Medical Advancements of the Vietnam War

Part 1 of 3

A UH-1B "Huey" helicopter prepares to land in a rice paddy to pick up a wounded soldier during Operation COOK, Quang Ngai Province, on September 4, 1967. (National Archives)

Corpsman D.R. Howe treats the wounds of Private First Class D. A. Crum, 5th Marine Regiment, during Operation HUE CITY on February 6, 1968. (National Archives)

In 1967, near Cu Chi, South Vietnam, 27th Infantry Regiment medics fight to keep a wounded soldier alive during Operation MANHATTAN. (National Archives)

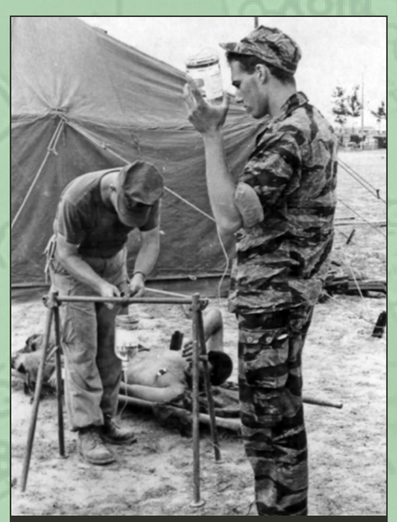
Throughout our nation's history, armed conflicts have compelled the military and medical profession to introduce innovations for the care and treatment of America's servicemembers. The Vietnam War was no exception.

Whether on patrol in hot, humid jungles, steep mountain ridges, or in remote rice paddies and villages, U.S. servicemembers, allies, and civilians received extraordinary health care during the Vietnam War. According to one source, 97.4 percent of casualties who reached the hospital survived. Rapid and effective air evacuation and advancements in pre-hospital care were partly responsible for the higher number of wounded servicemembers who survived their injuries. Many of the medical advancements first pioneered by military healthcare professionals during the Vietnam War have become common practice in healthcare systems around the globe.

Medical Evacuation and Pre-Hospital Care

Perhaps the most enduring innovation of the Vietnam War was medical air evacuation by helicopter. Prior to the Vietnam War, medical air evacuation had been conducted using fixed-wing aircraft; however, fixed-wing aircraft are limited by the need to use runways for takeoffs and landings. During the Korean War, the U.S. military first experimented with medical air evacuations by helicopter. Able to land without a runway, the Bell H-13 Sioux and Hiller H-23 Raven ferried supplies to troops in the field, undertook reconnaissance missions, and retrieved wounded servicemembers from forward locations. Both of these aircraft could transport two patients via external, skid-mounted litters. The Vietnam War saw air evacuation expand substantially with the introduction of larger, faster helicopters that were specially configured to evacuate up to nine wounded at one time and provide emergency medical care en route to hospitals.

Servicemembers in Vietnam who required hospitalization often sustained multiple injuries or contracted serious diseases, such as malaria, viral hepatitis, and diarrheal disorders. The UH-1 Iroquois helicopter, commonly known as the "Huey," transported the wounded to treatment faster than in any previous war. "Dust Off" was a nickname for Army helicopter ambulance missions. The name originated with the call sign of the 57th Medical Detachment, one of the first aeromedical evacuation units to arrive in Vietnam in 1962, and its commander, Major Charles Kelly, who became one of the earliest Vietnam War "flying medics," before being killed in action in 1964. When ground troops radioed for Dust Offs, helicopter ambulances—often "Hueys"—landed, frequently under fire, to remove, treat, and transport the wounded to medical facilities.



A corpsman administers plasma to a wounded Marine at a field hospital in Tam Ky, South Vietnam, during Operation UNION on May 3, 1967. (National Archives)

The crews of Army, Navy, Marine, and Air Force rotary and fixed-wing aeromedical evacuation crews demonstrated uncompromising dedication, which saved many lives during the conflict. From 1962 to 1973, air ambulances transported and assisted thousands of casualties, often at great peril. Today, civilian helicopter medical evacuation, trauma centers, and helipads are common at hospitals across the United States.

The Vietnam War also accelerated advancements in pre-hospital care. Medics and corpsmen utilized new treatments such as opening surgical airways and conducting thoracic needle decompressions and aggressive shock resuscitation on patients prior to transportation to field hospitals. These techniques are now employed by Emergency Medical Technicians and paramedics throughout the United States. "The golden hour," a term used to describe the concept that a patients' prognosis improves substantially if they receive definitive treatment within the first hour after suffering a traumatic wound, became a reality during the Vietnam War. Innovations in field medicine, such as flight crews stabilizing the wounded during air evacuations and surgical teams treating patients for hemorrhagic and traumatic shock, contributed to reducing the time between injury and treatment. "The golden hour" still serves as a benchmark of civilian emergency care.

Personnel of the 21st Casualty Staging Flight at Tan Son Nhut Air Base, South Vietnam, remove wounded personnel from an ambulance and load them onto a C-130 transport aircraft. These patients are being medically evacuated to Clark Air Base, Philippines, in May 1967. (National Archives)

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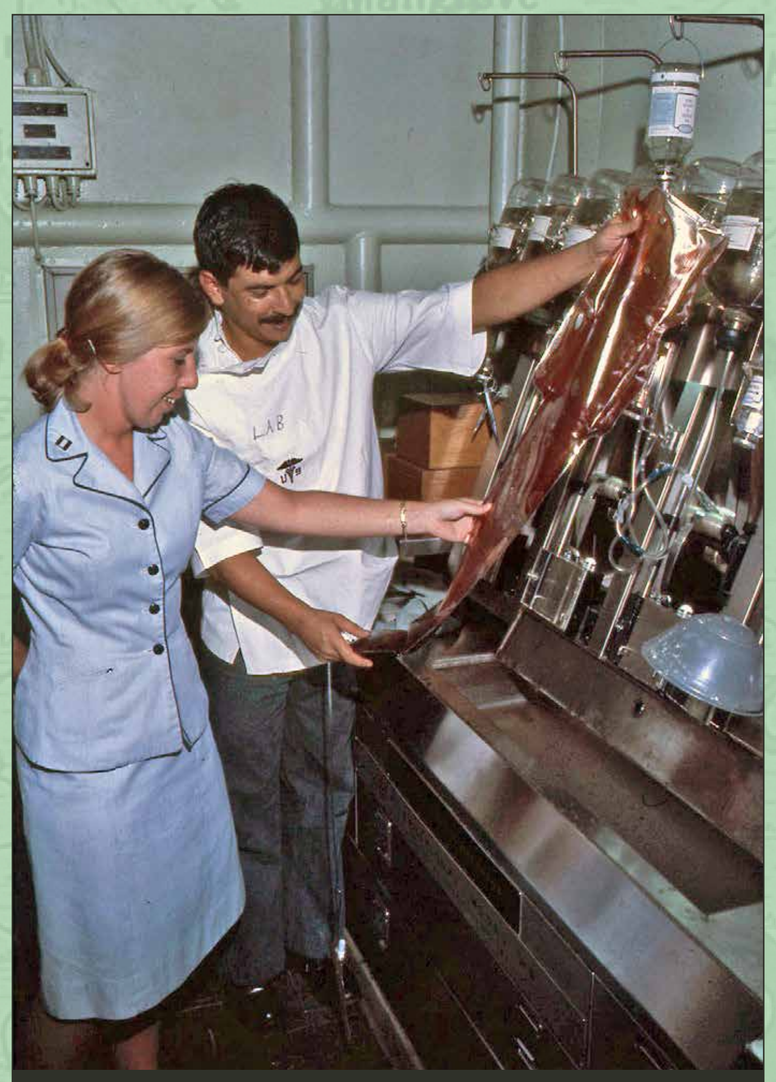
Specialist Fourth Class James S. Woods prepares to give an injection to Private First Class Nelson E. Graham at the 774th Medical Dispensary, Can Tho Army Airfield, South Vietnam, on June 16, 1970. (National Archives)



Aboard the Naval Hospital Ship USS **Repose** *in the South China Sea, November 1967 – November 1968, Lieutenant Carmen Marshall, Medical Service Corps, and Hospital Corpsman Second Class Abe Conrique check the reconstitution process on a unit of frozen blood using the Huggins Cytoglomerator (an apparatus that stores frozen blood). The frozen units were developed for emergency use when the regular blood supply was low or shipments were interrupted. (Courtesy of Carmen Marshall Adams)*

From 1965 to 1969, nearly two-thirds of in-country military hospital admissions resulted from malaria, viral hepatitis, diarrheal ailments, skin infections, and fevers of unknown origin. Preventive interventions kept these numbers from climbing even higher.

Contributions to Global Health through Preventive Treatment

The fight against malaria during the Vietnam War serves as a prime example of the struggle to manage tropical disease in its natural environment. Malaria is spread to humans through the bite of female Anopheles mosquitos infected with Plasmodium parasites. The two Plasmodium species that pose the greatest threat to humans are *P. falciparum* and *P. vivax*. In 1965, *P. falciparum* incapacitated infected servicemembers for an average of five weeks, while *P. vivax* caused soldiers to miss an average of 21 days of duty. In 1966, Major Robert J.T. Joy, MC (Medical Corps), chief of the Army Medical Research Team in Vietnam, conducted studies which documented significantly lower rates of malaria in servicemembers who ingested the medication dapsone by mouth daily and took weekly doses of chloroquine-primaquine when they operated in areas with known malaria risk. Field commanders stressed to their troops the importance of personal protective measures, such as wearing long sleeves, applying skin repellents, and using bednets and headnets. Physicians discerned that adherence to a post-exposure antimalarial medication regimen minimized the risk of contracting and spreading malaria. Then in 1967, a team of scientists at the Walter Reed Army Institute of Research collaborated in the development of the antimalarial drug mefloquine. By 1969, patients who had been infected with *P. falciparum* returned to duty in 17 to 19 days and patients suffering from *P. vivax* returned in 5 to 8 days. Currently, as U.S. servicemembers deploy to parts of the world where malaria remains endemic, chemoprophylaxis (the use of drugs to prevent disease) and mosquito repellents continue to help minimize the risk of contracting malaria. Military physicians perfected these tactics during the Vietnam War.

Meningococcal meningitis, a serious bacterial infection of the meninges (the protective membranes covering the brain and spinal cord) can be contracted while living in close quarters such as in military barracks. In March 1963, Navy Commander Jack Millar, MC, and his team demonstrated that, despite treating naval recruits with sulfa antibiotics, a significant number of recruits became carriers of sulfa-resistant group B meningococci. Another team, led by Army Lieutenant Colonel Joseph Cataldo, MC, noticed a similar pattern at a post in 1964. In response to the dangers of antibiotic-resistant meningococci, a research team led by Dr. Malcolm Artenstein at the Walter Reed Army Institute of Research documented that vaccinations would need to be developed against each serogroup (distinct variations of a bacteria) of meningococci. By 1968, the team produced and tested a vaccine against serogroup C meningococci, which caused the largest number of cases of meningococcal meningitis at the time. Throughout the 1970s, scientists developed vaccines against three of the other serogroups of meningococcal meningitis. Today, all U.S. military recruits receive a vaccine to prevent the four most common serogroups of meningococcal meningitis before they begin basic training. Meningococcal meningitis vaccines help protect U.S. servicemembers and civilian populations around the world. In 2003, one source estimated 60 to 80 million doses of meningococcal vaccine were required annually for worldwide epidemic control.

In 1962, the Department of Defense established the Armed Services Blood Program (ASBP) to provide blood for the U.S. military. During the Vietnam War, the ASBP created a system to ensure that the blood supply was sufficient to meet demand. The quick administration of fresh whole blood at forward aid stations was one of the most important reasons why severely wounded patients survived their wounds. Some of the ASBP innovations during the war included the development of a styrofoam container, which allowed storage of blood for several days in the field. Fresh frozen plasma (the colorless fluid part of blood in which the red and white cells are suspended) was determined to aid with volume replacement and help control bleeding in patients. By 1969, at the peak of the Vietnam War, the ASBP provided some 36,000 units of blood per month to 100 surgical teams. Today the ASBP has a "worldwide mission to provide quality blood products for servicemembers, veterans, and their families in both war and peace."

First Lieutenant Mary Ann Caldwell takes a blood smear for a malaria test from Specialist Fourth Class Tryg C. Rydberg, 11th Infantry Brigade, Americal Division, at the 3rd Field Hospital Saigon, South Vietnam, on July 12, 1971. (National Archives)

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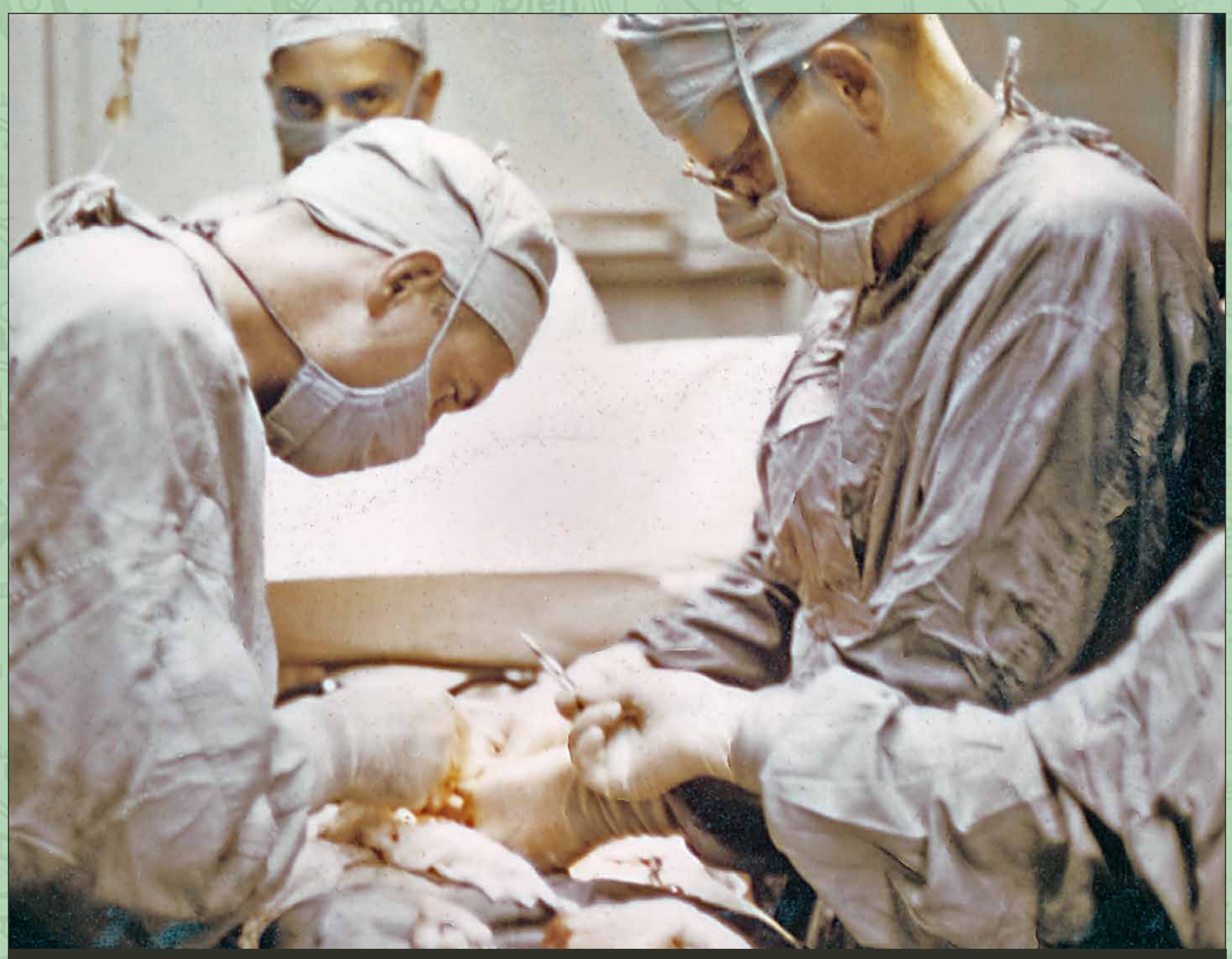
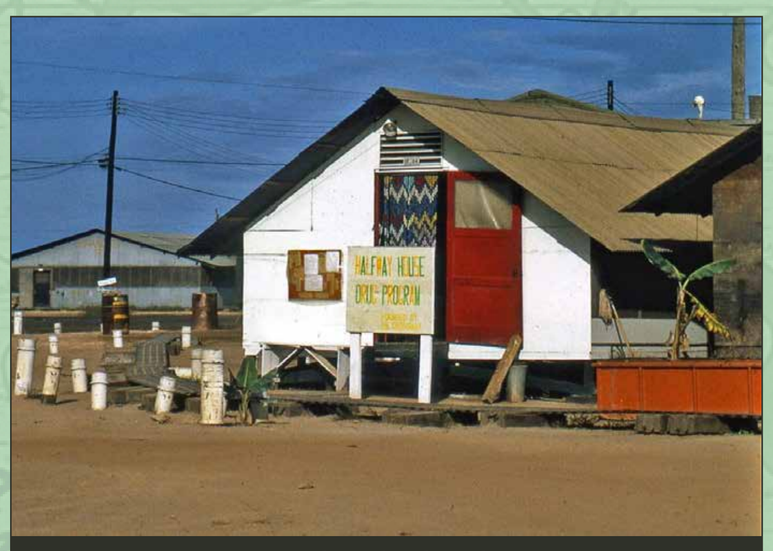


Dr. Norman Rich performs surgery at the 2nd Surgical Hospital in An Khe, South Vietnam, 1965-66. (Rich Collection, Otis Historical Archives, National Museum of Health and Medicine)

First Lieutenant Naomi Holtzer, and anesthetist Captain Ivan Dunlap prepare a patient for surgery at the 24th Evacuation Hospital in Long Binh, South Vietnam, on November 7, 1969. (National Archives)



Halfway House Drug Program located at the 85th Evacuation Hospital in Phu Bai, South Vietnam, 1970 – 1971. (Courtesy of Gus Kappler, MD)

From front-line trauma care and evacuation of the wounded to treatment protocols for diseases such as malaria and meningitis, military medical advancements during the Vietnam War came about through the efforts of ingenuous and caring healthcare professionals.

Specialty Fields

Anesthesiology – Throughout South Vietnam, anesthesiologists and nurse anesthetists were stationed at military treatment facilities (MTFs), where they helped evaluate patients in the triage area and worked in operating rooms to administer anesthesia. Two anesthetic medications commonly used during the war were halothane and methoxyflurane. Ketamine, an ideal anesthetic for hypovolemic trauma patients (those suffering from a decrease in blood plasma volume), was discovered in the 1960s; in 1970, the U.S. Food and Drug Administration approved this sedative for medical use. Major Casey Blitt, chief of anesthesia from 1970 to 1971 at the 85th Evacuation Hospital in Phu Bai, stated that he had colleagues from UCLA mail ketamine to him in South Vietnam because his facility was unable to obtain the medication through military channels. "We had good surgeons and we provided good care, and we had an illegal drug that was good for our patients," he recalled. Today ketamine is listed in the World Health Organization's Essential Drugs List for health care systems to use worldwide.

At the beginning of the Vietnam War, MTFs were equipped with the adequate but antiquated World War II-era Heidbrink anesthesia machine. In 1967, the modern Ohio Model 785 Field Anesthesia Machine, which was capable of administering anesthetic agents, such as halothane, methoxyflurane, and ketamine, replaced the Heidbrink. During the Vietnam War, American researchers also developed a standardized field-anesthesia chest, which contained a three-day supply of anesthetic drugs. The standardization of medication, equipment, and supplies ensured that MTF's possessed adequate stores to meet the diverse needs of the wounded during the Vietnam War.

Behavioral Health – As a result of studies of Vietnam veterans, Holocaust survivors, and other trauma victims, the American Psychiatric Association recognized Post-traumatic Stress Disorder (PTSD) as a psychological ailment in 1980. Psychiatrists understood PTSD to be a mental malady caused by the stresses of combat or similar traumatic incidents. Research conducted on veterans during and after they returned from Vietnam led to the establishment of this diagnosis. As servicemembers return from the battlefields of Iraq and Afghanistan, mental health professionals continue to study this condition and make innovations in the diagnosis and treatment of PTSD.

During the Vietnam War, the military established the first amnesty and drug treatment programs to address the rise of illicit drug use among uniformed personnel. Servicemembers who voluntarily admitted drug use to their commanding officer, chaplain, or unit surgeon often received treatment and sometimes avoided punishment. In 1970, Major Michael Grossman, chief of medicine and pharmacy at the 85th Evacuation Hospital in Phu Bai, South Vietnam, developed a drug treatment program for opioids, such as heroin and opium, and other widely-abused narcotics like hashish. "I trained in San Francisco, so I had some experience in drug rehabilitation. [At the 85th Evacuation Hospital] We helped people get straightened out, and it was an amazingly rewarding thing for me and everybody around me."

Veteran Navy Corpsmen Victor Germino (center) and Kenneth Ferrell (right) practice intubation skills as Physician Assistant students in 1966. Photo appeared in September 6, 1966 issue of Look Magazine*; produced by Roland Berg, photographed by Phillip Harrington. (Courtesy of the Physician Assistant History Society)*

Physician Assistants – Medical practice in the United States became increasingly specialized after World War II. By the 1960s, there was a shortage of family practice doctors, especially in rural regions of the country. To help alleviate the rising shortage of primary care physicians in 1965, Duke University Medical Center in Durham, North Carolina, began a two-year Physician Assistant training program. Simultaneously, corpsmen and medics returning from the Vietnam War possessed a plethora of trauma skills, which made them ideal applicants for this novel medical field. In fact, the original Duke University physician assistant's class was comprised of four veteran Navy corpsmen. Now there are thousands of physician assistants who practice medicine in civilian and military health care settings throughout the United States and in at least 12 foreign countries.

Vascular Surgery – Major Norman Rich, MC, chief of surgery from 1966 to 1967 at the 2nd Surgical Hospital in Lai Khe, South Vietnam, pioneered venous repair for military trauma that helped salvage badly wounded limbs. He established the Vietnam Vascular Registry, a database that contains more than 7,500 records of surgical cases, which is still used by battlefield surgeons. Innovative techniques in vascular reconstruction led to an amputation rate in Vietnam that was 25 percent lower than the amputation rate in World War II. Venous repair techniques established in Vietnam became the standard of practice employed by civilian vascular surgeons.

Conclusion

During each war our nation has endured, military medical research has led to advancements in meeting the needs of America's servicepeople. From front-line trauma care and evacuation of the wounded to treatment protocols for diseases such as malaria and meningitis, military medical advancements during the Vietnam War came about through the efforts of ingenious and caring healthcare professionals. These dedicated professionals heralded innovations in health care for our citizens and the world.

References can be found on The United States of America Vietnam War Commemoration website
http://www.vietnamwar50th.com/education/