Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

A military perspective on the vascular surgeon's response to the COVID-19 pandemic

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The novel coronavirus-19 (COVID-19) disease pandemic represents the largest and fastest moving challenge to the world's public health and health care systems in decades. As the virus and its impact spread, health care systems around the world are responding with large-scale protective measures and reallocation of resources. Amid the pandemic, the global community of vascular surgeons is working to contain the virus and to surge treatment capacity. Recent reports from Ng et al[1] in the *Journal of Vascular Surgery* and Starnes and Singh[2] in *Vascular Specialist* as well as guidelines from the Society for Vascular Surgery (SVS) and the American College of Surgeons (ACS) for the triage of vascular conditions[3,4] highlight the role of vascular surgery as part of the whole-of-medicine approach to this challenge.

Although different in scale, military medicine's response to 9.11.2001 provides insight into how the surgical profession can optimize its response to the 2020 pandemic. To rapidly attain a capability to care for thousands of injured service members around the world and to make patient care decisions in austere, resource-limited situations, the U.S. military relied on international partnerships, expanded its patient care capacity, and implemented data-driven performance improvement, including practice guidelines.[5-7] Aspects of this experience may help to optimize the vascular surgery community's response to the current global health threat.

INTERNATIONAL PARTNERSHIPS

In their letter to the editor, Ng et al[1] describe the approach that their vascular service has taken in Singapore and in doing so provide an outline for the global community as it adjusts to the pandemic. This group initiated a split-team policy with complete separation to protect personnel and to maintain clinical capability. The group also created capacity in the form of space, equipment, and personnel by limiting operations and appointments. With these steps, the group has increased the availability of intensive care beds, ventilators, personal protective equipment, and providers. Ng and colleagues are also maximizing the use of telemedicine and remote triage while maintaining a high standard of care.

Ng and colleagues took their efforts a step further with an innovative survey of vascular practices around the world to understand and to characterize how the global community was adjusting. During 4 days in March, this group obtained responses from dozens of vascular teams around the world, showing that 90% of practices have canceled some if not all elective operations, and a similar 90% have canceled staff meetings or converted to online video or text messaging platforms. Similar to the military's having learned from international partners during the recent wars, vascular surgery's response to the pandemic confirms that *medicine is an international language and we do not have to learn alone*. To optimize our effectiveness in this pandemic, we must put to use strong international partnerships in vascular surgery.

CREATING CAPACITY

Faced with the COVID-19 crisis in Seattle, Starnes and Singh[2] also reached out to international partners, Pierantonio Rimoldi and Germano Melissano in Milan. In their communications, they received an assessment of how the system in Milan had been overrun as well as information that allowed the team in Seattle to implement measures to preserve "staff, space, and stuff." By canceling cases, clinics, and conferences, Starnes and Singh quickly created capacity for their health care system. By maximizing telecommunication and devising a split-shift call schedule that separates the vascular teams, they have optimized the well-being of the staff and their ability to continue the mission should a member become ill or quarantined. The vascular groups in Singapore, Milan, and Seattle have also served as trusted leaders within their respective health care systems, supporting plans for surges of exposed or ill patients and helping to make difficult decisions relating to resource allocation.

A GUIDELINE-DRIVEN RESPONSE

In March, the ACS provided recommendations for the management of procedures during the COVID-19

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pandemic.[3] The ACS and the SVS then coordinated guidelines for the triage of patients with vascular conditions.[3,4] These guidelines are intended to support surgeons in developing an organized, deliberate response to what could be a rapidly changing practice setting. Similar to the military's casualty care guidelines, these documents do not usurp independent decision-making and will be applied in different ways by surgeons in different cities and regions of the United States and worldwide.[7] As the military does for its clinical practice guideline process, the ACS and SVS should modify theirs over time as the guidelines are informed by feedback (ie, data) from the clinical community.[5,6]

As a means to facilitate real-time exchange of information on the vascular surgery community's response to the pandemic, the SVS has initiated online forums.[4] On March 27, the SVS hosted a virtual town hall that included more than 500 participants and an informative discussion of what vascular surgeons are experiencing and what concerns they have. Using a similar format, the military has used weekly worldwide virtual town halls for more than a decade as a performance improvement mechanism. These weekly meetings allow the military's trauma system to gather real-time information from its clinical community, to discuss what is working and what is not working, to make adjustments in practice guidelines, and to find ways for the system to support those on the ground.

RESOURCE-LIMITED ENVIRONMENTS

Triage refers to the military's process of assessing wounded on the battlefield, and it depends on the number of ill and injured and on the available resources (ie, staff, space, and stuff). Most mass casualty events occur without notice, providing little time for the health care system to respond. As such, the most important factor in optimizing team performance and patient survival is to do systemwide planning ahead of time. In our experience, no mass casualty triage scenario ever goes perfectly, and they are always chaotic. However, implementing lessons from those who have been through similar events goes a long way to improving success when health care providers are faced with such a daunting task. Unlike most mass casualty events, this pandemic has provided a short lead time for many providers and health care systems not yet affected to prepare. The time to act is now.

APPLYING LESSON LOCALLY AT WALTER REED

Our vascular surgery group has adopted the Seattle approach to curtailing operations, clinics, and the vascular laboratory while preserving call coverage and general surgery residency and vascular fellowship training activities. The decision to adopt split-shift call teams (1 week at a time) with separation of staff was validated as another subspecialty service in our hospital had multiple providers removed from duty after testing positive for COVID-19 or requiring quarantine. As part of the "one team, one fight" ethos of military medicine, we are helping to staff a COVID-19 screening tent outside of the hospital, participating in local contingency planning, and we deployed a surgeon to the USNS Comfort, with two partners planning to deploy within weeks or months.

One of Dr Norman Rich's favorite phrases regarding military students, trainees, and faculty at the Uniformed Services University and Walter Reed is "we teach contingency, we must practice contingency."[8] As vascular surgeons, we have a knack for responding to conditions that evolve quickly and have life-threatening consequences. In the case of the 2020 pandemic, we should use the tools we have developed to adapt and to lead in the whole-of-medicine response to the virus. The good news is that we do not have to learn or lead this alone. Like military medicine, we have international partners and institutional resources to inform and to support our efforts.[2-4,7] As we practice contingency in these uncommon times, military medicine's "one team, one fight" ethos and specific aspects of its wartime experience may serve as a useful perspective.

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