

Medical support of military operations in Iraq and Afghanistan

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ABSTRACT

The system of medical support in the territory of military operations in Iraq and Afghanistan is based on four levels of medical treatment. Level 4 is organized outside the war theatre, in the territories of the countries that are a part of the stabilization forces of international organizations (NATO). Both the tasks and the structure of medical support are adjusted to fit the requirements of the U.S. Forces. The same tasks and structure are also recognized by medical services of other NATO countries participating in military operations in Iraq and Afghanistan. Each subsequent level of medical support is progressively more highly specialized and capable of providing more advanced medical treatment in comparison to the preceding level. Medical evacuation is executed either by air or overland depending on the type of illness or injury as well as the tactical situation prevailing in the combat zone.

The aim of this paper is to present the planning, challenges, and problems of medical assistance in the contemporary battlefield.

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Key words: medical support, military operations, Iraq, Afghanistan

INTRODUCTION

In response to the events which took place in New York and Washington on 11 September 2001 the Coalition Forces serving under the authority of NATO decided to intervene immediately. A month later operation Enduring Freedom was launched in the territory of Afghanistan, which was thought to be a hiding place for the terrorists responsible for the attacks. On 19 March 2003 another military operation began in Iraq, Operation Iraqi Freedom, which overthrew the regime of Saddam Hussein. The number of military personnel participating in Operation Iraqi Freedom totalled 151,000 soldiers from 26 countries in 2007, of whom 141,000 were American [1] (as of August 2009 all non-U.S. coalition members had withdrawn from Iraq). From the beginning of the operation in March 2003 until November 2010 the num-

ber of fatalities among American soldiers amounted to 4427, and 31,902 US soldiers were injured in combat. Within the same period 318 fatalities occurred among soldiers of different nationalities including 179 British, 33 Italian, and 23 Polish soldiers [2]. The number of peacekeepers serving in the stabilization forces in Afghanistan nowadays totals 119,800. The soldiers come from 47 different countries. America contributes 78,430 soldiers in the ISAF and further military personnel in Operation Enduring Freedom. The UK contributes a contingent of 9500 soldiers, Germany – 4590, France – 3750, Italy – 3400, Canada – 2830, and Poland – 2630. The number of fatalities, from the beginning of the military operation in Afghanistan in October 2001 until November 2010, amounted to 2195 soldiers (1370 US soldiers and 825 peacekeepers of other nationalities). Twen-

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ty-two soldiers of the Polish Military Contingent died of battle injuries in the years 2007–2010 [3].

LEVELS OF MILITARY HEALTH CARE IN THE COMBAT ZONE

The system of medical support for military operations in Iraq and Afghanistan is based on four levels of health care [4] and medical evacuation overland or, more frequently, by air (typically by means of helicopters, which were first used on a mass scale during the Korean conflict) [5].

LEVEL 1

Level 1 medical support denotes immediate first aid at the scene, usually provided by buddy-aid or a paramedic (*combat medic* in the U.S. Forces). As well as cardiopulmonary resuscitation (CPR), first aid typically includes tourniquet application, stabilization of broken limbs by splint application, and application of sterile dressing on wounds. A wounded soldier is then transferred to a Battalion Aid Station (BAS) where a physician or a physician's assistant (PA) stabilize a patient and provide treatment of diseases and injuries not requiring long hospitalization [6]. Since Level 1 has a limited capability to provide medical aid, soldiers with serious injuries are immediately transferred to Level 2 – to a Forward Surgical Team (FST), where they are provided with surgical treatment. Soldiers who cannot be returned to duty within 24 hours are also immediately transferred to a higher level.

LEVEL 2

Forward Surgical Teams (FSTs) are Level 2 medical units, which have been operating within the framework of the U.S. Armed Forces since the early 1990s (*Operation Desert Storm*). The FST is tasked with providing qualified surgical assistance and stabilizing a patient. FSTs have limited diagnostic capability based on basic laboratory equipment and X-ray. FSTs are mobile units and are located together with a medical supporting unit, which provides the FST with logistical support. FSTs have a 72-hour capability and are capable of providing operating tables for 10 serious cases or for a maximum of 30 minor cases. FSTs have to be withdrawn after 72 hours in order to renew their surgical treatment capability (all the equipment needs to be re-sterilized). An FST has the ability to provide post-operative intensive care for 6 hours. After the operation according to indications or full range a patient is transferred to Level 3, to a Combat Support Hospital. The Forward Surgical Team is a 20-person medical unit organized into 4 subunits: Ad-

vanced Trauma Life Support (ATLS) – responsible for triage and preparing casualties for surgery, Operating Room (OR), Recovery Intensive Care Unit – providing post-operative care and preparing patients for evacuation, and Headquarters – holding administrative functions. The FST is operational in field conditions within 2 hours after arrival at the scene. The FST consists of 4 surgeons (3 general and 1 orthopaedic surgeon), 8 nurses (including 2 nurse anaesthetists), 4 medics, 3 surgical technicians, and 1 staff officer. The staff of the FST lack anaesthetists, mainly due to the difficulties in recruiting physicians of this specialization to the U.S. Forces. The ATLS team is responsible for admission, stabilization, and triage of casualties into specific categories, e.g. chest wounds, limb injuries, shock, bleeding, haemorrhage, and respiratory tract injuries. The surgical team is able to work in two separate teams – one in the operating room and the other in the triage room – thus conducting two independent surgeries simultaneously. The main stress is placed on life- and limb-saving procedures and the prevention of infections. The recovery ICU has a total of 8 beds including 4 post-operative intensive care beds (waking patients after the surgery and their preparation for medical evacuation) [7].

LEVEL 3

The Combat Support Hospital (CSH) represents Level 3 of medical support. Its aim is to stabilize the patient and provide specialized treatment within a combat zone according to indications or full range. Patients who cannot be returned to duty are evacuated to Level 4 of medical support (e.g. hospitals in U.S. military bases in Europe). CSH provides up to 248 beds and can be separated into two independent hospital companies: one deploying 168 beds and the other 84 beds. The CSH is capable of providing general, orthopaedic, thoracic, vascular, urological, and gynaecological surgery. The CSH has extensive laboratory capabilities: X-ray, ultrasound scan, CT scan, blood bank, and physiotherapy. The 84-bed medical company employs 168 medical staff and is equipped with 2 operating rooms, 24 intensive care unit beds, and 60 hospital beds. The 164-bed medical company employs 253 medical staff and is equipped with 4 operating rooms, 24 intensive care unit beds, and 140 hospital beds [8].

LEVEL 4

Specialized medical care according to indications or full range at Level 4 is provided outside the zone of operations. The bulk of casualties evacuated from

Iraq and Afghanistan are transferred to Landstuhl Regional Medical Centre in Germany, an American medical unit located in the U.S. Air Force base. It admits casualties who need to be evacuated from a combat zone [9]. The patients are later evacuated to hospitals in their home countries, where they are provided with multi-profile specialized medical care.

CHALLENGES OF MEDICAL ASSISTANCE IN THEATRES OF MILITARY OPERATIONS

Medical support in the contemporary war theatre is far more mobile, advanced, and effective than that provided throughout earlier military conflicts. As a result, the morbidity from battle injuries has decreased significantly. Although the weapons have been updated and the strike force increased, the mortality rate has fallen. Battle injuries accounted for 30% of all fatalities among American soldiers fighting in World War 2, during the Vietnam war the figures dropped to 24%, while during present-day operations in Iraq and Afghanistan the number does not exceed 10% [10].

The research conducted by Rustemeyer et al. on battle injuries sustained throughout military operations carried out in Vietnam, Lebanon, Slovenia, Croatia, Iraq, Somalia, and Afghanistan demonstrated that wounds from small arms constituted the bulk of all casualties, whereas during all armed conflicts conducted in the 1990s, as well as during contemporary military operations in the Middle East and Central Asia, the majority of battle injuries were fragmentation wounds [11]. Injuries to the musculoskeletal system account for approximately 70% of all battle injuries of the present-day war theatre. The presence of orthopaedic surgeons in the operation room is crucial when it comes to providing medical treatment both within a combat zone and outside it. The advanced technology of life-saving procedures, prompt evacuation, and modern equipment used in the Iraqi Freedom and Enduring Freedom Operations made it possible to save the lives of many soldiers who would not have had any chance of survival if they had been fighting in one of the military conflicts of previous decades [12].

On the one hand, the rate of mortality within a combat zone is relatively low, but on the other hand, American medical services supporting military contingents deployed overseas struggle against a deficiency of medical staff. Just 120 general surgeons serve in the 1.5-million-strong American army; the other 120 are reservists. Approximately 30–50 general and 10–15 orthopaedic surgeons serve in me-

dical units of the U.S. Army deployed to Iraq, with the majority operating in Forward Surgical Teams (FST) [13]. To cope with the increased demand for highly skilled medical personnel the U.S. Forces health service organizes special training for physicians who are not surgeons, so they are capable of providing medical support for American soldiers deployed to Iraq and Afghanistan. During such training, in the years 2005–2007, 60 military physicians – internists, primary care physicians or paediatricians – underwent a theoretical and a practical course to teach them how to carry out surgical procedures in the battlefield [14].

Battlefield surgery implemented within combat zones in Iraq and Afghanistan is primarily based on *damage control* and it does not include full-range medical treatment for the patient unless it can be provided in a relatively short period of time. Forward Surgical Teams, mobile medical units operating on the front line in direct contact with the enemy (Level 2), can operate on the liver, intestines, and disinfect wounds, and can stop haemorrhaging. The time limit spent on a surgical patient is two hours. After that time, a wounded soldier is evacuated to a Combat Support Hospital – an immobile medical unit away from the hostilities (Level 3). Wounded soldiers subjected to medical evacuation are often transported in the middle of an operation, unconscious, ventilated, or with open abdomen and towels inside. The CSH does not have the capability to carry out all surgical procedures to the full extent. The most complicated cases are directly transferred to a Level 4 medical unit outside the combat zone. According to the statistics of the Walter Reed Army Medical Centre (WRAMC, Washington), during the first two months of Operation Iraqi Freedom the average period of evacuation for an American soldier from the battlefield to a multi-profiled specialist hospital in the USA amounted to eight days. At present, the period of evacuation, which is a deciding factor of the therapeutic success, does not exceed four days (in Vietnam it was 45 days). Nevertheless, even at the highest level of medical support, late complications such as pulmonary embolism (5% of patients treated in WRAMC, including 2 deaths) or venous thrombosis occur. Treatment-resistant infections caused by *Acinetobacter baumannii* pose yet another problem. Statistics relating to 442 medical evacuations to the USA demonstrated the occurrence of tissue infection due to *A. baumannii* in 8.4% of the casualties. Currently, all American soldiers evacuated from the territory of Iraq or Afghanistan owing to medical rea-

sions are routinely isolated and examined for infection with bacterial flora [13]. Considering the fact that the majority of wounds sustained during combat operations are injuries of the musculoskeletal system, including open fractures, amputations, nerve, blood vessel, or soft tissue damage, such procedures are fully justifiable [15-17].

The statistics referring to battle injuries, diseases, and non-battle injuries occurring in the U.S. Armed Forces are registered in a system, which allows the researchers to evaluate the rate and structure of morbidity and traumatism in the population of soldiers assigned to a particular part of the world. It also makes it possible to analyse the combat effectiveness of troops and provide health services with appropriate means and measures [18]. The U.S. Department of Defence carries out epidemiological investigations of each soldier on a regular basis (in the form of a DD Form questionnaire) [19, 20]. The questionnaires are continually analysed and updated [20]. Thus, not only the morbidity and traumatism, but also the costs of treatment as well as strategy of health promotion can be evaluated.

Each soldier of the U.S. Forces is continually monitored in terms of their health condition prior to their deployment overseas, throughout their stay there, and following their return. This is not merely a question of a specialist examination conducted by a board of physicians before and after being assigned to a duty abroad, but also consists of filling in questionnaires in which soldiers report on (or conceal) any of their health problems. Before being relocated overseas an American soldier completes a Pre-Deployment Health Assessment (DD Form 2795) in which he/she reports his/her current health condition. Thus, the collected data is used to provide each soldier with appropriate medical support (chronic diseases, allergies). Throughout all military operations, medical staff are obliged to complete Adult Preventive and Chronic Care Flow sheets (DD Form 2766), including information on preventive vaccinations, applied treatment, or other diseases which have been diagnosed in an individual soldier. Upon their homecoming American soldiers are required to complete a Post-Deployment Health Assessment (DD Form 2796) in which they report on their health condition yet again. All the medical questionnaires are completed in the presence of a physician. The physician's task is to verify all the registered data on the spot. In this way a comprehensive medical history of the patient is completed, which allows suitable services to monitor the health condition of each soldier in terms

of possible medical or judicial problems (disability, occupational disease) [21].

PROBLEMS OF MEDICAL SUPPORT OF POLISH MILITARY CONTINGENTS IN IRAQ AND AFGHANISTAN

Monitoring soldiers' health condition is essential, especially when it comes to injuries sustained within a zone of operations. From September 2003 to January 2006 five rotations of the Polish Military Contingent were assigned to Iraq. The total number of military personnel deployed to Iraq within this period of time amounted to 10,243, of whom 810 (7.9% of the total population) were injured and required the implementation of post-accident proceedings. The highest incidence of injuries occurred in combat units [22]. The execution of compensation for injuries remains a considerable problem for Polish soldiers who have suffered any health damage while being deployed abroad. One of the obstacles in the vindication of claims is incomplete medical records kept in the mission area. In some cases the medical records of Polish soldiers treated at Level 3 in American hospitals in Iraq were sent to the USA instead of Poland, and there they were lost [23].

The transport of the sick and wounded as well as the bodies of soldiers killed in action is executed by the American Air Force. Polish soldiers are transferred from Afghanistan (they concluded their duty in Iraq in 2008) to the U.S. base in Ramstein, Germany. Next, they are transported to Poland by one of the three air medical teams. There are three military hospitals in the territory of Poland, which are in constant readiness to provide specialist medical help for the sick and wounded evacuated from the area of a military mission. If need be, they provide support for the air medical teams throughout the transportation of casualties, and medical treatment of the casualties, based on their capabilities. The operational readiness of a medical team is 4 hours, of medical transport – 12 hours, and of overland transport – 24 hours. The medical services operating within the area of a military mission are supplied with pharmaceutical drugs, dressings, medical equipment, and laboratory reagents by the 10th Logistic Brigade (the unit is in charge of providing supplies for the Polish Military Contingent in Afghanistan) [24]. One of the most serious problems relating to medical supplies of the PMC remains the smooth transport of drugs and laboratory reagents. The swift transfer of drugs, reagents, and equipment has been routinely delayed due to prolonged tender procedures, the process of

choosing the best offer, purchase, and transport. In such a situation the best solution would be to compile a catalogue of drugs, dressings, reagents, and medical equipment available on the spot within the national delivery system (to be immediately transported into a mission area, omitting the time-consuming tender procedures) [25]. It would also be sensible to introduce such a system of drug distribution which would operate on the principle that a pharmaceutical agent delivered into a zone of operations has been automatically dispensed (if it is not used or its validity expires, it would be deleted from the records and officially destroyed). Thus, one could avoid fictional distribution of pharmaceutical drugs (usually confirmed by admission records of an outpatient clinic), which distorts the real image of morbidity and traumatism among soldiers.

Another important subject which needs to be discussed is the effective and safe isolation of patients suffering from infectious diseases or those assumed to be infected (especially with particularly dangerous diseases). Within a mission area it is often the case that a makeshift isolation tent is a substitute for a proper isolation room. Similarly, the same situation occurs during most of the field exercises organized in Poland [25].

An additional drawback connected with medical support of military missions abroad is the absence of consistent procedures and standards concerning triage, treatment, and medical evacuation of the sick and wounded as well as the absence of standardized medical records relating to the matters mentioned above in all of the military missions conducted with the participation of Polish Military Contingents. Poor knowledge of English along with the ignorance of NATO standards and procedures among medical personnel of the Polish Military Contingents poses yet another serious problem, which considerably impedes effective work of medical services, especially at Levels 2 and 2+ [25]. A different problem, even more significant than all of the above-mentioned, is limited access to professional training in field surgery at a clinical level, among other things, in emergency wound dressing until delayed treatment, and gunshot or fragmentation wound dressing. This is mostly due to the absence of an appropriate training base as well as a limited number of highly educated research workers [26]. However, the foremost difficulty encountered by medical services supporting Polish Military Contingents deployed to Afghanistan is the scarcity of medical personnel at Levels 1 and 2 [27]. Above all, recruiting a specialist has become

quite an achievement, and Military Recruitment Offices are more than glad to employ any civilian physician willing to serve in a mission abroad. In such a situation, additionally complicated by difficulties with the supply of drugs, reagents, and equipment, it is no mean achievement to overcome all the obstacles facing the Polish military health service supporting military missions abroad [28, 29].

CONCLUSIONS

1. The system of medical support of military operations in Iraq and Afghanistan is based on four levels of medical treatment. Each subsequent level is progressively more highly specialized and capable of providing more advanced medical treatment in comparison to the preceding level. Level 4 is organized outside the war theatre, in the territories of the countries that are a part of the stabilization forces.
2. Both the tasks and the structure of medical support are adjusted to fit the requirements of the U.S. Forces. The same tasks and structure are also recognized by the medical services of other NATO countries participating in military operations in Iraq and Afghanistan.
3. The challenges of contemporary military operations are concentrated in two areas: a lack of medical staff (mainly anaesthetists, general surgeons, orthopaedic surgeons), and a lack of the full range of soldiers' treatment in the combat zone.

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