Organization of the German Army Medical Service 1914–1918 and the role of academic surgeons

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Summary

The First World War, mankind's first high-technology conflict, resulted in unprecedented mass mortality. Medical services were confronted with overwhelming challenges in treating casualties from mobile warfare, trench warfare, battles on different fronts and infectious diseases. In this article, we give an overview of the organization of the German army medical service using contemporary reports in order to describe surgical and medical developments that originated from the experience. Consulting physicians (*beratende arzte*), many of whom were internationally known specialists, had a great impact; some of their innovations remain in use today, including the scientific evaluation of contemporary conflicts, the implementation of different echelons of care with a fast movement of patients, and the treatment of penetrating wounds. This article includes an appendix, available at canjsurg.ca/005118-a1, with more information.

During the First World War, high-technology armies with millions of soldiers were facing each other for the first time in history. The mutual armouries caused a never-known carnage on all fronts. On the German side alone, about 2 million soldiers were killed, 4.2 million were wounded and more than 20 million suffered from other diseases,[1] highlighting the enormous challenge for the medical service. Moreover, the characteristics of warfare added to the problems. In the beginning, it was a mobile warfare in which the medical service had to follow the fighting troops. Soon it became gruesome trench warfare, in which the medical service could rely on a permanent infrastructure, but had to deal with infectious diseases. Furthermore, there were extensive differences between the Western and Eastern Fronts.

To understand the treatment of the wounded, it is important to be familiar with the organization of the medical service, which was defined in the war medical regime (*kriegssanitätsordnung*) from 1907 (Fig. 1).[2] It distinguished between the operative area (*operationsgebiet*), the rear area (*etappe*) and the facilities back home. The purpose of this organization was to clear the forward facilities of wounded as fast as possible, so these facilities could receive patients continuously and were able to follow the mobile warfare.

After first treatment directly on the battlefield (comrades and medics), the wounded were brought to the aid post (*truppenverbandplatz*), which was installed on the bataillon and regimental level. Their purpose was the preliminary treatment to enable transport to a higher echelon of care. The first triage and even lifesaving surgical procedures were performed. The wounded were brought by bearers from the infantry companies to the *truppenverbandplatz*. On the army-corps level there were three medical companies per corps, meaning one company per division. These companies installed the main dressing stations (*hauptverbandplätze*) and were responsible for transport to and from the station through which all wounded had to pass. A triage officer separated the wounded into three groups: able to walk, transportable, not transportable. Those able to walk were sent back to the rear areas after a short treatment;

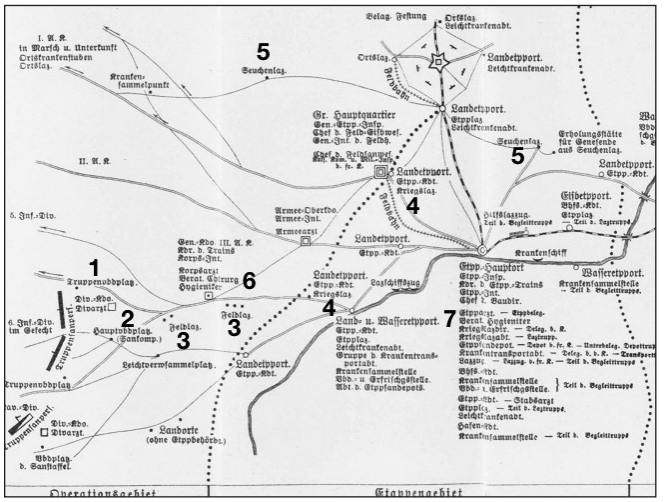

Fig. 1. Portion of a graphic (Tafel 3) from the *kriegssanitätsordnung* (1907) that depicts the organization of the medical service from the point of injury to hospitals at home, showing 1) *truppenverbandplatz* (aid station), 2) *hauptverbandplatz* (main dressing station), 3) *feldlazarett* (field hospital), 4) *kriegslazarett* (war hospital), 5) *seuchenlazarett* (hospital for infectious diseases), 6) *beratender chirurg* (consulting surgeon), and 7) *beratender hygieniker* (consulting hygienist).[2] The entire graphic is available in Appendix 1, available at canjsurg.ca/005118-a1, courtesy of Lt.-Col. M. Urbatschek.

Fig. 2. The *beratende armeepathologe* (consulting army pathologist), Ludwig Aschoff, at an autopsy of a soldier, courtesy of Cpt. (Navy) Volker Hartmann.

those deemed not transportable were treated surgically. It has to be emphasized that treatment was still preliminary, as these installations had to follow the troops.

The field hospitals (*feldlazarette*) were about 15 km behind the Front; surgical procedures were performed at these hospitals, and they had stationary patient care. They were designed to treat 200 patients. At the beginning of the war each corps had 12 *feldlazarette*, and later on the number was reduced to six. As they were part of the mobile warfare, they often used existing infrastructure. They were relieved by the war hospitals (*kriegslazarette*), which were part of the *etappe*. Special hospitals for infectious diseases (*seuchenlazarette*) were founded, as infectious patients were not transported back home. The transport in the *etappe* and back home (to the so-called *reservelazarette*) was organized by the *krankentransportabteilung* (transport unit).

During the First World War, consulting physicians (*beratende Ärzte*) were deployed on the army-corps level. They were renowned scientific leaders in different fields of medicine, often holding chair positions at universities. Many of their names are still remembered today: surgeons including Erich Lexer (1867–1937), Georg Perthes (1869–1927), Martin Kirschner (1879–1943), Erwin Payr (1871–1946) and Ferdinand Sauerbruch (1875–1951); pathologists including Ludwig Aschoff (1866–1942; Fig. 2); and internists including Wilhelm His (1863–1934). Their foremost task was to coordinate a scientifically based treatment of the wounded. They had to gather and evaluate the experiences of the ongoing war. In the scientific discourse and during special conferences, these experiences were assessed and shaped into practical recommendations for the medical officers at the Front.[3] Consulting surgeons could be found in the operative and rear areas. At the beginning of the war they performed surgical procedures by themselves; later on they concentrated on their consulting roles or on patient care in the *reservelazarette*. Consulting hygienists and internists were deployed to the *etappe* in order to support the treatment of infectious diseases (typhus, dysentery). From 1916 onward, pathologists were deployed to do standardized autopsies. They gathered an enormous scientific knowledge.

The publications of consulting physicians give a good impression of their tasks. August Borchard (1864–1940) was the consulting surgeon of the 25th reserve corps at the Eastern Front.[4] In peacetime, he was a professor of surgery in Berlin, and after the war he was one of the founders of the German Society of Traumatology and became the president of the German Society of Traumasurgery in 1934/35. He published his experiences as a consulting surgeon in the weekly *German Medical Journal* in 1934. Prof. Borchard performed surgical procedures himself at the beginning of the war. With the ongoing war, he concentrated on the consulting task to improve the treatment and returned to the table only if local resources were overwhelmed. He reports that the triage and sequential treatment were not implemented at the beginning. Major surgical procedures were performed at advanced facilities many times, which bound massive resources. He emphasized in his area of responsibility the importance of wound treatment, performance of lifesaving procedures and establishment of transportability. A further change was made in the treatment of thoracic injuries. These injuries were treated conservatively with a

bad outcome at the beginning; hemothoraces were not drained. As Prof. Borchard had an overview over the rear areas, he was able to assess the previous therapy as insufficient. He founded special hospitals for thoracic injuries and started to drain hematothoraces. He shared his experiences with other consulting physicians at the surgical conference in Brussels in 1915. Several changes in the treatment of wounded were made after this conference. Shot and grenade wounds were treated using wound dressings or primary sutures in an erroneous sense of asepsis previously, leading to devastating septic wounds. Carl Garrè (1857–1928), professor of surgery at the university of Bonn, propagated the exposure, rinsing and broad drainage of grenade wounds. Prof. Borchard summed up the characteristics of a consulting surgeon as follows:

> (…) He should be superior to his colleagues in the evaluation, in experience and in the courage to take responsibility (…) Not only scientific importance, but vast practical experience in combination with scrutiny and a certain generosity are the best characteristics.

The strain and the challenges of a *feldlazarett* are described in several publications of former physicians. A very detailed report is given by Dr. H. Hölscher, who later became a politician.[5] He served in a *feldlazarett* at the Western Front for more than 2.5 years. He described the hardships of following the troops and providing care at the same time during mobile warfare. This was hindered by the lack of motorized transport capacities. Dr. Hölscher described the equal treatment of French and British prisoners of war, who were nursed in the same facilities. With the arrival of trench warfare, the *feldlazarett* used permanent infrastructure and had to react to infectious diseases (dysentery, typhus) by creating a separate *seuchenlazarett*. They were supported by the consulting internist Ludolf von Krehl (1861–1937). Dr. Hölscher's *feldlazarett* treated 3266 patients in 1915, with 975 wounded, 225 surgical procedures and 65 deaths. In 1916 they had 3200 patients with 747 surgical procedures and 201 deaths. The increase in the numbers of wounded and dead was due to the deployment to hard-fought areas. The *feldlazarett* was deployed to Geluwe in Belgium from February to July 1916. At the beginning of June they had to treat 362 critically injured patients in only five days: 122 critically injured patients were admitted during the first night, and the next five days and nights brought another 240 patients. Dr. Hölscher took part in the Battle of the Somme in August 1916 and was deployed to the French Ytres. In 23 days they had to perform 188 major surgical procedures.

The First World War had a great impact on military medicine worldwide. For German military medicine, the war led to advances that are the basis of contemporary knowledge. The overwhelming numbers of wounded demanded a staged treatment after triage on different echelons of care with an installation of a fast and reliable transport system. Owing to this effective system, it was possible to give medical care to the highest number of wounded and even to recover many for duty at the Front. North Atlantic Treaty Organization echelons of care 1–4 are derived from this system. The scientific evaluation of experiences that are used today to improve patient care originated during the First World War. This is particularly true of wound care, where the advances used today were dearly bought 100 years ago.

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