured, was conscious and able to free himself from the wreckage. What followed was a prolonged extrication of his family and initial management of multiple victims. Styner himself had sustained rib and facial fractures and had impaired vision from facial swelling and bleeding. His ten-year-old son, Chris, had a fractured right forearm and severe hand laceration, but was alert and oriented. They worked together to extract the rest of his family from the wreckage. His son, Randy, was unconscious with a pinned right leg, while his other children, Rick and Kim, were both suffering from decreased levels of consciousness. Amazingly, after approximately 6 hours, Styner and Chris were

successful. Styner subsequently sought help by walking almost a mile to a highway, where he flagged down a car that took him and his family to a nearby community hospital.^{4,5}

On arrival, the family was greeted with locked doors. The hospital was only staffed by nurses at night, and they were told they would have to wait for physicians to arrive to allow access. Upon recognizing the gravity of the situation, the nurses allowed the group to enter the hospital. Eventually, physicians arrived and began management of the injuries. Rick, who had sustained a head wound and was semiconscious, was carried “by the shoulders and knees” to the x-ray suite where it was determined that there was no skull fracture. A physician then sutured the facial laceration from the previous night closed and administered IV Diazepam. Styner reports that he does not remember anyone else receiving IVs. While he does not recall becoming irritated at the staff at the hospital, Styner soon contacted his partner Bruce Miller and requested transport to his home hospital for more comprehensive and better equipped care. They arrived at Lincoln General Hospital at approximately 8:00 AM, fourteen hours after the crash.^{4,5}

Given the high-energy trauma sustained and the prolonged delay to care, it is remarkable that the outcomes for the Styner family were not graver. Chris’ injuries were limited to a fractured left forearm and right hand laceration. Randy suffered a popliteal laceration and compound fracture of the skull, and was in a coma for three days. Rick and Kim both suffered traumatic brain injuries and were in comas for seven days. While they suffered the loss of their mother, Charlene, the rest of the family survived the ordeal.⁵

As Styner returned to his normal life, he struggled to make sense of the gaps in care his family received. He had the insight to not blame the health care practitioners themselves, but rather the lack of quality education on trauma care. A passage in ATLS reflects this sentiment: “When I can provide better care in the field with limited resources than my children and I received at the

primary facility, there is something wrong with the system and the system has to be changed".⁴ He worked with physicians and nurses to create a training course for physicians in rural Nebraska. They drew significantly from the existing Advanced Cardiac Life Support (ACLS) course and had physicians writing chapters focused on their own specialties.⁴

In examining current ATLS protocols, one can clearly appreciate their relation to Styner's experience. Styner had noted several issues with his family's care at the community hospital. First, there was initial delay at entry to care and lack of adequate staffing. There was also inattention to cervical spine protection in transport of the victims and during investigations. Minimal IV access was obtained, and an open, contaminated wound was closed after nine hours of exposure. These errors and oversights in care became the basis of several ATLS teaching points.⁶ ATLS has clear emphasis on time management, an efficient and systemized primary survey, objective clinical clearance and protection of the cervical spine, and ensuring adequate IV access and antibiotics for open wounds. These are all principles that ideally should have been applied in the care of Styner's family.⁶

While tragic, Styner's accident spurred the development of an educational program that has revolutionized global trauma management. As of 2008, ATLS was the standard of care for over fifty countries and was in use by over one million physicians worldwide.⁷ Following his role in the inception of ATLS, Styner cites an international experience where he was involved in the management of an emergent trauma. Although few of the physicians shared a common language, they were able to use global principles of ATLS to communicate and efficiently provide care.⁴ With roots anchored in personal experience and real-life scenarios, ATLS provides a clear, systematic process to trauma management that can be used across borders and independent of resources.

REFERENCES

1. Lozano R, Naghavi M, Foreman K, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*. 2012;380(9859):2095-2128. doi:[10.1016/S0140-6736\(12\)61728-0](https://doi.org/10.1016/S0140-6736(12)61728-0)
2. Olden GDJ van, Meeuwis JD, Bolhuis HW, Boxma H, Goris RJA. Clinical impact of advanced trauma life support. *The American Journal of Emergency Medicine*. 2004;22(7):522-525. doi:[10.1016/j.ajem.2004.08.013](https://doi.org/10.1016/j.ajem.2004.08.013)
3. Rutledge R, Fakhry SM, Baker CC, et al. A population-based study of the association of medical manpower with county trauma death rates in the United States. *Ann Surg*. 1994;219(5):547-563; discussion 563-567. doi:10.1097/00000658-199405000-00013
4. Styner J. Guest Editorial: The Birth of Advanced Trauma Life Support. *Journal of Trauma Nursing*. 2016;13(2):41-44.
5. Bridgewater FHG. Forty Years on From an Event That Changed the Management of Trauma Around the World: What Actually Happened That Night Forty Years Ago? *Mil Med*. 2016;181(10):1176-1181. doi:[10.7205/MILMED-D-15-00554](https://doi.org/10.7205/MILMED-D-15-00554)
6. Manifold C, Armstrong JH. ATLS Algorithms | Pocket ICU Management. Anesthesia Central. https://anesth.unboundmedicine.com/anesthesia/./view/Pocket-ICU-Management/534159/all/ATLS_Algorithms?refer=true. Accessed February 27, 2020.
7. Søreide K. Three decades (1978–2008) of Advanced Trauma Life Support (ATLS™) practice revised and evidence revisited. *Scand J Trauma Resusc Emerg Med*. 2008;16:19. doi:[10.1186/1757-7241-16-19](https://doi.org/10.1186/1757-7241-16-19)