BATTLEFIELD INJURY – THE SCOPE FOR SURGERY *
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SUMMARY: The Role of the military surgeon and the scope for military surgery has increased over the last 400 years. New types of warfare, new methods of war and effects of new weapons have repeatedly challenged the resources of Army medical services and the inner resources of individual surgeons.

This challenge has been met successfully in the past by military surgeons whose experience of war, knowledge of military science and practised surgical skills overcame the problem of their wounded comrades.

The role of the doctor is defined in the Regulations for the Army Medical Services with an accent on preservation of health and care of the sick but there is a third charge—the care of the wounded.

The surgeon's role in preservation of health is an important one—the radical cure of herniae in young soldiers is one of the commonest military surgical tasks. In peacetime the surgical care of the sick extends to the soldier's family at home and abroad but the primary responsibility of the military surgeon is to be prepared to care for the soldier wounded in battle.

It may be pointed out that it is not soldiers alone who suffer the wounds of war, and recent events in Cambodia, Vietnam and Northern Ireland bear this out. Again, reference to any campaign medical records will show that the treatment of wounds and injuries forms only a small proportion of the total work load of Army Medical Services in war but this need not deter us from giving to military surgeons a pre-eminent role in the medical services of any armed forces.

It is the surgeon that the sailor, soldier or airman looks for comfort, and support in time of war, when he is at his most vulnerable. Any commander leading any army which has failed to provide for the wounded soldier is in the end, doomed to defeat.

It is not without good reason that R.A.M.C. historians dwell on the lessons of the Crimean War and the trials of the unfortunate Dr. Andrew Smith (Michie 1877).

Military surgery up to 1815

Although the history of military surgery extends over 3000 years I propose to start my examination with Ambrose Paré who joined the French army at Turin in 1536 and left after the battle of Moncontour in 1569.

He began writing on the treatment of wounds in 1551 and his collected works were first published in 1582. His books were translated into English and were used as standard texts for over a 100 years (Johnston 1670).

Although De Vigo had written about “gunshot wounds” in 1514 it was during Paré's service that the hand gun was first used effectively. He shares with few others the

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ability to convey the realities of military surgery on the battlefield. These tend to be submerged in the writings of more detached or more scientific observers (Hunter 1794).

Paré described a horseman wearing a helmet being struck on the head by a bullet. The bullet dented the helmet. The horseman "died apoplectick upon the sixth day after" Paré being "desirous to know what might be the true cause of death, dividing his skull, observed that the second table was broken, and cast off scales and splinters".

He gave an excellent description of the effects of a diaphragmatic hernia following a perforating bullet wound of the epigastrium but most of his detailed descriptions are of wounds of the extremities.

A "common soldier" received a musket ball in the wrist. Paré amputated the gangrenous limb at the elbow and staunched the flow of blood with a hot iron. The soldier was housed in a barn, in the middle of winter, when snow was falling. He developed tetanus but eventually recovered. Paré's later introduction of the use of bland dressings on amputation stumps as an alternative to the terrible cautery, was a significant advance in military surgery.

The works of Richard Wiseman, Sergeant Chirurgeon to King Charles the Second, John Ranby, who was a surgeon at the battle of Dettingen, Sir Charles Bell, whose paintings of wounds at Waterloo hang in the Royal College of Surgeons at Edinburgh, and George Guthrie, the most famous of British Peninsular Surgeons can also be recommended as readable accounts of surgical triumphs and tribulations in the field. They can all be found in the Royal Army Medical College library.

Paré was the first of the scientific surgeons who not only observed and recorded their observations of the wounded, but also speculated on the nature of battlefield injury to the benefit of their patients.

Although John Hunter was arguably the greatest surgical scientist he, like Joseph Lister a century later, was an inexperienced military surgeon and some of his conclusions on the management of battle wounds were questioned by his juniors such as John Hennen.

The Peninsular War

John Hennen (Hennen 1818) was a dedicated professional military surgeon who remained in the army after Waterloo, unlike his more illustrious contemporaries such as Guthrie and Bell who returned to civilian practice. He gave an excellent historical account of writings on "gunshot wounds" up to that time, and an excellent description of military field surgical practice.

He described limb wounds of the same severity as other writers such as Bell and Guthrie and argues the case for amputation as soon as practicable in those cases where the limb is severely injured and especially if a joint is involved. He says that all experienced military surgeons of the time agreed on amputation—only Hunter had expressed doubts and those, according to Hennen, theoretical. He described wounds containing coins, bone fragments and a tooth from other victims standing close to the wounded man in battle. He described penetrating wounds of the head with musket balls lodging in the brain and late death from infection of brain fungus. In discussing wounds of the thorax he recorded the "lodgement" of wadding, clothes, spicules of bones, balls and dressings in the lungs, in the pleural cavities or in abscesses. In one soldier there was a wound
between the 3rd and 4th ribs of the right side capable of admitting 3 fingers conically placed. Blood and air were freely discharged from it. From a tumour on his scapula was extracted his breastplate, which had been rolled up and carried in by the musket bullet. The man died 3 weeks later.

The suffering associated with penetrating wounds of the lungs is of "the terrible symptoms of dyspnoea, sense of stricture and suffocation, insupportable anxiety and faintness".

Up to the time of Waterloo no attempt was made to make a scientific study of the battlefield dead and wounded. Those who survived long enough to be taken from the field at the end of the day to houses or barns or regimental hospitals were obviously the less seriously wounded and many that did so survive were witness to the terrible injuries that could be inflicted on men without killing them.

From the surgeons reports it would seem that musket balls frequently caused large wounds and that they usually lodged in the body. They were capable of shattering limbs to such an extent that amputation was required to prevent infection developing in the damaged tissue. They frequently carried clothing and protective armour into the wounds. Wounds from cannon balls were usually fatal.

The inefficient and inaccurate hand weapons of the day were largely responsible for the development of close quarter fighting. In this type of warfare only extreme or near-fatal was sufficient to incapacitate an enemy.

Not only on the battlefield was mortality high. The virtual inability of the medical services of the time to remove the wounded from the battlefield to a place of refuge and to treat penetrating wounds of the head, chest and abdomen meant that the majority of such wounded inevitably faced death, often attended by extreme and prolonged suffering.

It is notable that up to that time surgeons very carefully recorded their successes, often in men of rank who alone could pay for their personal services. The wounded common soldier was frequently left to the "fender" mercies of his comrades who cut his throat to ease his pain. Up to the time of Waterloo military surgery was limited to the suturing of sword cuts, the dressing of wounds and the amputation of injured limbs.

The Crimean War 1855-56

Surprisingly there were surgical successes in the Crimea that were overshadowed by the ill-treatment afforded the sick and the complete inadequacy of the hospital services. Chloroform was used for the first time. The Official History records the medical and surgical successes and it also relates the wounds to the wounding agent. (Official History 1858).

About 40 per cent of wounds in those admitted for hospital treatment were caused by balls or bullets, especially during assaults, for example, the assault on the Redan on 8 September 1855.

The most severe injuries occurred from the effects of shells and common shot and if the injured soldier survived the "shock" caused by these, he might succumb under anaesthesia if amputation was attempted too soon. He suffered from the effects of
inflammation due to infection, from sloughing of wounded tissue, from maggot infestation or from delayed healing of wounds due to general debility associated with dietary deficiencies and intercurrent disease.

In the period 1 April 1855 till the end of the war in June 1856, 86 out of a total 851 head wounds were penetrating or perforating, all died. Fracture of the skull bones with depression carried a mortality of 53 in 74 cases, and contusion and fracture without depression 23 deaths in 61 cases.

The mortality from penetrating wounds of the chest was almost as high, 31 out of 33, where the missile was lodged in the chest, 71 out of 83 where it had passed through.

"John Carroll, 97th Regiment, age 20 was wounded on 8 September (1855), and admitted at the Castle, 14 September, having received a musket ball in the right shoulder, slightly to its posterior aspect, which appeared to have passed downwards and entered the chest, and to be lodged. Urgent symptoms of pleurisy were present, and much dyspepsia, with a very feeble but rapid state of the pulse, and generally sanguine look". An attempt to remove the bullet was followed by severe dyspepsia and he died 3 hours later "having remained the whole time in the greatest distress."

Of 167 cases of penetration or perforation of the abdominal cavity 5 survived. In those who survived possible visceral injuries the evidence "was not unequivocal" since no attempt could then be made to explore the peritoneal cavity.

British soldiers suffered in the Crimea from many things and the cool prose of Florence Nightingale gives some of the reasons. (Nightingale 1858). The sufferings of the wounded were overshadowed by the sufferings of the sick, and the nature and site of the campaign did not attract the surgical attention accorded the Napoleonic Wars. The officers of the Army Medical Department of the day were held publicly to account for many of the deficiencies in the treatment of sick and injured. Protocol prevented their self-justification (Michie 1877) and in the circumstance surgical writing was overshadowed by health reports.

**The American War of the Rebellion 1861-65**

Military historians consider that the first "modern" war was the American Civil War which began in 1861 and ended in 1865. (Fuller 1954, Montgomery 1968).

The most complete record of the wounds of war up to that time was compiled as the result of staff action at the outset (Otis 1870). In it is described the remarkable case of Private Edson D. Bemis, 12th Massachusetts Volunteers, who having survived penetrating ball wounds of left humerus and right groin in previous engagements, was hit by a musket ball on 5 February 1865 at Hatcher's Run. This ball removed a piece of his left squamous temporal bone with brain substance and membranes causing hemiplegia and insensibility. A badly battered conoidal ball was removed from the substance of the left hemisphere on 8 February by Surgeon Vanderveer. Bemis recovered consciousness and his hemiplegia had disappeared 10 days later. He was eventually invalided from the army on a pension of 8 dollars a month.

Penetrating gunshot fractures of the skull were usually immediately fatal, "the sufferers being instantly killed, or lingering for a few hours at the field depots".

Where there was undoubted perforation of the cranial cavity survival was very rare, but 10 such cases were reported in a total of 12,000 head injuries, the result in each case
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being total and permanent disablement, with impairment of vision, partial paralysis, defective memory and impairment of mental faculties.

Concerning gunshot wounds of the chest (including bullet wounds) it is stated that of the 8,715 penetrating chest wounds, out of a total of 22,264 chest wounds of all types admitted to medical units, recoveries were exceptional in some divisions and the mortality viewed in the aggregate, about 62.5 per cent,

Private Joseph Barnham, 125th New York Volunteers, received a penetrating wound of the chest from a conoidal musket-ball on 9 July 1863 at Gettysburg. "The ball entered the cavity of the thorax on the right side between the third and fourth ribs, about three inches from the median line. When admitted, he was in a state of delirium. He suffered with dyspnoea and severe pain in the chest, unattended by cough of haemoptysis. Being unable to partake of nourishment he sank rapidly, and died on 12 July 1863. At the necropsy the cavity of the thorax, right side, contained about four quarts of seropurulent fluid. The right lung was closely compressed against the vertebral column and completely solidified. The middle lobe was perforated by the ball, which was found lying loose in the lower part of the thorax within the pleura". It was a conoidal musket ball which had been flattened by impact on bone.

This was the fate of most of those who sustained penetrating injuries of the chest despite an attempt by Surgeon Howard to resurrect the treatment of closure of the wound, as advocated by John de Vigo, Paré, Larrey and others.

Only 421 out of 3671 cases of gunshot injury of the abdomen with injury to the viscera survived. These figures are comparable to those of the French at Sedan in the Franco-Prussian War of 1870 and the British in the Crimea.

On the day the Prussian Army advanced into Alsace, 4 August 1870, a British Society for the Aid of Sick and Wounded in time of war was formed, which had sent out 62 surgeons and 16 nurses by the end of September to aid the wounded of the French and German Armies (Swain 1970).

The German armies lost 460 officers and 8,500 men killed and wounded and the French 3,000 killed and 14,000 wounded during the battle of Sedan on 1 September 1870 (Fuller 1954).

But even these horrifying figures had been exceeded at the battle of Solferino on 24 June 1859 when three field marshals, nine generals, 1566 officers and "about" 40,000 soldiers were killed or wounded on this day.

It is not surprising that Sir William MacCormac, President of the Royal College of Surgeons of England who had tended the wounded after the battle of Sedan, should have thought that the war in South Africa was "a humane war".

The South African War 1899-1900

Those civilian surgeons headed by the President of the Royal College who proceeded to South Africa at the invitation of the Director-General of the Army Medical Department to advise on the surgery of the wounded were well qualified to comment on the effects of the various weapons employed on each side. (MacCormac 1871, MacCormac 1895). This was very much a long range rifle war. The surgeons not only described the conditions under which they treated their patients and the details of the wounds they saw
and their response to treatment but made observations on range, type of bullet and causes of mortality (MacCormac 1900, Treves 1900, Dent 1900, Lancet 1900a, James 1971).

MacCormac described many cases of perforating wounds of trunk and limbs caused by Mauser bullets at ranges of 500 up to 3000 yards with survival, absence of infection despite a lack of operative surgical treatment and minimal disability. Even the Lee-Metford bullet used by the British could pass right through the abdomen with minimal damage and with the possibility of successful laparotomy and suture of the caecum (MacCormac 1900b).

Many perforating wounds of the chest caused minimal disability.

Dent (Dent 1900) was somewhat cynical on his contributions to the medical press on the subject of the “humanity” of the South African War. He conceded that wounds did well, that operations did well and that many of the recoveries that had taken place were undoubtedly remarkable. He dreaded lest the good surgical results be not ascribed to their proper cause, and that a relaxation of effort to improve further, especially by the Army Medical Department, might bring “...a terrible awakening in store for us when we next have to face the hideous horrors of war amidst unfavourable surroundings”.

Surroundings were not invariably favourable in South Africa especially in the field (Treves 1900). Treves was Consulting Surgeon with the Field Force Natal. His interest in abdominal surgery had long preceded his operation on King Edward VII for appendicitis, and like everyone else who went out to this war, he thought that it was time to introduce abdominal surgery in the field. The mortality from abdominal wounds in the American Civil War had been over 90 per cent but Treves’ impression was that 60 per cent of men shot through the belly in South Africa had recovered. The difficulties of laparotomy in the field and the poor success that attended his efforts caused him to limit abdominal surgery to those few, very few, patients who were seen within seven hours, had had an easy transport with an upper abdominal wound on an empty stomach, caused by a perforating bullet, especially when associated with extensive haemorrhage.

Despite the use of the new field ambulances, despite the surgical successes, despite the general agreement of the benign nature of wounds that resulted in this rifle war, of the 13,194 British Officers, N.C.Os and men who received wounds on the battlefields, 2,171 did not survive long enough to receive medical attention and 513 died during treatment (20 per cent). In addition 1,572 died of disease (Lancet 1900b).

The First World War

The tradition of American military surgical writing that started with the American War of the Rebellion, continued through World War I, World War II and Korea (Otis 1870, Beebe and De Bakey 1952 Coates and Beyer 1962).

In World War I, if the figures for “killed” and “missing presumed killed” are added together and compared with the number of wounded, some impression of the lethality of the situation is given in Table I.

To put it another way 40 per cent of French, 36 per cent of German, 28 per cent of British and 19 per cent of American casualties died on the battlefield.
Table I
Comparison of killed and missing presumed killed with wounded

<table>
<thead>
<tr>
<th>Nationality</th>
<th>Killed or missing</th>
<th>Wounded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germans (Western Front)</td>
<td>1,757,597</td>
<td>3,088,743</td>
</tr>
<tr>
<td>French</td>
<td>1,357,800</td>
<td>2,052,984</td>
</tr>
<tr>
<td>British</td>
<td>784,993</td>
<td>2,036,750</td>
</tr>
<tr>
<td>Americans</td>
<td>36,780</td>
<td>153,537</td>
</tr>
</tbody>
</table>

Adapted from “The Medical Department of the United States Army in the World War” (1927).

Since the majority of British surgeons had been trained in the new techniques of abdominal surgery it was natural to question the “utility of former experience” (Wallace 1918). World War I proved that dirty wounds must be cleaned and abdominal wounds must be explored (Wallace 1918, Wallace and Fraser 1918).

In a series of 834 abdominal injuries Cuthbert Wallace assessed that 40 per cent were due to bullets, of which 60 per cent passed completely through the trunk. These were all patients who had survived the journey to Casualty Clearing Stations. After treatment there, 50 per cent of those injured by bomb or grenade fragments, 46 per cent of those injured by bullets, 40 per cent of those injured by shell fragments and only 27 per cent of those injured by shrapnel survived to reach the base (Wallace 1918).

This of course was an improvement on the figures for the American War of 1861 but disappointing when compared with the South African experience.

Most surgeons accepted without apparent surprise that battlefield missiles were very destructive of human flesh. That they were less concerned with the effects of bullets than with the effects of shells or grenades in the patients they treated might have been due to the high mortality of bullet wounds on the battlefield or it might have been due to the overall greater frequency of wounds from explosive shells and grenades.

The surgical success of conservation of limbs in South Africa was repeated under the very much worse conditions of World War I in the trenches. Added to the conservation of limbs was the conservation of the lives of those wounded in the abdomen and the beginnings of modern missile surgery of the chest and head.

The Second World War

These successes were consolidated in World War II but even so abdominal wounds had an estimated overall mortality of 50 per cent. Of 5,105 men who reached hospital with abdominal wounds the mortality was 29 per cent (Porritt 1946).

During some 3 years in the Middle East and Central Mediterranean theatres a survey of 1639 penetrating chest wounds treated by a thoracic unit showed that cardiac, mediastinal and left thoraco abdominal wounds were usually fatal on the battlefield, where one in four of those who perished had chest injuries. Chest injuries accounted for one in twelve of those admitted to hospital and the subsequent mortality was only 4.27 per cent (Nicholson 1946).
Femoral shaft fracture carried a 5 per cent mortality in hospital patients in the battles for Moscow and Rjev mainly due to delays of up to two weeks before they had surgical treatment (Yudin 1944). The successes of individual surgical teams (Gordon Taylor 1944, Ogilvie 1944, Blackburn and Rob 1946, Blackburn and d'Abreu 1946) were due not only to surgical skill but to improved casualty management, blood transfusion and latterly antibiotics (Nicholson 1946). Antibiotics were no substitute for surgery (Furlong and Clark 1944) but helped to control infection and penicillin gave some hope for the cure of gas gangrene (Jeffrey and Scott Thomson 1944).

The influence of the wounding agent on the outcome was discussed by Gordon-Taylor in relation to the size of fragments causing abdominal wounds. The smaller the fragment, the better the prognosis. He also recounted the case of two sailors wounded in the abdomen by the same bullet, which, having caused small entrance and exit wounds in the first who survived, caused large entrance and exit wounds in the second, lacerating his transverse colon. The second man died following colon suture and caecostomy (Gordon Taylor 1944).

Ogilvie (Ogilvie 1944) considered that exteriorisation of wounded colon improved the patient's chances of survival, but while agreeing for left sided lesions Blackburn and Rob considered that many wounds of the colon especially on the right could be sutured (Blackburn and Rob 1946). The influence of the wounding agent was not considered.

In a series of 33 cases of gas gangrene 23 followed shell wounds, five mine injuries and five followed bullet wounds. Twelve patients in all recovered (Jeffrey and Scott Thomson 1944).

British surgeons in World War II were aware that high velocity fragments from all types of missiles caused more severe wounds than external appearances would suggest, and this knowledge influenced their approach to surgical treatment, and was a factor in their success.

Present time

British military surgical technique has been standardised from experience in World War II (Field Surgery Pocket Book 1962, Cope 1953).


The United States armed forces were involved in conflict in Vietnam from 1963 till 1973. During this time 55,136 Americans were killed and 153,302 seriously wounded in Indo-China. Four times as many South Vietnamese and possibly twenty times as many North Vietnamese and Communists were killed (Times, 27 August 1973). The surgical writing from all this experience has provided a more detailed analysis of military wounds and the management of the wounded than at any previous time in history.
From battlefield to Hospital

In Vietnam the system of rapid helicopter evacuation of the wounded to base hospital with provision of resuscitation on the way, may have contributed to an increased survival rate after wounding and a decreased mortality rate after admission to hospital.

Intensive resuscitation procedures on arrival in hospital have been described for soldiers in Vietnam (Knight 1972), for civilians in Africa (Odling-Smee 1970) for civilians in Vietnam (Dudley et al 1968) and for civilians and soldiers in Belfast (Gordon and Crockard 1974) and there is general agreement that replacement of lost blood and management of the airway with or without added oxygen and controlled ventilation, contributes to the decline in mortality after wounding (Matheson 1968, Maughon 1970).

Surgical treatment of wounds

Surgeons and pathologists will be aware of the character of wounds caused by modern missiles but even experienced surgeons may not be in a position to appreciate that the nature, type and distribution of the wounds they see is influenced by military policy, tactics and weapon use.

Civilian surgeons faced with weapon casualties may make decisions on the surgical management of wounds (Robb and Matthews 1971) which are at variance with those of civilian surgeons in battlefield situations (Dudley et al 1968) or with those made by military surgeons (Moffat 1967, O'Brien 1973).

Experience may be limited not only by numbers, by the geography of the campaign and the military situation but above all by ignorance of the nature of the predominant weapons employed.

Thus the favourable outcome for suture of low velocity bullet wounds of the colon in Africa when these are sutured primarily (Odling-Smee 1970) is not a good basis for practice in a modern military battlefield (Blackburn and Rob 1946, Porritt 1946, Schmitt, Patterson and Armstrong 1967, Getzen et al 1972) and experience with low velocity bullet wounds in civilian practice may lead to practices in the management of abdominal wounds which will require alteration when injuries are caused by high velocity missiles (Feltis 1970).

Limb wounds: Military surgical management of missile wounds of the limbs has evolved from the work of Trueta (Trueta 1939). The reason for wound excision, delayed primary suture and antibiotics (Field Surgery Pocket Book 1962) has been demonstrated by researches into the mechanism of wound infection in such cases (Hopkinson and Watts 1963, Thoresby 1966, Thoresby and Watts 1967, Thoresby and Matheson 1967, Thoresby and Darlow 1967) and its control (Owen-Smith and Matheson 1968). Failure to base treatment on these principles may result in sepsis, gas gangrene or death (Moffat 1967) but in favourable circumstances they may be improved upon by the addition of internal splintage to fractured bones (Dudley et al 1968).

Head wounds: It is doubtful whether the dismal figures cited for penetrating bullet wounds of the brain in the American Civil War can be improved upon. Head wounds cause a high proportion of deaths on the battlefield (Small and Turner 1964b, Maughon 1970) and in the military situation very few men with penetrating or perforating bullet
wounds survive long enough to reach hospital. (Martin and Campbell 1946). With rapid carriage to hospital some survivors of penetrating head injury due to low velocity fragments or bullet wounds may benefit from hyperventilation and replacement of lost blood (Crockard, Coppel and Morrow 1973, Gordon and Crockard 1974).

The technique of wound excision, dural closure, decompression and scalp closure are well established for penetrating wounds (Small and Turner 1946a, Cairns 1947, Hammon 1971, Byrnes et al 1974). Surgical decompression after non-penetrating injury with skull fracture is a matter for surgical judgement in the individual case, but may be indicated more readily for injuries from high-velocity military bullets than from low velocity firearms. (Hammon 1971).

Chest injury: The high mortality of penetrating or perforating chest injury in the American Civil War had been reduced to 43 per cent in World War II. For hospital admission the mortality for chest wounds was as low as 8 per cent in some theatres (Beebe and De Bakey 1952).

Abdominal wounds: The successes of the abdominal surgeons of World War I (Wallace and Fraser 1918, Till 1974) and World War II (Estcourt et al 1944, Blackburn and Rob 1946, Porritt 1946) continued in Vietnam (Schmitt, Patterson and Armstrong 1967). The techniques developed by military surgeons were used in Vietnam on civilian patients (Dudley et al 1968) but have been modified in Africa (Odling-Smee 1970) and Belfast (Rodgers 1973) where early experience was of low velocity wounds.

The development of methods of repair of major vessel injuries by American military surgeons has been well described (De Bakey and Simeone 1946, Hughes C. W. 1958, Levitsky et al 1968, Rich, Baugh and Hughes 1970). Few other groups of surgeons have had similar experience in conditions suitable for primary reparative vascular surgery following war wounds of arteries. (Watts 1960).

American experience suggests that primary anastomosis of lower limb arteries gives the best result when it is feasible.

Access is very important in arterial wounds caused by bullets and fragments. It is doubtful whether the approaches of the great masters of the past can be improved upon. (Guthrie 1815). Methods evolved for peacetime vascular surgery are not usually applicable.

Conclusion

In this rapid survey of the wars of the last 400 years I have tried to show how the scope of military surgery has increased. This has been due primarily to the efforts of individual surgeons, but in addition better surgical training, the advent of anaesthesia, the understanding and control of infection and the development of resuscitation have been combined with improvements in the carriage of the wounded from the battlefield to properly equipped surgical hospitals to improve the surgery of the wounded.

Military surgeons have continually faced new problems imposed by new conditions of war and new types of weapon. Their concern has extended beyond the hospital or the operating tent to the very forefront of the battle and they may even influence the conduct of the belligerents.
Having evoked the memory of our military surgical forefathers I do not propose to talk about the challenges facing us at the present time, although I believe that these may be as great as those in 1875 and in 1775.

It may not be too presumptuous of me to suggest that the British sailor, soldier and airman expects, and has a right to expect, that we will continue to be “in arduis fidelis”.

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