

John Hunter – A very modern military surgeon

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“He who wishes to be a surgeon, must first go to war”

Hippocrates

Introduction

The history of warfare and surgery is long and complex. As Hippocrates' dictum states, war has been the crucible in which many medical advances have been pioneered, and has also been a bloody business. In the time of John Hunter, 40% of those injured on the battlefield could expect to die of their wounds. By the 20th century, with improved technique, anaesthesia and aseptic technique, this had been reduced to 25%, where it remained at the end of the first Gulf War (1990-1991). However, renewed interest fuelled by the conflicts in Iraq and Afghanistan, has brought about a quantum leap in the treatment of battlefield wounds, with mortality now standing at 10% [1]. This revolution has been brought about, in part, due to an improved scientific understanding of the pathophysiology of trauma [2]. Such an approach to military trauma would have found favour with John Hunter (1728-1793), who in addition to his career as a surgeon, anatomist and scientist, had a distinguished military career, rising to Surgeon General. This essay will review John Hunter's contribution to military surgery, and compare it with modern developments.

Hunter's Military Career

Following training at St. George's Hospital and employment as an anatomist, John Hunter enrolled as an army surgeon in 1760, during the Seven Years' War (1756-1763). It is suggested that Hunter's motivation for a military career was poor health, or the need for a career in the open air, after some years in his brother's anatomy school [3]. It is also likely that he was motivated by the financial security an army position could offer, as well as the opportunity to gain a medical qualification, and to practice surgery – echoing Hippocrates' dictum [4]. It is worth noting that in the pre-Listerian era of anaesthesia or aseptic surgery the opportunity to practise surgery as a civilian was limited, making a military career imperative for the aspiring surgeon [4].

Upon commissioning into the Army, Hunter accompanied the Army during the siege of Belle-Ile near Brest and during the campaign in Portugal, where he completed his famous treatise [5]. Upon returning to England, he resumed his surgical career, and was appointed Surgeon-General and Inspector of Regimental Hospitals in 1790. During his tenure war broke out with France, and Hunter oversaw the medical support for 10 overseas expeditions, as well as managing the entire medical administration of the Army, owing the ill health of his colleague, the Physician General [6]. Hunter held the office until the year of his death, 1793. Famously, he died after suffering a fit brought about during a heated argument over the admission of students to St. George's Hospital [7].

Hunter on Gunshot Wounds

The medical treatment of gunshot wounds at the time Hunter arrived in Portugal was antiquated, at best. The standard treatment at the time was wholesale blood-letting, brutal exploration of the wound in an attempt to excise the bullet, and liberal recourse to amputation [8]. Hunter's more conservative approach was based on the observation of a group of four French soldiers, who following injury on the first day of fighting had hidden themselves in a Farmhouse, and had

received no medical attention. However, despite minimal treatment, Hunter noted that they had satisfactory outcomes. Hunter's practice was to allow the wound to suppurate and heal by primary intention. It is now known that to operate without aseptic technique was to introduce further contamination into the wound, to open tissue planes to further infection and was of limited value in the pre-anaesthetic era [8]. Hunter described a set of indications for surgery, which included superficial wounds where the bullet was easily removed, arterial damage or skull fractures, or the restoration of normal anatomy in abdominal wounds, rib or sternal fractures [8].

Modern treatment of gunshot wounds derives from surgical experience in the Great War, where great emphasis was placed on the prevention of infection [9]. 20th century gunshot wounds therefore required a radically different approach, with surgical doctrine being centred on early surgical exploration of the wound and delayed primary closure.

At first glance, Hunter's non-surgical approach may appear to be at odds with modern teaching. Over the course of the 20th century, due to the development of efficient rifling, the velocity of projectiles increased dramatically. As Hunter was aware [8], the wounding effects of missiles are directly proportional to the energy of the projectile, which is related to the square of the velocity. The effect of efficient rifling has been to develop highly accurate, high velocity rifles which cause significant internal damage due to cavitation, despite a deceptively benign looking entrance or exit wound [10]. The Argentinian approach during the Falklands conflict of 1982 was to carry out primary wound closure without débridement, resulting in the perfect environment for anaerobic sepsis [11], highlighting the importance of Hunter's approach of ridding the wound of its slough [8].

Furthermore, on the modern battlefield, fragments from bombs, shells, grenades and mortars are the principle causes of wounding [11], and such fragments may cause low velocity soft-tissue wounds. There is increasing evidence that a non-operative "Hunterian" approach to such wounds may be indicated [12,13].

Hunter's innovations in military care

The development of battlefield ambulances is attributed to Dominique Jean Larrey, who introduced his *ambulances volantes* to the Napoleonic battlefield, a concept which lies at the heart of modern battlefield treatment of trauma, with truly flying ambulances in the form of helicopters [14]. However, Hunter had made similar proposals during the Portugal Campaign for "flying hospitals" [15], which allowed for the treatment of patients in forward positions [16], as well as arranging for the employment of nurses in military hospitals.

Hunter's approach to military care also echoes modern treatment. Larrey, Hunter's French contemporary, advocated early amputation. Hunter, however, felt that the patient should first be afforded a "stabilisation period". If the patient survived this critical period, Hunter felt that he was in a better position to withstand the amputation procedure [17]. It is now recognised that trauma patients develop a triad of hypothermia, acidosis and coagulopathy – the so called "deadly triad" or "coagulopathy of trauma" [18]. Whereas, traditional resuscitation methods would concentrate on the correction of acidosis and hypothermia, and surgery on the control of haemorrhage and contamination, the modern doctrine of "Damage Control Surgery" is a concept where initial surgery is directed at the restoration of normal physiology. Following this initial and limited surgical intervention, there is a period of stabilisation in an intensive care facility, before returning to theatre for definitive treatment. The concept is likened to the naval doctrine of damage control: any initial efforts must be to keep the ship afloat, not to restore the ship to its original state. Importantly, damage control surgery "recognises that outcomes after major trauma are determined by the physiological limits of the patient, rather than by efforts of anatomical restoration by the surgeon [19]". Such an approach, which is centred on the importance of physiology, particularly of the role

of coagulopathy and infection in trauma would be supported by Hunter.

Conclusion

John Hunter enjoyed a remarkable military career, rising to the post of Surgeon-General of the Armed Forces during a time of war and revolution on the continent. His approach to military medicine is summed up in his famous treatise [5], which emphasises the importance of sepsis and inflammation in the pathophysiology of trauma. Modern military surgical doctrine, whether it be delayed primary closure, or the concept of damage control surgery finds many echoes in John Hunter's approach, making him a very modern military surgeon.

1260 Words

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