Introduction: Military neurosurgery, past and present

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For a physician has the worth of many other warriors, both for the excision of arrows and for the administration of soothing drugs.
Homer, Iliad XI.514–515

E ver since armed conflict has been used as a means to settle disputes among men, there have been those who have been tasked to mend the wounds that ravage a soldier’s body from the weapons of war. The Iliad portrays the pivotal 10th year of the legendary Trojan War, during which a schism in the Greek leadership prolongs the extended siege of the city of Troy. In the midst of this martial epic come the lines quoted above, quietly attesting to the value of the military physician, even under the crude conditions of the Greek Dark Age. They are uttered by Idomeneus, one of the foremost Greeks, when he is enjoining one of his comrades, Nestor, to rescue the injured Greek physician Machaon and take him back from the line to treat his wounds. He is afraid that Machaon will be captured by the Trojans, a loss far greater than that of any other single warrior.

Duty to country has helped shape the careers of many neurosurgeons, including iconic US figures such as Harvey Cushing and Donald Matson. This issue of Neurosurgical Focus celebrates the rich history of military neurosurgery from the wars of yesterday to the conflicts of today. We have been humbled by the tremendous response to this topic. The 25 articles within this issue will provide the reader with both a broad and an in-depth look at the many facets of military neurosurgery. We have attempted to group articles based on their predominant topic. We also encourage our audience to read other recently published articles.1–4

The first 8 articles relate to the current conflicts in Afghanistan and Iraq. The lead article, written by Randy Bell and colleagues from the National Naval Medical Center and Walter Reed Army Medical Center, discusses what is arguably one of the most important contributions by military neurosurgeons from these 2 conflicts: the rapid and aggressive use of decompressive craniectomies. This is followed by articles on decompressive craniectomy techniques by Ragel and colleagues and cranioplasty outcomes by Stephens and colleagues. After reading these articles, the reader will come away with an appreciation of the often complex nature of wartime penetrating and closed-head injuries and the remarkable recovery that many injured soldiers make with time.

Klimo and colleagues then review the military and civilian literature on penetrating spinal injuries, an injury that has received relatively little exposure in neurological publications. This topic continues to generate the same controversies as it did more than 60 years ago during World War II. The paper concludes with treatment recommendations that were agreed on by members of all 3 services (Air Force, Army, and Navy) of the US Armed Forces.

The diagnosis and management of cerebrovascular trauma has been another hallmark of the current Iraq and Afghanistan conflicts, affecting roughly 30% of all soldiers with penetrating head injuries. Articles by Bell and Vadivelu review and discuss our current understanding and management strategies of wartime cerebrovascular trauma.

Eisenburg and Ragel detail the neurosurgical experience in the military conflict that has currently taken center stage (with the drawdown in Iraq), Operation Enduring Freedom in Afghanistan. The first article is written by our colleagues in the German Army about their time in southern Afghanistan (Kandahar), whereas the second
documents the US Air Force's experience in central Afghanistan (Bagram).

There is a shift in topic focus with the next 2 papers. Given the shortage of military neurosurgeons, the military has led the way in educating nonneurosurgeons (for example, trauma surgeons and otolaryngologists) on lifesaving neurosurgical maneuvers, something that would be very difficult to implement in the civilian world. Our nonneurosurgical colleagues are often stationed in remote locations (forward operating bases) that are very close to, if not in the immediate vicinity of, combat activity. The articles by Teff and Mauer show how such education is being undertaken and provide examples in which such training has led to life-saving operations for both local nationals and soldiers.

The recent conflicts in Iraq and Afghanistan have also forced military medicine to integrate the remarkable advancements in aeromedical evacuation into military medical operations. This has resulted in a truly global-reach system that can literally transport neurologically critically ill patients from the country of conflict to fully equipped medical centers in Europe and the US in a matter of hours. The challenges faced by the men and women of aeromedical evacuation are detailed in the articles by Fang and Reno.

This issue of *Neurosurgical Focus* has given us the opportunity to introduce nonmilitary neurosurgeons to military neurosurgical services from around the world. The reader will learn about military neurosurgical history and capabilities in France, Germany, Bulgaria, and Turkey.

Despite military neurosurgeons’ caring for those who are wounded on the battlefield, the majority of their time is committed to caring for those who are at home—active-duty members and their family members—and are afflicted with neurosurgical diseases not unlike the general population. However, the delivery of medical services within the military results in several unique issues for the neurosurgeon, one of them being “return to duty” for active-duty members who undergo spinal operations for degenerative disease. Furthermore, the military medical system allows neurosurgeons, at times, to offer patients services that are in some respects more difficult to acquire in the civilian setting, such as artificial cervical and lumbar discs. These are the topics discussed in papers by Tumialán and Cardoso. Training of neurosurgeons also occurs in the military, and the article by Neal discusses an approach to assessing the acquisition of neurosurgical skills in residents with a particular surgical procedure that can easily be applied to all neurosurgical training programs, both military and civilian.

This issue of *Neurosurgical Focus* would not be complete without several historical articles. These articles pay tribute to underrecognized pioneers of the field (Loyal Davis) and describe the evolution of battlefield management of penetrating head injury and peripheral nerve injury during particular conflicts in history. We felt it was appropriate to conclude this issue with an article by Kellner and colleagues that discusses the emerging technologies of the future—brain-computer interfaces.

In conclusion, we are personally honored to have served in the US military. Although military neurosurgeons continue to strive for better treatments and outcomes, their humanitarianism is eclipsed by the bravery of their soldier patients as well as the wives, husbands, and children who had the strength to “keep the home fires burning” while their loved one was deployed in the service of this great nation.

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**References**