

Combat Dermatology: The Role of the Deployed Army Dermatologist

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PRACTICE POINTS

- Army dermatologists routinely deploy to combat zones as field surgeons. In this role, they provide routine, emergency, and trauma care for active-duty soldiers and coalition forces.
- With 5 years of general medical training, army dermatologists often are the most prepared to provide advanced care when compared to co-located physician assistants and combat medics.
- Maintaining basic medical skills would serve any dermatologist in case of local or national emergencies.

Shortly after completing residency or fellowship, army dermatologists routinely deploy to combat zones as field surgeons. The US Army generally does not deploy dermatologists for their expertise in diagnosing and managing cutaneous diseases; rather, as field surgeons they provide routine, emergency, and trauma care for active-duty soldiers and coalition forces. In this article, we review the various functions of the deployed dermatologist and highlight the importance of maintaining basic emergency medical skills that could be generalized to the civilian population in case of local or national emergencies.

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Military dermatologists complete their residency training at 1 of 3 large military medical centers across the country: Walter Reed National Military Medical Center (Bethesda, Maryland), San Antonio Military Health System (San Antonio, Texas), or Naval Medical Center San Diego (San Diego, California). While in training, army dermatology residents in particular fall under the US Army Medical Command, or MEDCOM, which provides command and control of the army's medical, dental, and veterinary treatment facilities. Upon graduating from residency, army dermatologists often

are stationed with MEDCOM units but become eligible for deployment with US Army Forces Command (FORSCOM) units to both combat and noncombat zones depending on each individual FORSCOM unit's mission.

The process by which dermatologists and other army physicians are tasked to a deploying FORSCOM unit is referred to as the Professional Filler System, or PROFIS, which was designed to help alleviate the financial cost and specialty skill degradation of having a physician assigned to a FORSCOM unit while not deployed.¹ In general, the greater the amount of time that an army medical officer has not been deployed, the more likely they are to be selected for deployment with a FORSCOM unit. For the army dermatologist, deployment often comes shortly after completing residency or fellowship.

In this article, we review the various functions of the deployed dermatologist and also highlight the importance of maintaining basic emergency medical skills that could be generalized to the civilian population in case of local or national emergencies.

THE FIELD SURGEON

With rare exceptions, the US Army does not deploy dermatologists for their expertise in diagnosing and managing cutaneous diseases. Typically, a dermatologist will be assigned to a FORSCOM unit in the role of field surgeon. Other medical specialties including emergency medicine, family practice, internal medicine, pediatrics, and obstetrics and gynecology also are eligible for deployment as field surgeons.² Field surgeons typically are assigned to a battalion-sized element of 300 to 1000 soldiers and are responsible for all medical care rendered under their supervision. Duties include combat resuscitation, primary care services, preventive medicine, medical training of battalion medical personnel, and serving as the medical adviser to the battalion commander.¹ In some instances, a field surgeon will be stationed at a higher level of care co-located with a

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trauma surgeon; in those cases, the field surgeon also may be expected to assist in trauma surgery cases.

ARMY DEPLOYMENT MEDICAL SYSTEM

To better understand the responsibilities of a field surgeon, it is important to discuss the structure of the army's deployment medical system. The US Military, including the army, has adopted a system of "roles" that have specific requirements regarding their associated medical capabilities.³ There are 4 roles designated within the army. Role 1 facilities are known as battalion aid stations (BASs). Capabilities include initial treatment, triage, and evacuation, with a goal of returning soldiers to combat or stabilizing and evacuating them to a higher-role facility. Role 2 facilities are capable of providing a higher level of emergency care, including basic radiology, laboratory services, transfusion of blood products, and surgical interventions when co-located with a forward surgical team (Figure 1). Role 3 facilities, also known as combat support hospitals, have inpatient hospitalization capabilities including subspecialty surgery and intensive care. Role 4 facilities are fully capable medical centers located in the United States and other noncombat locations.³

Role of the Field Surgeon

Within the broader structure of the army, approximately 5 battalions (each composed of 300 to 1000 soldiers) comprise a single brigade combat team. Role 1 medical facilities typically have a single battalion surgeon assigned to them. Field surgeons most commonly serve in this battalion surgeon position. Additionally, Role 2 facilities may have slots for up to 2 battalion surgeons; however, field surgeons are less commonly tasked with this assignment.¹ Occasionally, in one author's (N.R.M.) personal experience, these roles are more fluid than one might expect. A field surgeon tasked initially with a Role 1 position may be shifted to a Role 2 assignment on an as-needed basis. This ability for rapid change in roles and responsibilities underscores the need for a fluid mind-set and thorough predeployment training for the field surgeon.

PREDEPLOYMENT TRAINING

As one might expect, dermatologists who have just graduated residency or fellowship are unlikely to have



FIGURE 1. A Role 2 battalion aid station in Afghanistan.

honed their trauma support skills to the degree needed to support a deployed battalion actively engaging in combat. Fortunately, there are many opportunities for military dermatologists to practice these skills prior to joining their FORSCOM colleagues. The initial exposure to trauma support comes during medical internship at the mandatory Combat Casualty Care Course (C4), an 8-day program designed to enhance the operational medical readiness and predeployment trauma training skills of medical officers.⁴ The C4 program includes 3 days of classroom training and 5 days of intensive field training. During C4, medical officers become certified in Advanced Trauma Life Support, a 3-day course organized by the American College of Surgeons.⁵ This course teaches medical officers how to quickly and judiciously triage, treat, and transport patients who have sustained potentially life-threatening traumas.

The next components of predeployment training, Tactical Combat Casualty Care and Tactical Combat Medical Care, occur in the months to weeks immediately preceding deployment.^{1,6} Tactical Combat Casualty Care prepares participants in the initial stabilization of trauma to occur at the point of injury.⁶ Tactical Combat Casualty Care principles generally are employed by medics (enlisted personnel trained in point-of-care medical support) rather than physicians; however, these principles are still critical for medical officers to be aware of when encountering severe traumas.⁶ In addition, the physician is responsible for ensuring his/her medics are fully trained in Tactical Combat Casualty Care. Tactical Combat Medical Care is geared more toward the direct preparation of medical officers. During the 5-day course, medical officers learn the gold standard for trauma care in both the classroom and in hands-on scenarios.¹ This training not only allows medical officers to be self-sufficient in providing trauma support, but it also enables them to better maintain quality control of the performance of their medics continuously throughout the deployment.¹

DEPLOYMENT RESPONSIBILITIES

Dermatologists who have completed the above training typically are subsequently deployed as field surgeons to a Role 1 facility. Field surgeons are designated as the officer in charge of the BAS and assume the position of medical platoon leader. A field surgeon usually will have both a physician assistant and a field medical assistant/medical plans officer (MEDO) to assist in running the BAS. The overarching goal of the field surgeon is to maintain the health and readiness of the battalion. In addition to addressing the day-to-day health care needs of individual soldiers, a field surgeon is expected to attend all staff meetings, advise the commander on preventative health and epidemiological trends, identify the scope of practice of the medics, ensure the BAS is prepared for mass casualties, and take responsibility for all controlled substances.

To illustrate the value that the properly trained dermatologist can provide in the deployed setting, we will

outline field surgeon responsibilities and provide case examples of the first-hand experiences of one of the authors (N.R.M.) as a Role 2 officer in charge and field surgeon. The information presented in the case examples may have been altered to ensure continued operational security and out of respect to US servicemembers and coalition forces while still conveying important learning points.

Sick Call

In the deployed environment, military sick call functions as an urgent care center that is open continuously and serves the active-duty population, US government civilians and contractors, and coalition forces. In general, the physician assistant should treat approximately two-thirds of sick call patients under the supervision of the field surgeon, allowing the field surgeon to focus on his/her ancillary duties and ensure overall medical supervision of the unit. As a safeguard, patients with more than 2 visits for the same concern must be evaluated by the field surgeon. Sick call concerns range from minor traumas and illnesses to much more serious disease processes and injuries (as outlined in Medical Emergencies). As a field surgeon, it is critical to track disease nonbattle illnesses to ensure medical readiness of the unit. In the deployed environment, close quarters and austere environments commonly lend themselves to gastrointestinal illnesses, respiratory diseases, heat injuries, vector-borne diseases, and sexually transmitted infections.

Case Examples—During an 8-month deployment in Afghanistan, one of the authors (N.R.M.) provided or assisted in the care of more than 2300 routine sick call appointments, or approximately 10 patients per day. Epidemiology of disease was tracked, and the condition of the unit was presented daily to the battalion commander for consideration in upcoming operations. The top 5 most common categories of diagnoses included musculoskeletal injuries, gastrointestinal diseases, dermatologic concerns (eg, dermatitis, bacterial infections [cellulitis/abscess], fungal infections, arthropod assault, abrasions, lacerations, verruca vulgaris), respiratory illnesses, and mental health care, respectively. Maintaining a familiarity with general medicine is critical for the military dermatologist, and an adequate medical library or access to online medical review sources is critical for day-to-day sick call.

Medical Emergencies

In the event of a more serious injury or illness, a Role 1 BAS has very little capability in performing anything beyond the most basic interventions. Part of the art of being an effective field surgeon lies in stabilization, triage, and transport of these sometimes very ill patients. Both the decision to transport to a higher level of care (eg, Role 2 or 3 facility) as well as selection of the means of transportation falls on the field surgeon. The MEDO plays an essential role in assisting in the coordination of the transfer; however, the responsibility ultimately falls on the field surgeon.^{1,6} The field surgeon at the Role 2 BAS may be expected to perform more advanced medical and surgical interventions. More advanced pharmacotherapies include

thrombolytics, antivenin, and vasopressors. Some procedural interventions include intubations, central lines, and laceration repairs. The Role 2 BAS has the capability to hold patients for up to 72 hours.

Case Examples—Specific conditions one of the authors (N.R.M.) treated include heat injury, myocardial infarction, disseminated tuberculosis, appendicitis, testicular torsion, malaria, suicidal ideation, burns, and status epilepticus. Over 8 months, the Role 2 BAS received 91 medical emergencies, with 53 necessitating evacuation to a higher level of care. Often, the more serious or rare conditions presented in the foreign contractor and coalition force populations working alongside US troops.

In one particular case, a 35-year-old man with an electrocardiogram-confirmed acute ST-segment elevation myocardial infarction was administered standard therapy consisting of intravenous morphine, oxygen, sublingual nitroglycerin, an angiotensin-converting enzyme inhibitor, and a beta-blocker. Given the lack of a cardiac catheterization laboratory at the next highest level of care as well as a low suspicion for aortic dissection (based on the patient's history, physical examination, and chest radiograph), fibrinolysis with tenecteplase was performed in the deployed environment. After a very short observation for potential hemorrhage, the patient was then evacuated to the Role 3 hospital, where he made a near-complete recovery. Preparation with advanced cardiac life support courses and a thorough algorithmic review of the 10 most common causes of presentation to the emergency department helped adequately prepare the dermatologist to succeed.

Trauma Emergencies

The same principles of triage and transport apply to trauma emergencies. Mass casualties are an inevitable reality in combat, so appropriate training translating into efficient action is essential to ensure the lowest possible mortality. This training and the actions that stem from it are an additional responsibility that the field surgeon must maintain. During deployment, continued training organized by the field surgeon could quite literally mean the difference between life and death. In addition to the organizational responsibilities, field surgeons should be prepared to perform initial stabilization in trauma patients, including application of tourniquets, establishment of central lines, reading abdominal ultrasounds for free fluid, placement of chest tubes, intubation, and ventilator management. The Joint Trauma System Clinical Practice Guidelines also offer extensive and invaluable guidance on the most up-to-date approach to common trauma conditions arising in the deployed environment.⁷ At the Role 2 level, the field surgeon also must be prepared to coordinate ancillary services, manage the Role 2/forward surgical team intensive care unit, and serve as first assist in the operating room, as needed (Figure 2).

Case Examples—One of the authors (N.R.M.) assisted or provided care in approximately 225 trauma cases while deployed. A mass casualty event occurred, in which the Role 2 BAS received 34 casualties; of these casualties,



FIGURE 2. A Role 2 battalion aid station operating room after rendering care.

11 were immediate, 10 were delayed, 11 were minimal, and 2 were expectant. Injury patterns included mounted and dismounted improvised explosive device injuries (eg, blast, shrapnel, and traumatic brain injuries) as well as gunshot wounds. Direct care was provided for 13 casualties, including 10 abdominal ultrasound examinations for free fluid, placement of 2 chest tubes, 1 intubation, establishment of 3 central lines, and first-assisting 1 exploratory laparotomy. Of the casualties, 22 were evacuated to the Role 3 hospital, 8 were dispositioned to a coalition hospital, 2 were returned to active duty, and 2 died due to their injuries. The military trauma preparation as outlined in the predeployment training can help adequately prepare the military dermatologist to assist in these cases.

Ancillary Services

An important part of the efficacy of initial evaluation and stabilization of both medical and traumatic emergencies involves expedited laboratory tests, imaging, and the delivery of life-saving blood products to affected patients. The field surgeon is responsible for the readiness of these services and may play a critical role in streamlining these tasks for situations where a delay in care by minutes can be lethal. The MEDO assists the field surgeon to ensure the readiness of the medical equipment, and the field surgeon must ensure the readiness of the medics and technicians utilizing the equipment. In a deployed environment, only a finite amount of blood products may be stored. As a result, the design and implementation of an efficient and precise walking blood bank is critical. To help mitigate this issue, servicemembers are prescreened for their blood types and bloodborne illnesses. If a situation arises in which whole blood is needed, the prescreened individuals are screened again, and their blood is collected and transfused to the patient under the supervision of the physician. This task is critical in saving lives, and this process is the primary responsibility of the field surgeon.

Case Example—A 37-year-old man presented to the BAS with abdominal and pelvic gunshot wounds, as well as tachycardia, rapidly decreasing blood pressure, and altered consciousness. An exploratory laparotomy was performed to look for the sources of bleeding. The patient's blood type was confirmed with a portable testing kit. Due to the injury pattern and clinical presentation, a call was immediately placed to begin screening and preparing servicemembers to donate blood for the walking blood bank. As expected, the Role 2 supply of blood products was exhausted during the exploratory laparotomy. With servicemembers in place and screened, an additional 12 units of whole blood were collected and administered in a timely fashion. The patient was stabilized and transported to the next highest level of care. Due to the process optimization performed by the laboratory team, whole-blood transfusions were ready within an average of 22 minutes, well ahead of the 45-minute standard of care. Local process was studied by the military leadership and implemented throughout Afghanistan.

Operating Room First Assist

If a field surgeon is stationed at a Role 2 BAS with a forward surgical team, he/she may be required to adopt the role of operating room first assist for the trauma surgeon or orthopedic surgeon on the team, which is especially true for isolated major traumas when triage and initial stabilization measures for multiple patients are of less concern. Dermatologists receive surgical training as part of the Accreditation Council for Graduate Medical Education requirements to graduate residency, making them more than capable of surgical assisting when needed.⁸ In particular, dermatologists' ability to utilize instruments appropriately and think procedurally as well as their skills in suturing are helpful.

Case Example—A 22-year-old man with several shrapnel wounds to the abdomen demonstrated free fluid in the left lower quadrant. The field surgeon (N.R.M.) assisted the trauma surgeon in opening the abdomen and running the bowel for sources of bleeding. The trauma surgeon identified the bleed and performed a ligation. The patient was then packed, closed, and prepared for transfer to a higher level of care.

Preventive Medicine

As a result of the field surgeon being on the front line of medical care in an austere environment, implementation of preventive medicine practices and disease pattern recognition are his/her responsibility. Responsibilities may include stray animal euthanasia due to prevalence of rabies, enforcement of malaria prophylaxis, medical training and maintenance of snake antivenin, and assistance with other local endemic disease. The unique skill set of dermatologists in organism identification can further bolster the speed with which vector-borne diseases are recognized and prevention and treatment measures are implemented.

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Case Example—As coalition forces executed a mission in Afghanistan, US servicemembers began experiencing abdominal distress, chills, fevers (temperature $>40^{\circ}\text{C}$), debilitating headaches, myalgia, arthralgia, and tachycardia. Initially, these patients were evacuated to the Role 2 BAS, hindering the mission. Upon inspection, patients had numerous bug bites; one astute soldier collected the arthropod guilty of the assault and brought it to the aid station. Upon inspection, the offender was identified as the *Phlebotomus* genus of sandflies, organisms that are well known to dermatologists as a cause of leishmaniasis. Clinical correlation resulted in the presumed diagnosis of Pappataci fever, and vector-borne disease prevention measures were then able to be further emphasized and implemented in at-risk areas, allowing the mission to continue.⁹ Subsequent infectious disease laboratory testing confirmed the Phlebovirus transmitted by the sandfly as the underlying cause of the illness.

CONCLUSION

The diverse role of the field surgeon in the deployed setting makes any one specialist underprepared to completely take on the role from the outset; however, with appropriate and rigorous trauma training prior to deployment, dermatologists will continue to perform as invaluable assets to the US military in conflicts now and in the future.

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