

Military Medicine in Elizabeth's Time

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Introduction

The year 1585 was pivotal for Queen Elizabeth I. Philip II of Spain had consolidated his hold on 15 of the 17 provinces of the Netherlands and was committed to consolidating Catholicism in Europe. The Spanish army under the Duke of Alba was in the Low Countries where it had been suppressing revolts from 1567.

Elizabeth and her Privy Council decided to adopt defensive neutrality, despite William of Orange asking Protestant nations in 1583 for assistance. Elizabeth provided funds to defend the region, but this was insufficient to stem Spanish dominance, as only two provinces, Holland and Zeeland, had any viable military capability. In October 1584 the Privy Council authorised military aid to the Dutch, ratified by the Treaty of Nonsuch in August 1585. It committed England to a field force (under Robert Dudley, the Earl of Leicester) of 5,000 men, 1,000 cavalry and an additional 1,150 men for garrison duty. Further financial aid was also promised.

Medical Support for Armies

From the time of Henry VIII, it was understood that there would be a medical component to any military force. The appropriate medical establishment was considered to be one 'medical practitioner' to each band of 100 soldiers. Losses from non-combat causes in campaigns in France from 1589 to 1591 totalled 11,000 English dead, of whom only 1,100 died in combat. Mortality from unsanitary conditions, leading to typhoid and gastroenteritis, were common. Typhus or 'camp

fever' was also an ever present threat due to the presence of the carrier, the body louse, always a problem among dirty soldiers. Troops also suffered from exposure and malnutrition.

Medical manpower for military campaigns was drawn from several sources. From the charter granted to the Barber-Surgeons Company, which was incorporated in 1541 by Henry VIII, it is clear that it was expected to supply manpower on demand. However there were not sufficient members to meet the need. For instance, in 1577 there were only 90 persons on the roll. The Barbers' arts and skills had developed in response to the dissolution of the monasteries and the consequent loss of their role as hospitals. Barbers had previously acted as assistants to the monks.

To the troops, unlicensed practitioners would have been quite acceptable as in their home life they were the accepted healers. Many healers were skilled in advising, tending wounds, suturing, dressing burns and setting bones. The status of the army surgeon was reflected in his pay, which was same as that of a drummer. The English military surgeon Thomas Gale (1507-1587) pointed out to Elizabeth that such low pay would attract only the poorest standard of men as medical personnel.

Unlicensed and unsuitable persons were particularly likely to serve late in the Flanders campaign. Officers were authorised to recruit their own surgeons. Any person who purported to give assistance to the ill and whose occupations involved healing the sick could be recruited. Apothecaries, a guild allied to surgeons and also trained by apprenticeship, were also enlisted. By the end of the 16th century there were 100 apothecaries practising in London alone. In 1518 Henry VIII had chartered the College of Physicians but it appears to have been mainly a 'debating club', contributing little to military medicine.

Health Support in Elizabeth's Army

The ideal ratio of Barber-Surgeons to soldiers was impossible to provide since Elizabeth's forces numbered 32,000 by 1590. Most members of the medical force were unlicensed. Many women were involved in the healing processes in village medicine but their roll in the military was restricted to nursing duties. The Disciplinary Code of Leicester (i) states:

therefore it is ordained that no man shall carrie into the fiede, or deteine with him in the place of his garrison, any woman whatsoever, other than such known to be his lawful wife, or such women to tend

the sicke and to serue for launders, as shall be thought meete by the marshall, upon pain of whipping and banishment

The most senior medical person in the army was William Clowes (c. 1540-1604) a Barber-Surgeon, who had been specifically requested by Elizabeth to attend Robert Earl of Leicester. He had been in military and naval service from the age of 18 and was very distinguished in military matters. As well as attending Leicester, he was ordered to attend to 'the curing of the hurt and wounded soldiers'. Clowes, following his time in Flanders, wrote a most unflattering comment about the unlicensed practitioners in 1602:

*'beastlie abusers of physicke and chirurgerie, tinkers, tooth-drawers, pedlars, ostlers, carters, porters, horse-gelders and horse-leeches, idiots, apple-squires, broom men, bawds, witches, conjurers, sooth sayers and sow-gelders, rogues and ratcatchers, renegades and proctors of spittle-houses, with such rotten and stinking weed, which do in country, without order, honesty and skill daily abuse both physick and chirurgery, having no more perseverance, reason or knowledge in this art than hath a goose....and this is one principal cause that so many perish'*²

This criticism may be harsh, for often unlicensed practitioners were the best that the recruiters could muster.

The Army's responsibility for public health was poorly understood. In 1544, Henry VIII issued an order: 'prohibiting carrion, filth, or other unwholesome or infectious stinking thing to be near lodgings and the same to be buried'. This demonstrates some awareness of the need to remove waste. The Earl of Leicester in his disciplinary code, (item 44) was more specific:

'nor shall suffer the garbage to remain unburied, neither shall any man trouble or defile the waters adioyning, but in the lower part of the stream some good distance from the camp, under the payne of imprisonment'.

Item 45 also forbade soldiers 'to ease [himself] or defile the campe or toune or garrison, save in such places as is appointed for that purpose'.

It can be inferred that hygiene was recognised by the military as desirable, probably more for reasons of camp comfort, rather than for health. However troops would hardly pay much heed to these when within their own cities and villages basic disposal of human waste and pure water supply was absent.

The Development of Military Medicine by William Clowes

Clowes was an excellent observer and was prepared to use new methods in treatment. In 1588, he wrote *'Prooved Practice for all Young Chirurgeons concerning Burnings with Gunpowder'*. He warned that untrained persons should not stir gunpowder with their hands; no doubt he had seen burns occurring from premature ignition of gunpowder in the firing pans of guns and the resultant spill from too vigorous loading.

Clowes tried to stop haemorrhage by applying ligatures ('chokeband') to the affected limb and the use of topical powders. He praised the dynamic French surgeon Paré for suggesting that the stump of an amputated limb should

be sewn over in the shape of an X. Clowes did not specify suturing materials; but fine fibres from cow and horse tendons and horsetail hair were often used - and were strong suture materials. It is unclear whether needles were made of metal or bone.

Another innovation was the avoidance of cauterising wounds: instead Clowes followed the lead of Paré and Thomas Gale in using local dressings. Both Paré and Gale advocated the use of onions in topical dressings of wounds. Onion and garlic contain allicin, an amino acid derived from cysteine. This has antibiotic properties against some common bacteria (including the common wound-infecting bacteria) which amount to about 2 percent of the potency of penicillin.

There were glimmerings of recognition that infectious disease could be transmitted. Paré condemned flies as the carriers of 'contagion'. The Frenchman Philbert Guybet wrote *'The Charitable Physician with the Charitable Apothecary'* in late Tudor times. Although not published in English until 1639, his ideas were probably developed during Elizabeth's time. He wrote regarding the care of pipes for clysters (enemas), that should the patient have 'pestiferous' disease, the pipe should be washed and cleansed, warning that if this is not done the disease can be on the attending family within an hour. He recognized that unclean instruments could transmit disease.

Clowes listed the composition of the 'unguents and liniments' for the young surgeon but did not deal with the problem of pain relief. There were early experiments in anaesthesia and pain on the Continent. The vapours from a mixture of opium poppy juice with mandragon derived from the herbs Mandrake and Henbane (hyoscyamus, scopolamine) made up a compound '*spongia somnifera*'. It could be delivered from a sponge saturated with the solution. This mixture was well known to Greek physicians and was probably derived from the Egyptians. Paracelsus knew about laudanum (tincture of opium) but he may not have appreciated its analgesic properties.

An early depiction of the technique of limb amputation was drawn by von Gersdorf in 1517. A woodcut of this illustration is held by the American College of Surgeons³. (*see next page*)

The surgeon is using a cross-saw for a below knee amputation, there is a tie (an esmarche) below the knee, not above it if it was to act as a tourniquet. One of his assistants holds a bladder from a bull, ox or hog ready to be applied to the stump. The patient appears amazingly unrestrained and placid. Was he drunk or under the influence of an anaesthetic vapour? Perhaps he had been sedated with the '*spongia somnifera*'?

Clowes did not describe any dental aspects of military surgery. However damage from any blunt trauma from a striking weapon would loosen, dislocate and remove teeth. Gunshot wounds to the face would open sinuses and probably lead to gross sepsis and death. If recovery did occur facial deformity might well have been grotesque. Dating from Tudor times, 'tooth pullers' attempted some degree of specialisation by designing a dental chair. Brunschwig devised a support for the chin for jaw fractures in 1497. Both Clowes and Paré suggested wiring the teeth together with gold wire to realign the jaw. Paré also advocated this method and also devised artificial ivory teeth on a gold base.



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English Military Medicine follows the Continental Lead

In the Elizabethan era, England was essentially a medical backwater. Continental medical superiority caused many physicians and Barber-Surgeons to attempt to raise medical standards in England by introducing advanced techniques into England; among these were Thomas Linacre, John Caius, John Hester, Peter Lowe, John Banister and, in particular Thomas Gale for his military input.

Ambroise Paré (1510-1590) joined the French Army as a 'self-taught' field surgeon in 1537 soon after completing his apprenticeship. He wrote *'Method of Treating Gunshot Wounds'* in 1545. (Not published in English until 1617). In Milan, he lacked oil with which to cauterize wounds and thus commenced possibly one of the earliest 'controlled' medical trials. He had a group of casualties whose wounds were treated with the conventional boiling oil for cautery and others who received dressings and an ointment of egg yolk, rose water and turpentine. The results in this second group of patients were dramatically better in terms of survival and patient comfort.

He advocated ligating major bleeding arteries and swift amputations above the wound as needed thus indicating a possible understanding of the physiology of the arterial system. He would not remove lead bullets, but did remove iron and other corrosive metals. Paré developed artificial limbs, and

manufactured false eyes. He attempted to treat fractured neck of the femur, recognised urinary straining as a symptom of prostatic hypertrophy and identified syphilis as a cause of arterial aneurysms. He published *'Cinq Livres de chirurgie'* in 1582 and lectured at the Paris Faculty of Medicine which vigorously opposed his concepts of wound treatment.

William Clowes knew of Paré's work and acknowledged it by calling him a 'master'. It is reasonable therefore to assume that the Barber-Surgeons knew that Paré had been advocating new methods of treatment. Why then were these developments not adopted? The teaching institutions were overseen and dictated to by the conservative College of Physicians and any advance or change had to be philosophically debated in the College before being accepted.

Clowes drew on his experiences in the Flanders campaign, which ended in 1588, to write *'A Brief and Necessary Treatise of Morbus Gallicus'*. Later he changed the title to the more politically correct *'Lues Venerea'*. He was a firm advocate of mercury therapy for syphilis. He highlighted the problem of venereal disease in the military by devoting some of his treatise *'A Proved Practice'* to the cure of syphilis and the use of mercury in therapy.

One of the greatest, but perhaps least known, events in military medicine occurred during the Siege of Metz in 1552. The siege was conducted by the Emperor Charles V against Francis, Duke of Guise and commander of the Metz garrison. Guise initiated basic hygiene measures by ensuring a clean water supply was placed under guard. Adequate food was rationed systematically; all carrion and body wastes were disposed of over the fortress wall and there was immediate isolation of the ill from the healthy. It was the duty of the 'pioneers' to clean the drains and the streets. The Barber-Surgeons of the nobles were required to treat anyone who required their services. There were no serious outbreaks of epidemic illness in the 65-day siege.

Guise and the Duke of Alva, from the imperial army, initiated a type of 'Red Cross' humanitarian arrangement to allow better treatment for prisoners. Guise fostered compassion to the enemy and organized river transport for enemy wounded at a time when it was the practice at the time to slaughter the wounded enemy.

Early Management of Military Injuries

What situations would confront the medical personnel in battle? Wounds due to slashing weapons and arrow wounds were expected but the compound fractures and gross tissue destruction would have been new challenges. Burns were a major and common trauma since fire was necessary close to a battle area, particularly in siege warfare. Pouring boiling oil from ramparts was common requiring cauldrons and a brazier nearby. Arrows were often tipped with burning cloth. Red-hot cannon balls were often used both on land and at sea.

Leonard Digges wrote a pocket book for English army officers in 1571 outlining the qualities required for military medical service, but it was not until 1590 that his son Thomas had it published. His theories were well ahead of his time. Thomas Digges was the Muster-Master in the Netherlands from 1586 to 1594 and was later to become a distinguished astrologer.

He wrote: -

Many times small wounds are made sometimes maymes and some times mortall. It is therefore fit that no surgeon in any bande be admitted till the surgeon-major of the regiment have examined with his skill. He ought to be provided of a good chest of salves, oyles and waters for killing the heat of shot, and all such instruments as are necessary for his art; without which and his testimonial from the surgeon-major of his sufficiency, he ought not pass muster, or receive pay. He ought to be careful, honest and loving to the souldiers he hath in cure, and besides his ordinary pay of the prince, he is to have monthly somewhat out of every souldiers pay, towards the charge of his chest of medicines, besides the rewards of such as are his abilities, to the end of the poore souldiers being cured gratis.

Military Hospitals

Some English officers recognized the value of hospitals and recommended that churches and abbeys be converted to this purpose. However William Clowes, the senior English surgeon did not specifically comment on the need for a hospital near the battlefield. It was not until Elizabeth's Irish campaign that provision was made for military hospitals in 1598. This was not implemented until the 1600's. Clowes was subsequently appointed to St Bartholomew's Hospital. St Bartholomew's and St. Thomas' Hospital in London were two of the few medieval hospitals to survive the dissolution of the Reformation.

In Spain Queen Isabella had put the concept of a field hospital into practice in 1437 at the siege of Malaga, where the hospital was known as an 'ambulancia'. Emperors Maximilian I and Charles V also arranged for wounded to be taken to the baggage train where they were treated in tents by medical personnel and nursed by women from the army train.

Late in Elizabeth's campaign in the Low Countries a system of 'guest houses' for the sick and wounded was developed. House owners were required to look after the ill and to report on their condition to the muster-master and the treasurer-at-war. It is not clear who determined the rate of pay or if the soldier had to contribute for his keep.

Concluding Remarks

The medical skills learnt during the Flanders campaign slowly influenced military medicine in England. Following Elizabeth's Continental campaigns, new concepts of patient care there were recognised and adopted by the Barber Surgeons. English medicine finally began to emerge from a medical wilderness.

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