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RELEARNING IN MILITARY SURGERY: THE CONTRIBUTIONS OF PRINCESS VERA GEDROITS

by

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Abstract

It is a well-known truth that knowledge is often forgotten and has to be relearned. In medicine, this unfortunate trend is especially prevalent in the history of military surgery. The story of a Russian Princess, military surgeon and poet, Dr. Vera Gedroits, is one such forgotten story. Dr. Gedroits' largely unrecognized contribution to military surgery was the adoption of laparotomy for penetrating abdominal wounds (PAWs).

In the latter half of the 19th century, the treatment of PAWs was controversial. However, the results of the Spanish-American (1898) and Boer (1899-1902) Wars and the outspoken opinions of prominent experts unified medical opinion; conservative treatment was clearly established as the treatment paradigm for PAWs at the birth of the 20th century. Indeed, conservative treatment was officially adopted by the Russians at the outset of the Russo-Japanese War (1904-1905).

During this war, the bold surgical practices of Dr. Gedroits would seriously challenge this standard of care. Dr. Gedroits performed operations in a converted railway car in a Red Cross hospital train. Despite these suboptimal conditions, she performed laparotomies on victims of PAWs with unprecedented success. These results, which were largely due to strict surgical indications and technical skill, effectively demonstrated the importance of laparotomy in the treatment of such wounds. As a result, the Russians adopted operative treatment as the new standard of care. Interestingly, however, no other countries seemed to take any notice. Dr. Gedroits' results were barely remarked upon and quickly forgotten. Indeed, contemporary Western observers of the Russian medical outfit, and historians since, have interpreted the surgical results of the war to support conservative management. It was not until WWI, ten years later, that surgeons relearned the utility of laparotomy. The story of Dr. Gedroits, both before and after her innovative treatment in the Russo-Japanese war, deserves remembering.

'Tis man's worst deed
To let the things that have been, run to waste
And in the unmeaning Present sink the Past.
Charles Lamb
Sonnet 9

It is a well known truth that knowledge is often forgotten and has to be relearned. In medicine, this unfortunate trend is especially prevalent in the history of military surgery. An interesting example of one such forgotten innovation lies in the work of the Russian Princess and military surgeon, Vera Gedroits. It was her pioneering work in the adoption of laparotomy for penetrating abdominal wounds (PAWs) that failed to permanently etch itself onto the malleable memory of Western medicine. Dr. Gedroits demonstrated the usefulness of this procedure during the Russo-Japanese War (1904-05), while serving as a chief surgeon for the Russian Red Cross. Unfortunately, only the Russians acknowledged and acted on Gedroits' life-saving results, while Western military surgeons continued to question the utility of laparotomy in war surgery.

During the first year of WWI, the Allied forces incurred a heavy cost in relearning Gedroits' lesson. Because of an ineffective treatment approach to PAWs, many lives were needlessly lost during the year the Allies required to rediscover laparotomy.

Dr. Gedroits' aggressive surgical management during the Russo-Japanese War violated the conservative, non-operative climate that dominated during the latter half of the 19th century. Specifically, this expectant or non-operant management consisted of placing the patient in Fowler's position, which was a semiflexed posture that facilitated abdominal drainage, rest and warmth, the withholding of food and water and the administration of morphine (Wallace 1917). Initially, this standard was defined by necessity; that is, operative management for PAWs was technologically impossible, with any acceptable success, until the advent of anaesthesia in 1846. Later developments in antisepsis, surgical technique, and instrumentation further enhanced the safety of laparoscopic intervention (Pryor *et al.* 2004). Despite recent advances, expectant management, and high mortality, still attended PAWs in warfare. In the American Civil War (1861-65) for example, PAWs, which were generally treated expectantly, had an 87% overall mortality (Pruitt 2006). Not deterred by these atrocious results, the efforts of Paul Reclus and William MacCormack, two influential surgeons of the period, played major roles in defining expectant management as the standard of care for PAWs in warfare.

Paul Reclus, a French surgeon, established an early evidence-based rationale for the supremacy of the non-operative approach. He studied the recovery rates of dogs after a series of 88 abdominal gunshot wounds (AGSWs) that were treated non-operatively. Reclus noted that 75% of the dogs survived without any operative management. Based

on these observations, he concluded that visceral involvement should be the only indication for operative intervention for PAWs (Adams, 1983). Interestingly, the interspecies differences in abdominal organ distribution did not seem to detract from the application of these results to humans. Similarly, the laterally-directed course of the bullets, which largely missed the canine viscera, was not accounted for. In spite of these significant drawbacks, Reclus' results effectively influenced the majority of military surgeons and physicians alike.

During this period, Sir William MacCormac, an Irish surgeon, secured the expectant approach as the standard of care for PAWs. It would be towards the end of his life, after he had acquired unrivalled international surgical prestige, that his observations during the Boer War (1899-1902) would be cemented into surgical doctrine that would go unquestioned until WWI (Smith and O'Leary 1999). MacCormac's early experience, while working as Surgeon-in-Chief of the Anglo-American Ambulance in the Franco-Prussian War (1870-1871), taught him that PAWs were both rare and invariably fatal (Bennett 1991). This early observation would later develop into a transient preference for operative management, as in 1895, MacCormac noted that laparotomy was the only treatment with any chance of success in such wounds (Bennett 1991).

To this end, MacCormac may have been influenced by the American surgeon, James Marion Simms. Simms was actually MacCormac's predecessor as the Surgeon-in-Chief for the Anglo-American Ambulance (Bennett 1991). From his experience with PAWs in the Franco-Prussian war, he concluded that the operative approach was the superior modality (Pruitt 2006). Indeed, Simms is considered to be the first strong proponent for this approach. Thus, despite his death in 1883, Simms' strong advocacy coupled with shared war experience may have left an interventionist impression on MacCormac.

Despite Simms' prospective role, MacCormac's temporary pro-operative stance was largely influenced by the increasing success of civilian laparotomy at the close of the 19th century. Although the efficacy of operative management in casualties of war was controversial, such management was clearly becoming the standard of care for PAWs in civilians (Wallace 1917). This distinction between civilian and military surgery, which would prove controversial, was largely due to the unstable and erratic operating conditions inherent in the itinerant nature of contemporary warfare. The disparate success of laparotomy in warfare was highlighted in the Spanish-American War (1898). It has been reported, from multiple sources, that the operative approach for PAWs, though only practiced to a limited extent, was universally fatal in both Spanish and American hospitals (Pruitt 2006).

It would seem that the British tempered MacCormac's pro-operative influence with the abysmal failure of laparotomy in the recent Spanish-American War, as they defined operative management as the standard of care for PAWs involving the viscera at the

outset of the Boer War (Adams 1983). MacCormac was sent to South Africa as Consulting Surgeon to the British forces for approximately 6 months, where he observed their medical and surgical treatment. During this war, the British performed 26 laparotomies for PAWs (Adams 1983). Eighteen of these 26 died, which constituted a 69% mortality rate. In addition to this high mortality associated with the operative approach, expectant management was met with surprising success (BMJ 1905). These complimentary observations led MacCormac to write, “In this war, a man wounded in the abdomen dies if he is operated upon and remains alive if he is left in peace” (Bennett 1991). This statement, which became known as ‘MacCormac’s aphorism,’ was unquestioningly accepted as surgical doctrine and defined expectant management as the standard of care until WWI (Adams 1983).

Importantly, MacCormac exerted considerable influence over Russian medical spheres, as he had been appointed an Honorary Member of the Russian Imperial Military Academy of Medicine in 1898 (Bennett 1991). Thus, the Russians, along with the majority of the Western world, also understood non-operative management to be clearly superior to operative management in the treatment of PAWs. This understanding was likely furthered by the catastrophic results of laparotomy in the recent Spanish-American War. As a result, Russia officially declared expectant management as the official paradigm at the outset of the Russo-Japanese War (1904-05).

The conservative attitude that dominated at the onset of the Russo-Japanese war failed to check the aggressive operative practices of the young Dr. Vera Gedroits. In breaking from accepted surgical dogma, Dr. Gedroits saved the lives of many wounded soldiers and, in so doing, demonstrated the efficacy of laparoscopy in PAWs. Insight into the life of this unique, but barely acknowledged, figure will help to contextualize her surgical accomplishments.

Vera Ignatievna Gedroits was born in Kiev in the spring of 1876 to a wealthy family (Bennett 1992). Her family estate was in Slobodischche, within the Russian district of Bryansk. As she was a descendent from a line of Lithuanian princes, Vera was officially a princess. Princess Gedroits received her early education at home, as was customary at the time. Continuing in the traditional mode of aristocratic Russian education, she was sent to St. Petersburg for finishing school. It was while studying in pre-revolutionary St. Petersburg that her independent spirit began to manifest itself. In 1892, at about 16 years of age, Princess Gedroits was caught participating in illegal, left-wing activities with the group, VA Veinshtok. Because of this involvement, the police sent her back to the family estate where she was effectively placed under house arrest (Bennett 1992).

Princess Gedroits did not tolerate these arrangements for long and fled to Lausanne, Switzerland. It was here in Lausanne that Princess Gedroits studied medicine (Bennett 1992). Unfortunately, due to the extreme paucity of information concerning her life, no

insight could be gleaned regarding her motivations for studying medicine. These motivations may have revealed aspects of her unique character, considering that less than 3.5% of doctors in Russia at that time were women (Editorial , 1904a). It is possible that Princess Gedroits was being pursued by the Okhrana, the Russian secret police, as she changed her name once and her address three times in three academic terms (Bennett 1992). Regardless of their prospective pursuit, the 22-year-old Gedroits graduated with excellent academic standing in 1898. Coincidentally, in this same year, the Spanish-American war was being fought.

After graduation, Dr. Gedroits worked in Switzerland for two years before returning to Russia. In Russia, she worked as an industrial doctor, practiced surgery, and published several academic articles. It is possible that these publications alerted the secret police to her presence, as she was again under their watch (Bennett 1992). This attention may have influenced her decision to volunteer for the Russian Red Cross at the outbreak of the Russo-Japanese War in 1904. Regardless of her motivations, the massive numbers of Russian casualties felled by the Japanese provided a fertile landscape for the cultivation of her aggressive, life-saving operative approach.

In January, 1905, Dr. Gedroits was transferred to a makeshift operating theatre on a hospital train. The Russians employed 78 of these hospital trains, which were effectively early mobile army surgical hospitals, during the war (Harvard and Hoff 1906; Smith and O'Leary 1999). Each permanent train could accommodate about 250 patients and typically consisted of 14 railcars. One of these railcars functioned as a triple-purpose operating theatre, dressing and dispensary station and nurse's quarters. As the Japanese sometimes fired directly upon the trains, the already suboptimal operating conditions became even more volatile. The stress and danger inherent in working as a hospital train surgeon would have been significant; indeed, 2 of their number were killed, 21 were injured, 7 were reported missing, 3 committed suicide and 28 were taken prisoner, though 20 were subsequently released (Bennett 1992).

Despite the unfavourable operating conditions, Dr. Gedroits managed to perform laparotomies for PAWs with unprecedented frequency and success. During her first 6 days on board the train, she performed 56 major surgical operations (Bennett 1992). This high volume continued, as over the next 6 months Dr. Gedroits performed 183 laparotomies for PAWs (Pruitt 2006). Although specific operative mortality data could not be found, her extraordinary success was universally stated by the handful of authors that mentioned her. More convincing of her success however, is the response of the Russian Society of Military Doctors to her results. These results, presented as a 57-page report in July, 1905, convinced the Society to change the official management of PAWs to Gedroits' aggressive operative approach (Bennett 1992; Pruitt 2006).

Dr. Gedroits' policy of only operating upon those who presented within 3 hours of sustaining a PAW was the major reason for her unprecedented success. This criterion reflects her understanding of the necessity of early operative intervention in PAWs. At this time, treatment delays, which were much longer than the 8-10 hour average in WWI, effectively guaranteed mortal hemorrhage, sepsis, or peritonitis in soldiers with PAWs (Pruitt 2006; Wallace 1917). Moreover, in that conservative age, even those soldiers who were quickly evacuated and brought to definitive care, were rarely operated upon immediately; they could spend days in the Fowler position, resting, fasting, and being warmed while they slowly died of intraabdominal hemorrhage or complications from obstruction of the small intestine. Indeed, the previous failure of the operative approach in the Spanish-American and Boer Wars was the direct result of delayed definitive care (Wallace 1917). Thus, Dr. Gedroits' results in the Russo-Japanese war clearly established the critical relationship between the injury-to-treatment interval and the outcome of operations for PAWs (Smith and O'Leary, 1999).

The Russians were able to deliver prompt interventions in the Russo-Japanese war because of the close proximity of the hospital trains to the battlefield. In addition, the extensive trench systems employed in this war created battle lines of unprecedented stability (Bennett 1991). This stability decreased the injury-to-treatment interval by allowing field operating centres to be positioned closer to the front. Also, the trenches would offer protection to the casualty bearers, allowing for their more rapid evacuation.

Although the infrastructure of this war allowed for the prompt evacuation and treatment of soldiers from all across the front, no other surgeons, Russian nor Japanese, were reported to have attempted operative management for PAWs with any consistency (Harvard and Hoff, 1909). Indeed, the Japanese are reported to have almost never operated on such wounds, being strict adherents of expectant management (Editor 1904b). It took Dr. Gedroits' innovation to recognize, and actively exploit, the opportunities associated with the timely presentation of the wounded. However, despite Gedroits' operative success and the resultant Russian conversion to the operative paradigm, the West interpreted the results of this war to favour expectant management (Wallace 1917). In failing to learn from her results in the Russo-Japanese war, the Allied forces adopted an expectant paradigm at the onset of WWI.

After the Russo-Japanese war, Dr. Gedroits received royal recognition and became senior 'ordinator' at the Tsarkoe Selo and Pavlovsk hospitals (Bennett 1992). In 1911, Dr. Gedroits joined the Poets Guild, which ultimately spurred her to publish several volumes of poetry in her future years. The following year in 1912, Dr. Gedroits was awarded a doctorate of medicine, from the University of Moscow, for her continued work in hernia repair. In addition, Dr. Gedroits published a book on her experiences as an industrial doctor, and another, *Surgical Discourses for Nurses and Doctors*, at the outset of WWI in 1914 (Bennett 1992).

In 1917, Dr. Gedroits became surgeon to the 6th Simbirsk Rifle Division. Of her time in WWI, almost nothing is written. However, it was documented that she was injured in 1918, necessitating her evacuation to Kiev (Bennett 1992). Dr. Gedroits' entry into this war would come after the Allies had learned of the life-saving benefit of the operative approach. Thus, it was that Dr. Gedroits returned to war to practice surgery amidst a newly learned, aggressive operative approach, an approach that was essentially identical to the one that she herself established over a decade earlier.

Unfortunately, the Allied forces did not learn of the benefit of the operative approach until August, 1915, one year and many lives into the war (Bennett 1991). It is difficult to speculate on how many soldiers with PAWs could have been saved had operative intervention been the standard of care at the beginning of the war. Expectant management during the first year of the war was associated with an estimated 70% mortality (Wallace 1917). As approximately 15% of all wounds were PAWs, it can be imagined that a decent number of the over 2.5 million Allied deaths could have been prevented with the 53% mortality established for the operative approach (Wallace 1917; Pruitt 2006). Fortunately, the unacceptable mortality inspired two British surgeons, Owen Richards and Cuthbert Wallace, to definitively champion the operative approach. In the eyes of the West, their work was seen as truly pioneering- the first consistent attempt since the Boer War.

Owen Richards, a temporary surgeon with the British Expeditionary Forces, is credited as being the first Englishman to publish results that clearly supported the operative approach (Bennett 1991). Owens described the results of 5 laparotomies for PAWs that involved the small intestine (Richards 1915). As small intestine involvement was thought to be universally fatal, the fact that laparotomy saved the lives of 3 of these soldiers offered persuasive evidence in favour of this approach.

Soon after the publication of Richards' work, Cuthbert Wallace, also a surgeon for the British Expeditionary Forces, performed his own research on operative management and ultimately effected the official paradigm shift. Wallace systematically performed a trial of laparotomies for PAWs (Wallace 1917). In addition to attempting these surgeries, Wallace also performed post-mortem exams on the many soldiers for which the operations failed. In so doing, he discovered the critical severity of many PAWs and came to better understand the excessive mortality attending such wounds. He also came to appreciate the prevalence of intraabdominal hemorrhage as a cause of death. Wallace reasoned that this hemorrhage could be arrested with timely surgical intervention. Thus, through his series of laparotomies and the post-mortems that sometimes followed, Wallace realized the critical importance of minimizing the injury-to-treatment interval, the same factor that Dr. Gedroits comprehended and optimized 12 years earlier.

Following from this realization, Wallace instituted a policy whereby all of those with PAWs were to be evacuated and brought to definitive operative care as quickly as possible. As he expected, mortality from PAWs decreased and many lives were saved by this approach (Wallace 1917). Indeed, the results of this aggressive operative approach convinced Surgeon-General Macpherson to adopt it as the new standard of care. Mortality for PAWs dropped to 53%, a significant decrease from the 70% that formerly attended expectant management (Wallace 1917). It followed that the West praised Wallace for his recognition of the time sensitive nature of abdominal trauma and his ushering in of a new, more effective management approach. Even today, Wallace is most often cited as being the main pioneer for the operative approach (Pruitt, 2006). At best, his predecessor, Dr Vera Gedroits, only receives obscure one- or two- sentence fragments in the odd textbook or article.

Whether Gedroits was aware of Wallace's rediscovery of her early results is not known. After her injury and the completion of WWI, Dr. Gedroits continued to publish additional academic articles and completed a last collection of short stories (Bennett 1991). In 1929, she was appointed Professor of Surgery at the University of Kiev. She has been cited as being the first female professor in Russia. Dr. Gedroits completed her fictionalized memoirs, entitled *Life*, in 1931. In the following year, at 56 years of age, Vera Ignatievena Gedroits died of uterine cancer (Bennett 1992).

Vera Gedroits was a princess, poet, scholar and innovative military surgeon. It is a wonder that her significant and diverse accomplishments are detailed in so few sources, especially considering that only two of these reference any original or primary material. It is clear that her surgical accomplishments deserve recognition, at least as much as that heaped upon those who effected almost identical feats over a decade later. The limited audience to which Gedroits presented her work defined its limited impact. Gedroits presented a 57-page report to the Russian Society of Military Doctors. Though Gedroits also published a textbook, *Surgical Discourses for Nurses and Doctors*, it is very unlikely that it was published in other languages, including English, precluding its dissemination beyond Russian military surgeons. In direct contrast, Wallace presented his work to the Surgeon-General, the Medical Society of London, and to the rest of the English-speaking Western world via his well-respected textbook and several articles in the *British Medical Journal*.

The failure of British observers to the Russian army medical corps during the war to note Gedroits' operative success was another key factor limiting Western awareness of her work (Harvard and Hoff 1906). Thus, deficient Western observation worked in concert with Russia's failure to actively communicate the life-saving advance to prevent the widespread dissemination of Gedroits' discoveries. Russia failed to show, and the West failed to see, Gedroits' discoveries. In this way, a painful lesson was not learned by the West, a lesson that would cost a great deal of human lives before it was relearned.

In conclusion, failure to operatively manage PAWs in the first year of WWI allowed many soldiers to die needlessly. The delayed application of this approach resulted from Western ignorance of the pioneering work of Dr Gedroits. As a result, the West was forced to independently address the massive mortality attending PAWs. In so doing, many lives were needlessly lost. The tale of Vera Gedroits is but one illustration of an unfortunately prevalent cycle of forgetting and relearning. Awareness of this cycle encourages one to contemplate possible discoveries that are mindlessly forgotten, or inadequately exploited. I wonder what exotic truths lie buried in the past, beneath foreign languages, yet unseen by Western eyes. These truths must be actively pursued beyond our own backyards, lest we depend on the false wisdom of hindsight to guide our every step.

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