War surgery 100 years ago

In 1915, 100 years ago, this country passed into the second dreadful year of what was then called 'The Great War', now downgraded to 'World War One' or even 'WWI'. There is an old saying that the only thing to benefit from war is surgery. Certainly, reading through the old bound volumes of the medical journals for 1915 – *The Lancet*, *British Medical Journal* and especially the *British Journal of Surgery* – one can only be astonished at the advances being made in the surgery of trauma by the time the conflict was in its second year.

In the early months of the campaign in Flanders, the surgeons in the Royal Army Medical Corps were amazed at the severity of the wounds they encountered. These surgeons were experienced men; many of the regular soldiers were veterans of the South African War (1899–1902) and most of the rest were Territorials, well familiar with the major industrial and road traffic accidents in civilian life and used to favourable results from standard routine antiseptic management of these injuries.

Now they were encountering a new pathology – the effect of high velocity missiles (bullets, shell fragments and shrapnel) at close range on human tissues. Moreover, the majority of these wounds were heavily contaminated with the fertile soil of Flanders, teeming with the anaerobic clostridial organisms of gas gangrene and tetanus. Gas gangrene was seen more commonly than in any previous war; pyaemia and erysipelas were common and secondary haemorrhage, as ligatures sloughed off divided blood vessels, was all too common and often fatal. A compound fracture of the femur in 1914, for example, carried a mortality of 80%. By 1915, the technique of 'delayed primary suture' was established; extensive excision of all devitalized tissues, the wound then left open, lightly covered with a sterile dressing, immobilized in a suitable splint and delayed closure carried out about 5 days later if the wound appeared healthy on inspection. This technique remains standard practice 100 years later.

The need for early surgery was met by establishing advanced surgical teams a few miles behind the front line in casualty clearing stations, manned by surgeons, anaesthetists and nursing sisters (the nearest women were found to the scene of battle).

The high death rate from compound fractures of the femur was dealt with by Sir Robert Jones, an orthopaedic surgeon from Liverpool, whose uncle, Hugh Owen Thomas, had devised the Thomas splint for the lower limb. Jones was now Director General of military orthopaedics. The Thomas splint was issued to the Royal Army Medical Corps stretcher bearers, who were taught how to apply it blindfolded. This meant that they could crawl out into no-man's land at night, splint the wounded soldier's leg and transport him to our lines.

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I read about this when I was house surgeon on the accident service in Oxford in 1949. That very evening, I was called down to casualty to see an old woman with a fractured femur. I put on her Thomas splint with my eyes shut tight (it wasn't too difficult), but I will never forget her look of astonishment when I opened them again!

Special 'femur wards' were established to deal exclusively with this injury, and by the end of 1915 there had been a remarkable improvement in the rate of survival.

Wound excision combined with antitetanus serum reduced the incidence of tetanus to the region of 0.2 per 1000, although gas gangrene was still encountered in cases where there was delay in definitive surgery.

At the beginning of the war, surgeons were instructed to treat penetrating abdominal wounds conservatively, this as a result of experience in the Boer War. It soon became obvious to the surgeons in the casualty clearing stations that the results were dreadful and deaths all but inevitable. Captain Owen Richards, who had joined the Royal Army Medical Corps straight from his position as Professor of Surgery in Cairo, where he had gained considerable expertise in abdominal surgery, disobeyed regulations and, early in 1915, was able to report two patients with successful resections of gunshot wounds of the small intestine. His first patient, operated upon on 18 March 1915, had 6 feet of small intestine resected, containing 20 wounds produced by a shell fragment. The patient had walked back to his own trenches with his intestines prolapsing through the wound because 'he wanted to die in his own lines'. It was now obvious that urgent surgery was the only hope for these perforating abdominal injuries and special units were set up to deal with them. In the absence of antibiotics, paucity of blood transfusion and little knowledge of accurate fluid and electrolyte replacement, these injuries still carried a mortality of around 50–60%.

Advances were made in every field of military surgery. Modern reconstructive plastic surgery really had its birth during the war, as surgeons grappled with the problems of reconstruction of shattered faces. Particular mention must be made of Harold Gillies and his team, first in Aldershot and then in Sidcup, who devised the tube pedicle flap to replace massive loss of facial tissues and bone grafts, usually taken from the iliac crest to reconstruct shattered jaws. Gillies, incidentally, continued his work in World War II.

Truly, the only thing to gain from war is surgery. BJHM

Conflict of interest: none.

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