

Baron Dominique-Jean Larrey (1766-1842): founder of military surgery and trauma care

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Rezumat

Baron Dominique-Jean Larrey (1766-1842): fondator al chirurgiei militare și al traumatologiei

Dominique-Jean Larrey a fost un distins chirurg șef în armata lui Napoleon și un fidel slujitor al Imperiului. Aptitudinile sale chirurgicale și invențiile, atașamentul absolut și devotamentul pentru profesie, spiritul său umanitar și curajul îl recomandă ca fiind unul dintre cei mai mari chirurghi militari ai istoriei.

Cuvinte cheie: Dominique Larrey, ambulanță, triaj, amputație

Abstract

Dominique-Jean Larrey was a distinguished surgeon in chief of Napoleon's army and a faithful servant of the Empire. His surgical skills and inventions, his absolute attachment and devotion to his profession, his humanitarian spirit and courage entitled him as one of history's greatest military surgeons.

Key words: Dominique Larrey, flying ambulance, triage, amputation

Introduction

Many advances in surgery have been made during armed conflict. During the past centuries the large number and serious degrees of wounds constituted the historic training ground for surgeons and as Hippocrates stated: "war is the only proper school for surgeon". The facilities often lacked on the field, hygiene was almost totally ignored and surgeons had no interest in prevention of post-operative infections. However, a new dimension to the military surgery and trauma care that embodied sanitation, epidemiology, evacuation of the injured and training of medical personnel, was given by the remarkable Baron Larrey, Chief Surgeon of the French Army.

His life and carrier

Dominique-Jean Larrey was born on the 8th July 1766 at Beaudean, near the Pyrenean Mountains in France (*Fig.1*). At the age of 13 he orphaned and he was taking under the supervision of his uncle Alexis Larrey (1750-1827), who was the Chief surgeon at the Hospital of Grove in Toulouse (1). Larrey studied medicine in Toulouse and in 1786 he went to Paris with the intention of completing his surgical training under the so called "Prince of French surgeons", Pierre-Joseph Desault (1744-1796) who taught him the importance of wide excision of nonviable traumatized tissues.

On qualification, he joined the naval medical service and served as a naval surgeon in the coast of Newfoundland. In 1789, he returned to Paris where he was soon involved in the Revolution, being present at the storming capture of the Bastille. From this time forward, he made his carrier as a

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Figure 1. Baron Dominique-Jean Larrey

surgeon in France's revolutionary and Napoleonic armies which accompanied all over Europe, in Syria, Egypt, Russia, in a total of 25 campaigns and 60 battles. He became Chief Surgeon to the Imperial Guard, Surgeon in Chief to the Imperial Army and Professor of Surgery at the army medical school at Val-de-Grâce hospital in Paris (2).

In February 1794, Larrey married Elisabeth Laville daughter of the minister of Finance. He was a devoted husband and father and wrote letters to his wife and their two children, Isaure and Félix Ippolyte, constantly while he was away (3). In 1804 he was given the Legion of Honour medal, France's highest decoration award and was ennobled receiving the title of Baron of the Empire (1).

During his wartime duties, he published numerous treatises on surgery. In 1803 he published his *Surgical and Historical account of the campaign of the East in Egypt and Syria* (4). In 1812, Larrey published three volumes of his massive *Memoirs of Military Surgery and Campaigns* adding a fourth volume in 1817. *Memoirs* constitute the history of his life and in them are described the countries and cities through which he passed, the wounds examined, the operations performed and the battles in which he was engaged (5).

Besides these, his work entitled *Surgical Clinic* is considered to be the most comprehensive of his surgical treatises concerning the surgical pathology and the only one of his work that was extensively illustrated (6).

After the Napoleonic Wars, Larrey became consultant surgeon to the new King Louis-Philippe and was appointed Surgeon Inspector to the army veterans until his retirement at

the age of 72. When Napoleon died in 1821 in his testament rewarded his courageous surgeon: "To the French Army's Surgeon General, Baron Larrey, I leave a sum of 100,000 francs. He is the worthiest man I ever met".

Physically vigorous even at 76, he went with his son Félix - Ippolyte, also a doctor, in Alger in order to inspect the military hospitals. On his return to Paris he got pneumonia and died in Lyon on the 25th July 1842 (7).

In a time where surgeons were despised for their perceived butchery, Larrey employed practical research without realizing that the outcomes of his innovative ideas would have a positive impact on today's surgery.

His name remained linked with the creation of flying ambulance, the first description of triage, the amputation at the shoulder joint (Larrey's amputation), the first successful pericardiocentesis for trauma, the ligation of the femoral artery immediately below Poupart's ligament, a muscular defect producing in the diaphragm between the Pars sternalis and the Pars costalis (Larrey's cleft), and a sign of sacroileitis (Larrey's sign) (8).

A gifted surgeon and a great man

There is no doubt of the greatness of Larrey's character. Three are the events of his life that merit to be quoted, as an example of his devotion, admiration and respect by his friends and enemies. During the battle of Alexandria in 1801 he operated on General Sully in the field. Actually he performed a leg amputation in three minutes, transported him on to his back and ran with him to escape the enemy (9).

After Waterloo, he was imprisoned by the Prussians and immediately given a death sentence. In the nick of time, he was recognized by a Prussian doctor who had once attended his lectures at Val-de-Grâce and released through the intervention of Marshal Gebband Bluncher (1742-1819) whose son's life saved Larrey during the Austrian campaign (10).

The third event seems to be an apocryphal tale from Waterloo. Marshal Wellington (1769-1852), spotted Larrey through his telescope during the battle and he was impressed by his energy and courage. He ordered his gun's not to fire in the surgeon's direction. Then bared his head and said: "I salute honour and loyalty which are passing by" (10).

His contribution in surgery and battlefield medicine

To Larrey the medical world owes the introduction of the field ambulance. Until his day army hospitals were situated at least three miles behind the front line. Wounded soldiers were often abandoned, either carried by comrades, or slow moving vehicles called Fourgons that could take up to three days to reach the field. Such delays meant that the injured often succumbed to their wounds. In 1792 as a result of the carnage in the Austrian/Prussian war, Larrey insisted on getting his special surgical teams near the front line to ensure early surgery and rapid evacuation of wounded men by means of his specially designed light horse-drawn vehicles which he named flying ambulances (*ambulances volantes*) (Fig. 2). Each unit

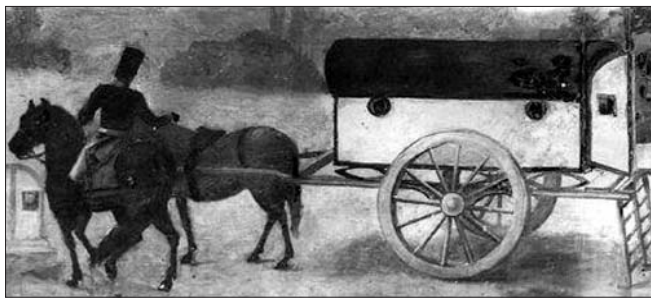


Figure 2. Larrey's flying ambulance

consisted of three Ambulance divisions, utilizing fifteen surgeons and one hundred soldiers who were equipped with twelve flying ambulances and four Fourgons which acted as mobile depots. They collected the dead as well as the wounded so that no one should be neglected. It has been said that even in the harsh desert terrain, his flying ambulances would collect the wounded in less than 15 minutes. With several other surgeons and a band of infirmiers, Larrey could operate on the wounded either where they fell, or have them carried to a sheltered spot nearby (11,12). Larrey in his Memoirs wrote: "The function of the organization is to rescue the wounded on the field of battle and, having given first aid, to transport them to the first line of hospitals" (5). Field ambulances have remained a basic division of all army medical services from that day to this.

Moreover, thanks to Larrey, the egalitarian model of triage has been developed. He based his system of sorting and transported the wounded on the principle that "those who are dangerously wounded must be tended first entirely without regard to rank and distinction". Those with minor injuries were made to wait, while the more seriously injured were put aside, often with alcohol to comfort them until they passed away. This process of systematic evaluation became known as "Triage", a French word meaning "to separate, choose" and remains in use till nowadays (13).

Besides being a creative administrator, Larrey was also a gifted surgeon and revolutionized the battlefield treatment of wounds.

Most wounds during the Napoleonic era were either from musket balls or canons. Canon wounds were associated with a high rate of amputation. The standard approach had been to delay treatment for several days and then to cut the limb circumferentially and to stretch the skin over the raw stump. This led inevitably to infected wounds, breakdown of the closure and death from gangrene. Larrey adopted Henri François Le Dran's (1685-1770) technique of cutting the muscle and bone well above the wound and leaving a cuff of skin for a tension-free closure (11). He preferred to operate as early as possible frequently in the field arguing that the wounds could be kept cleaner if closed early. Larrey believed also that the shock from the initial injury diminished the pain of surgery. He invented the curved surgical needles which passed more efficiently through tissue than the straight ones in common use (8).

As a surgeon he was working unceasingly during and after a battle, to a point of exhaustion. At the battle of Borodino, in the Russian campaign of 1812, Larrey operated without a break by the light of tapers, performing 200 amputations in 24 hours (14). He invented his own technique of rapid disarticulation of the arm at shoulder joint performed by splitting the deltoid and capsule, disarticulating the os humeri outwards by carrying the arm transversally across the body, either forwards or backwards, sliding the knife down under the bone, dividing the tissues containing the axillary vessels, tying the arteries and bringing the edges of the wound together with straps and sutures (Fig. 3) (5). A technique that presented an increased survival rate as in the campaign of Egypt Larrey disarticulated the arm at the shoulder joint sixteen times and only two of these cases proved fatal. (9).

In the treatment of gunshot wound of the abdomen he also advocated the wound to be left wide open and the foreign body removed. When the omentum protruded from the abdominal wound Larrey insisted on its being left until the portion outside the abdomen separated by necrotic tissue unless it could be reduced at the time of injury and before the swelling had supervened in the protruding part. He protected the omentum from the air and prevented it from adhering to the edge of the wound by using a dry dusting powder. When the slough separated the stump retracted within the abdomen and the wound gradually healed. Up until this time he records that it was the usual practice to tie off the omentum and cut away the protruding portion, with resulting secondary hemorrhage followed by inflammation and gangrene or death (15).

For the first time, bullets were extracted from wounds by making a counteropening instead of probing the torn entry path of the bullet and prophylactic incisions were made near bayonet wounds to let the pus flow out. So successful was the system of care he introduced that for example of 1200 guardsmen wounded in the battle of Aspern-Essling in 1809, only 45 died after receiving treatment (16).

For the care of wounds, Larrey substituted wet dressings for the dry lint used mainly at that time. He dipped his lint in hot wine to which he added camphor and he used to irrigate the

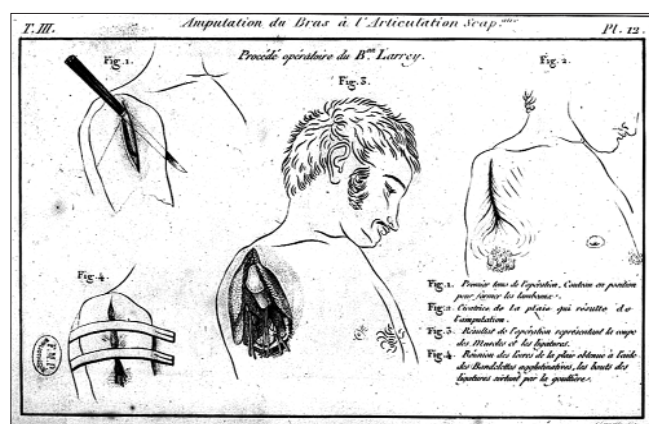


Figure 3. Larrey's surgical procedure for rapid disarticulation of the arm at shoulder joint

wound on antiseptic solution, anticipating the Carrel-Dakin technique of World War I. Also he noticed the beneficial role of maggots on trauma (6).

In 1810, Larrey was the first to perform a pericardiotomy on a soldier with a tamponade following a knife wound of the chest. Operating 45 days after the injury, Larrey evacuated a serous fluid mixed with old blood clots. The patient's condition improved but he died three weeks later from an inevitable post-operative infection (17).

Moreover he reported the successful treatment of a transected ileum by exteriorization, the healing of sigmoid colon injuries without fecal fistula formation, and the successful treatment of lacerations of the bladder (7).

Conclusion

In 1983 Norman M. Rich, Deputy chairman of surgery created the Baron Dominique Larrey Award for Excellence in Military Surgery, a tribute to Larrey's significant contribution in military surgery and humanitarian spirit in warfare. From the American Civil War to World War II and the Afghanistan war, the organization system introduced by Larrey saved thousands of lives. His monumental work translated into many languages constituted the foundation of the present concepts of military surgery and trauma care.

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