Introduction

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“We have met the enemy and he is us” - Walt Kelly

The tragedy of September 11, 2001, and subsequent anthrax distribution have turned into reality the threat of terrorist attacks causing mass casualties. As neurosurgeons, we must understand our roles in situations involving mass casualties. In particular, we must be prepared for environments contaminated by the effects of radioactive, chemical, or biological weapons. At the 2001 Congress of Neurological Surgeons meeting of military neurosurgeons, questions arose as to the role that neurosurgeons would play in mass-casualty situations arising from an attack involving these weapons of mass destruction (WMD).

The public health and military communities have conducted risk assessment analyses of WMD attacks causing mass casualties and have evaluated our preparedness for managing them. Most authors have concluded that the threat of WMD disasters is quite low. Sidel and associates³ have argued that being prepared for bioterrorist attacks makes as much sense as packing snow boots for a trip to San Jose, California, in case of a blizzard. They contented with some authority that money spent on domestic terrorism protection initiatives would be better spent on obvious domestic public health concerns. Each year there are 60,000 chemical spills that cause more than 300 deaths and 76 million cases of food-borne illnesses resulting in 5000 fatalities. Clearly, these are real and significant public health issues.

Unfortunately, recent events have made it clear that groups around the world have the will and an as-yet-undetermined capability to use WMD against the United States. Assessing the probability of such attacks is complex, involving many underlying assumptions. Dismissing such scenarios as improbable, however, would be to ignore a real current public health concern. Clearly preparing for public health risks such as food poisoning and chemical spills must be balanced with the unthinkable peril of a WMD attack. An unexpected blizzard in San Jose, California, has very different consequences compared with a lack of readiness in the event of a WMD attack.

Current preparedness for nuclear, biological, or chemical weapons scenarios is not comforting. The sheer magnitude of cases predicted by attacks is a primary issue. In one large-scale biological terrorism model investigators examined the effect of releasing *Bacillus anthracis* spores into prevailing winds headed toward the suburb of a large city. They predicted up to 50,000 cases of anthrax in an exposed population of 100,000 people with more than 32,000 deaths.¹ Undoubtedly, emergency facilities would be overwhelmed.

Wetter and associates⁴ used a questionnaire to examine the preparedness of several emergency departments in urban and rural centers in the Pacific Northwest. They assessed the following issues: 1) plans in place for a biochemical attack; 2) drills or training that had occurred within the last 24 months; 3) the availability of personal protective equipment; 4) the existence of an indoor decontamination area with or without ventilation isolated from the rest of the hospital; 5) the availability of a shower supplied by a separate water containment system; 6) the existence of portable outdoor decontamination equipment; and 7) whether enough medication (ciprofloxacin, doxycycline, atropine, and pralidoxime) was available to support treatment of a hypothetical incident involving 50 individuals exposed to a biological agent (anthrax in this case) or 50 individuals exposed to sarin (nerve agent GB) gas. Slightly more than half of emergency departments were aware of local or state preparedness plans, and only one third were aware of national plans. Approximately 80% of hospitals had hazardous materials response plans, but fewer than 20% had plans to respond to biological or chemical weapons. Urban hospitals were three times more likely than rural centers to have response plans for biological or chemical attacks. Twenty-one percent had an indoor isolated ventilation and water containment system. Approximately one third of these hospitals had additional outdoor portable decontamination units. There were no isolation or decontamination units of any type at 25% of hospitals. Only 12% of hospitals reported having a self-

contained breathing apparatus for hospital personnel, and another 11% had only chemical cartridge masks. Twenty-nine percent reported an atropine supply large enough to treat the 50 hypothetical sarin gas cases. Sixty-one percent did not have pralidoxime available, and the remainder had less than one quarter of the required dosing. The investigators of the hypothetical anthrax attack found that 64% of emergency rooms had enough ciprofloxacin and doxycycline to administer a 2-day supply to 50 patients.

Despite reporting bias inherent to questionnaire studies and the assumption that emergency facilities of the Pacific Northwest are representative of the nation as a whole, this aforementioned study demonstrated a significant problem after only 50 chemical or biological exposures.⁴ What can neurosurgeons do? The initial response to a WMD attack will be at the local level. Although an isolated attack would receive federal assistance, many patients would not survive the interval between attack and the federal response. As neurosurgeons we are not responsible for setting emergency department policy; however, we should be aware of our hospitals' response plans to hazardous material accidents and WMD attacks. If a hospital has no plan to deal with either type of incident, then what other hospitals in the area are prepared and what is the evacuation plan? If the hospital does have a plan, how many patients can be supported? Who will be making the decisions, and

when does authority change from local to state to national level? In scenarios in which resources are overwhelmed or patients are contaminated, is it inappropriate to treat all who come regardless of the consequences to the staff or other patients?

In this issue of *Neurosurgical Focus* we plan to discuss the realistic ability of neurosurgeons to function in the wake of a WMD attack. In doing so we will discuss the credibility of the threat, common threat agents, including presentation and treatment, and the principles of triage and evacuation.

References

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