

## Abdominal surgery in war – the early story

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### Introduction

Just because a surgical technique becomes possible does not mean that it will be used immediately in the correct manner at the correct time. Controversy usually accompanies new developments and extreme opinions are often held until the innovation is accepted into the body of knowledge which is accepted by the profession as a whole. The history of the development of early laparotomy for abdominal wounds illustrates this well.

### The beginnings of operative intervention

The practice of surgery in a military setting has always been difficult. There is not only the problem of inadequate or limited resources but in addition the nature of the injuries can differ from those found in civil practice. One of the most famous surgeons of the late Victorian era, Sir William MacCormac wrote in the report of his experiences during the Franco-Prussian War of 1870/71: 'The author is satisfied that errors may be committed by being too exclusively guided by the experience gained in civil hospitals'<sup>1</sup>. MacCormac was Surgeon-in-Chief of the Anglo-American Ambulance which served in France during the Franco-Prussian War, taking over command in September 1875 from James Marion Sims who had left his native United States of America because of the Civil War (1860-1865) but who now wished to return. It seems that in those days an abdominal wound was invariably fatal. He reports: 'Of penetrating wounds of the abdomen we saw but few, and the subjects of these died rapidly of peritonitis and shock'. From tables of injuries treated it seems that nothing was ever done for abdominal cases. There is a telling statement in his report following the 54-day siege of Metz during that campaign: 'As might be anticipated the penetrating abdominal wounds were all fatal. The four cases of wounds of the pelvis all recovered, as the abdominal cavity was not implicated.' However, despite MacCormac's pessimism about the value of operating on abdominal wounds Sims was not of the same opinion. Sims is chiefly remembered for his gynaecological speculum and work in biliary surgery but he also popularized the practice of surgical intervention for gunshot wounds of the abdomen. He advocated this during the 1880s when laparotomy was in its infancy but it was only recommended if there was good reason to believe that viscera had been damaged. Thus the *British Medical Journal* of 1891 when reporting a case described in the *Medical News* could state that 'this adds one more to the growing list of successful enterorrhaphies for gunshot wounds'<sup>2</sup>. During the 1890s there was much controversy as to the best management and military surgeons became divided into two schools of thought:

the interventionists who advocated early operation and the abstentionists who did not. The interventionists were the smaller group and were mostly German and American. The abstentionists had their strongest adherents in France and were supported by one of the leading French surgeons, Réclus. He backed his claims with experimental work on dogs, demonstrating that leakage of the perforated intestine was stopped naturally by protrusion of the lining mucous membrane. Even when a large perforation occurred the loop of intestine could stick to an adjacent coil and become sealed. Results from three military campaigns, the Sino-Japanese War (1894/95), the Spanish-American War (1898) and the Tirah expedition (1897/98), seemed to support this.

### Differences of opinion

The interventionists argued against this, deriving support from the fact that laparotomy was becoming a recognized procedure for conditions such as perforated ulcer. MacCormac had revised his views since his pronouncements following the Franco-Prussian War of 1870/71. In 1895 he wrote in the *British Medical Journal* that nothing else but early laparotomy was of any avail in these cases<sup>3</sup>. He reinforced this view in the Hunterian Oration which he gave at the Royal College of Surgeons in 1899 when he extolled the current status of surgery, wondering how John Hunter, who lived 1728-1793 and served as an army surgeon during the Seven Years War 1756-1763 achieving lasting renown both as a surgeon and founder of pathological anatomy, 'would admire an exploratory operation for the discovery of perforated intestine, the restoration of its continuity by one of the methods employed, the aseptic rendering of the abdominal cavity, and the frequent recovery of the patient'<sup>4</sup>.

This was in fact the planned policy as advised by the Professor of Military Surgery Colonel Stevenson for the newly formed Royal Army Medical Corps for the war in South Africa 1899-1902. He urged that on suspicion of intestinal damage operative intervention should be undertaken. This advice was followed in the early stages of the campaign. MacCormac, who was Chief Surgeon to the British National Aid Society for the Sick and Wounded in War, was appointed Consulting Surgeon to the South Africa Field Force. His word was law. He had after all been made a Knight Commander of the Victorian Order September 1898 in recognition of services earlier rendered to HRH the Prince of Wales. That same year he was made an Honorary Member of the Imperial Military Academy in St Petersburg on the occasion of its Jubilee. During his time in South Africa (4 November 1899-26 April 1900) he formed the opinion that:

'In this [the South African] war a man wounded in the abdomen dies if he is operated upon and remains alive if he is left in peace'. This policy was adopted and became known as 'MacCormac's Aphorism'. There does appear to be a contrast between this and his public pronouncements. At his Presidential Address of Welcome before the Prince of Wales at the Centenary of the Royal College of Surgeons 3 months after his return on 26 July 1900 he contrasts the current position of surgery with that of John Hunter's time: 'John Hunter, and many of the older surgeons, regarded operations as somewhat of an opprobrium to surgery, and as a confession of failure. How far otherwise it is now! Intracranial, intrathoracic and intraabdominal operations are successfully carried out, many of them by procedures which had never previously been imagined, even by the boldest amongst us.'<sup>5</sup> This clashes somewhat with his opinion on abdominal injuries published some 12 months later in the *British Medical Journal*: 'Many surgeons went to South Africa anticipating a large field of surgical enterprise in this direction, but I feel sure the surgical records of the campaign, when published, will prove the advantages of non-interference in the greater number of instances.'<sup>6</sup> The policy of non-intervention was also the official view during the Russo-Japanese War of 1904/5. It could hardly have been otherwise, such was MacCormac's influence, reinforced by the association with the Russian Imperial Military Academy of Medicine. However, as will be seen, it was successfully challenged by the Russian Princess, Dr Vera Gedroits. When one considers her early association with revolutionaries and expulsion from finishing school only to become physician to the Imperial Household it is not difficult to see why she was not unduly influenced by surgical authorities - or any other authorities. She later became Professor of Surgery at the University of Kiev in the 1920s.

The question of whether to operate on war wounds of the abdomen was complicated somewhat by the controversy of whether an operation was in fact needed at all, or whether an operation would be the best thing but under war conditions impractical. Cuthbert Wallace posed the question as to whether there was such an entity as war surgery at all as distinct from civil surgery. He considered it to be a question of whether war conditions allow the surgeon to apply the principles he knows to be right. Writing in 1918 he asserted: 'No man shot in the belly would be left to lie in bed in the civil hospital of a great town. The expectant treatment was only adopted because the surgeon could not operate under favourable conditions'<sup>7</sup>. This is not strictly true when one compares the conditions under which operations were performed during the war in South Africa and the First World War. The facilities available, or lack of them, were used to support both intervention and abstention. Another factor brought into the equation was infection. In South Africa many wounds were treated with little respect yet did well. At the time this was attributed to the less damaging nature of the new types of bullet, in comparison to the old ball shot. Attention was drawn to this in 1904 by an RAMC officer writing of his experiences in South Africa in treating gunshot wounds. The Mauser bullets made a very small entrance wound and despite their high velocity he was surprised to find that many remained lodged within the tissues rather than perforating and emerging from the other side. He attributed this to

the long range at which weapons were fired during this campaign<sup>8</sup>. This had been confirmed by the Russian experience of the Japanese bullet which had been described as 'humane'<sup>9</sup>. This picture was quite different to that pertaining during the Franco-Prussian War some 30 years before, further complicating the matter. Many surgeons were convinced that rest, starvation and morphia were the right treatment for abdominal wounds.

#### **Surgical opinion before the First World War (1914-1918)**

Once again the Royal Army Medical Corps has not been dealt a very kind hand by history. There is no doubt that for many years it had been held that the operative treatment of abdominal wounds was not to be advised under war conditions. This was a mixture of lack of success and the desire not to operate near the firing line. However, in view of what we have already heard about W F Stevenson and Sir William MacCormac, Wallace's pronouncement in his textbook written at the close of the war seem to be less than fair to the military: 'Although the expectant treatment was the orthodox one when the South African War broke out, many civil surgeons hoped to prove that it was wrong'<sup>7</sup>. That expectant treatment was in itself the right procedure was held by Frederick Treves. His popular book recounting his exploits with a field hospital which followed the Ladysmith Relief Column for 3 months had furthered his extensive professional and public reputation<sup>10</sup>. He went so far as to pronounce: 'Experience has shown that indiscriminate irrigation of the abdominal cavity does more harm than good, and that "evisceration" and rough handling of the damaged intestines is dangerous'<sup>11</sup>. Others (headed by Makins) believed that small gut lesions were practically always fatal. The cases that survived were those where the bullet had not actually injured the intestine. Makins went so far as to say that perforating wounds of the intestine were fatal injuries and that every patient died in whom this condition was diagnosed with certainty<sup>12</sup>.

However, a case can be made for the theory that it wasn't the success of the expectant policy, but rather the failure of operating due to delay. In general, operations were secondary or late and Wallace quotes two successful cases of resection of small gut (Messrs Neale and Tuke) where operation took place within 6 and 12 h. There were in fact a very small number of cases in total, and records were poor, which makes useful statistical analysis very difficult. Surgeon General Stevenson, in the *Official History of The War in South Africa 1899-1902* was only able to collect 207 cases of abdominal wounds. Among them it is stated that there were 26 laparotomies, with 18 deaths (mortality 62.2%). The total death rate of all abdominal wounds quoted (operated and unoperated) is given as 30.4%. However, figures for the Great War show that a mortality of 50% was considered a good result. There is no doubt that certain people shot through the abdomen in South Africa survived on the expectant regimen. Amongst these were two RAMC officers, which undoubtedly coloured opinion.

#### **A missed opportunity**

Thus the South African War left surgical opinion with the view that the expectant method was the correct course to follow. Wallace's view was that: 'This

opinion seems to have been only strengthened by succeeding wars - the French war in Morocco, the Balkan War and the Russo-Japanese War<sup>7</sup>. This was, in fact, not the case. Vera Gedroits had introduced early operation in her ambulance train in Manchuria during the Russo-Japanese War of 1904/5. However, although she published many articles on other subjects in journals indexed in *Index Medicus* from 1903 to 1913 this was not brought to Western attention. Although the British sent two officers as observers (a British Gurkha officer and a gunner) who made extensive reports on the war, they neglected this aspect<sup>13</sup>. Sir Frederick Treves, Sergeant Surgeon to King Edward VII was better qualified to gather and disseminate such information. He had been a consulting surgeon to the Forces during the South African campaign and went out to inspect the work of the Red Cross Societies. Unfortunately he was attached to the Japanese forces<sup>14</sup>. Furthermore, Wallace was not entirely correct in his thinking that the Great War was 'the first time since the rise of abdominal surgery that a great campaign has been fought in a settled country, and what is more important still, with a fixed firing line'. The Russo-Japanese War was in many ways a dress rehearsal for the First World War. There were many miles of trenches occupied by thousands of troops and provided with overhead shelter, barbed wire, machine gun emplacements and hospitals. Much of this was communicated in the official reports of the war by the British observers and so it was not just the medical lessons that went unheeded.

#### **Surgical practice during the First World War**

Records show that initially surgical practice was expectant. Interpretation of this procedure at the end of the war ascribed it not to the process of adopting current surgical policy, but to the fact that operative intervention could not be carried out under the prevailing conditions. When the policy changed to one of intervention it was considered that this was because the firing line had settled down to a fixed position of stalemate and surgery could then proceed unimpeded. Professor Tuffier wrote of the French experience that until February 1915 it was expectant because conditions dictated this. He had, however, found a small ambulance quite near the Front where several intestinal wounds had been successfully dealt with by laparotomy which he reported to the Society of Surgery. He claims that following this 'a movement commenced in favour of operation for all abdominal wounds'. The British had also come to this conclusion, the first to publish being Owen Richards, a professor of surgery who had been made a temporary captain in the British Expeditionary Force, in a paper entitled 'The Pathology And Treatment Of Gunshot Wounds Of The Small Intestine'<sup>15</sup>. This was based on 4 months' work in a Casualty Clearing Station in which he had a series of nine abdominal cases. In five of these he opened the abdomen and resected intestine. He concluded that wounds of the colon and duodenum tend to cause escape of intestinal contents and so require suture. Small intestine wounds rarely leaked, and if they did they caused only limited and local peritonitis. The cause of death with them was obstruction. This explained the initial well-being for the first couple of days, which had misled those advocates of expectant treatment. He considered that these wounds required resection, including a portion

of bowel above the injury to prevent obstruction developing. He also advised the thorough examination of the whole of the intestine, realizing that the course of the bullet was often unknown and also that the wounded intestine may have moved away from the wound and could easily be missed.

Wallace appeared to disagree with these findings, concluding that haemorrhage was the cause of early death. He quotes in his textbook: 'The re-establishment of the fact that haemorrhage was the chief cause of early death was of great importance, as it showed that only by rapid evacuation could one hope to combat such a condition'<sup>7</sup>. Whether an operation should be performed to counter haemorrhage or obstruction, the message now was that an operation was necessary. In the first week of August 1915 it was directed that the rapid evacuation of abdominal wounds for operation would be the official method and the conclusions at the end of the war were that this was the correct policy. Most cases arrived some time between 6 and 10 hours after injury and it became apparent that 'up to six hours the chances were in favour of the patient, after this period they are always against him'<sup>7</sup>.

#### **Post war practice**

We have seen how Treves was very much against surgical intervention in his *Manual of Operative Surgery of 1909* (3rd edn). By the 4th edition (1924) he had modified his view, stating that where there had been an extensive extravasation of septic fluid it may be necessary to wash out the peritoneal cavity. The Germans had, however, well-heeded the message from the war with Schmieden writing in the equivalent textbook a whole chapter on the operative principles of abdominal wounds in war<sup>16</sup>. The new principles were well established by the time of the Spanish Civil War and were reported by D W Jolly who was a major in the Spanish Republican Army Medical Services: 'In doubtful cases it is better to prepare for a formal laparotomy and to begin by exploring and excising the wound track rather than wait for the classical picture of peritonitis . . . any forward hospital system which cannot bring abdominal cases to the first intervention point before this clinical picture is established is, historically, back in 1915.'<sup>17</sup>

#### **Further developments**

This is not to imply that this was the end of the evolution of abdominal surgery, but it effectively ended the controversy between intervention and abstention. Further developments included techniques to diminish the incidence of leakage and speed the process of anastomosis. Nowadays, staplers allow this to be performed in a few minutes compared with up to half an hour using needles. The introduction of antibiotics has proved less of a revolution than originally anticipated, not allowing surgery to be dispensed with but certainly combating postoperative infection. The technique of 'second-look' surgery performed 2 days later has allowed greater leeway in the original operation and provided a further safeguard. However, in comparison to the fierce argument as to whether to intervene or not these developments have been far less controversial.

#### **Conclusion**

It is difficult to decide on the best management for a problem when that problem is itself changing.

The nature of abdominal wounds in war changed with the development of the weapons used. More sophisticated evacuation systems enabled casualties to be operated on earlier, though the nature of warfare caused more casualties and a more tortuous evacuation chain. Eminent civilians grafted on to the military medical services reported their findings in an anecdotal way and their eminence gave their pronouncements undue weight. Against this, the Royal Army Medical Corps (only formed in 1898) had little to offer in the way of scientific research. Breakthroughs which did occur, as in the Russo-Japanese War, were not brought to general attention and, as so often happens, the lessons of history had to be relearnt.

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