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We Fight Like We Train

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As we say in the U.S. Navy, "We train like we fight, and we fight like we train." In Boston, we do the same.

That was never more evident than at 2:50 p.m. on April 15, when two explosive devices abruptly shattered the 117th Boston Marathon. On Patriot's Day, the day we commemorate the opening battle of the Revolutionary War in Lexington and Concord, Boston was under attack.

Over the past 8 years, Brigham and Women's Hospital (BWH) has activated the emergency response team on 78 occasions. We have activated it for both real-world events and drills based on a wide array of scenarios — chemical attacks, oil spills, train crashes, blizzards, and building evacuations. Eight times we practiced mass-casualty drills simulating the human fallout from bombings, aircraft accidents, and "active shooters," such as those at Sandy Hook, Connecticut, and Aurora, Colorado. These drills have been departmental, hospital-wide, citywide, and statewide. They taught us familiarity, comfort, trust, and routines. On April 15, these routines saved lives.

At 8 a.m., in accordance with our annual Patriot's Day protocol, our emergency management director opened the hospital's Emergency Operations Center.

At 2:49 p.m., the nurse in charge of Alpha Pod (one of four separate 14-bed pods, all within the larger emergency department [ED]) conducted a scan of our 55-bed ED. It was full: 47 patients in beds, 6 in the hallway, 6 in the waiting room, and 4 in the triage area.

One floor below the ED, our perioperative nurse administrator reviewed his caseload: 30 of 42 operating rooms (ORs) were active, with 8 more available for the 4 patients waiting in the preoperative area. An additional 15 elective cases remained on the schedule for that busy Monday.

At 2:50 p.m., reports of an explosion came over the Boston Fire and emergency medical services radio frequency.

At 2:54 p.m., the Central Medical Emergency Direction Center hotline rang in Alpha Pod, reporting two explosions and incoming patients. The lead emergency medicine (EM) physician in Alpha Pod, recalling her experiences in Haiti after the 2010 earthquake and as incident commander during a practice drill for responding to mass casualties from a bomb in March 2011, huddled with the nurse in charge of Alpha Pod and the emergency management director. This team quickly assessed the crowded department and prepared to receive victims; their first task was to clear the ED of current patients.

The Boston Public Health Commission's Medical Information Center called; BWH would be receiving 8 patients from the scene. The team initiated Code Amber, our hospital-wide disaster response.

A senior EM resident who had attended a disaster-management training session in October 2012 reminded the team to consider the possibility of a hazardous-material (HAZMAT) threat.

As reports trickled in — that there was a fire at the John F. Kennedy Library across town, that other devices had been found — the emergency management director recalled the 2008 Mumbai attacks, in which a mass shooting was followed by an attempted assault on the hospital where victims were sent. He directed security to lock down the hospital and open the HAZMAT decontamination unit.

In Alpha Pod, the chief of the Division of Medical Psychiatry coordinated the placement of 8 patients awaiting psychiatric beds by transferring them to our surge pod or to McLean Hospital in Belmont. He spoke with every psychiatric patient, calmed one patient who believed the unfolding events were his own delusion, and collaborated with social workers to identify the psychosocial needs of patients and their families.

Teams of internal medicine

residents rushed from elevators and rolled existing ED patients to other wards. Trauma surgeons, anesthesiologists, and orthopedists reported to the ED for duty, rapidly forming interdisciplinary teams.

At 2:59 p.m., the Bravo Pod team gathered to prepare for incoming patients. A neurology critical care fellow, recognizing the urgency of the situation, took charge of a critically ill patient with a thalamic hemorrhage.

The nurse administrator, a former U.S. Army major who remembered the overwhelming need for surgical supplies and personnel during a mass-casualty event in Honduras, assembled a labor pool in the OR area and called for extra materials.

At 3:08 p.m., the first survivor arrived.

Over the next half hour, the hospital received 19 survivors. On entering rooms, patients were met by teams that conducted trauma surveys, assessing patients from head to toe for both obvious and subtle injuries. Resuscitations, including intubations, massive blood transfusions, and tranexamic acid infusions, were performed throughout the four ED pods. Five of the 19 survivors required emergency surgery.

In Room 38 in Bravo Pod, a team worked to resuscitate an elderly man, just as they had done with trauma victims on many overnight shifts in the past. This survivor, who was taking warfarin, had a complicated open fracture of his right ankle, burns, and multiple facial wounds; he was in hemorrhagic shock. An EM physician performed a primary and secondary survey. A trauma surgeon applied a blood pressure cuff to the patient's right thigh to control bleeding. A second EM physician intubated the patient. A plastic surgeon performed a lateral canthotomy. A nurse transfused blood and fresh frozen plasma.

At 3:15 p.m., the medical director of the ORs huddled with trauma and orthopedic team leaders in Alpha Pod to coordinate the flow of patients directly to ORs, bypassing preoperative areas, just as he had practiced during a 2007 simulation of an airliner collision at Logan Airport.

At 3:30 p.m., a thoracic surgeon scanned each room of Bravo Pod, assigning surgical staff just as he had done in the ED at Hadassah Hospital after multiple bus bombings in Israel 15 years earlier.

Between 3:39 p.m. and 4:38 p.m., 7 more survivors arrived.

At 3:45 p.m., an orthopedic chief resident took a 33-year-old man, whose mangled legs had been bound with tourniquets, and pushed him directly to the OR. The resident stuck to the steps he had learned at Massachusetts General Hospital, where he had operated on a patient whose leg had been mangled in a car accident. The bombing survivor's injuries required an amputation of his right lower leg, débridement of a large soft-tissue defect in his left thigh, and removal of shrapnel, including large metallic plates, nails, and BBs.

For the next few hours, survivors continued to arrive. They kept coming.

Overall, we treated 39 survivors, ranging in age from 16 to 65 years. Nine patients required emergency operative intervention for open fractures, amputations, devascularized limbs, burns, and shrapnel removal. Many required second, third, and even fourth operations to wash out debris, remove dead tissue, stabilize fractures, and perform myocutaneous flap replacements of missing tissue. Some required vascular reconstructions, placement of external fixators, and fasciotomies of the legs.

These complex procedures took careful planning and coordination across all surgical disciplines. Today, 4 survivors remain hospitalized with us.

We also treated patients with less severe injuries, such as ear barotrauma and shallow shrapnel penetrations. These patients were invariably more concerned for the other victims than they were for themselves.

In these extraordinary circumstances, successful care came from colleagues working alongside familiar teammates, performing familiar tasks. When challenged, each team performed as if the situation were routine. In Boston, we fight like we train.

Our next duty, as members of the Boston health care community, is to work with our colleagues in prehospital care and across all receiving hospitals to carefully and collaboratively analyze our collective experiences and share with others the lessons regarding health care and preparedness that emerged from this tragic event.

We have learned so much, but we have so much to learn.

Disclosure forms provided by the authors are available with the full text of this article at NEJM.org.

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