

# 9/11:

## Jersey City Medical Center— lessons learned



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September 11, 2001, began as a slow and easy day for me. Nothing was scheduled in the operating room, and I had chosen to remain home and download Zagat's guide to Manhattan restaurants onto my PalmPilot®. I live on the top floor of an apartment building situated right on the Hudson River, directly opposite the site of the World Trade Center. I didn't even look up or out the window when the first explosion occurred, assuming it was part of the blasting on the new Goldman Sachs Tower being built right down the street.

Instead, I completed my download and gathered up my German shepherd and my border collie for their morning walk. Halfway down to the lobby on the elevator, an acquaintance boarded with a camera and told me a plane had run into one of the World Trade Center Towers. I left the building and took the dogs to their favorite corner, still unable to see the burning tower. Eventually, we walked around our building and down the walkway along the Hudson River, and I saw that the North Tower was in flames. I continued to a spit of land in front of my apartment building which juts into the Hudson River directly opposite the twin towers. At this point, I noticed a jetliner in a two-minute turn moving quickly and lower than was usual. I recall thinking that there must be something wrong with the pilot who was flying the plane so close to the burning tower.

Then the unthinkable happened. The plane that had turned over Liberty State Park and the Statue of Liberty continued into the South Tower. There was an immediate orange fireball, and true to my military training, I hit the ground and covered up, fearing a possible blast effect. No blast was noted, so I stood up and began the short walk home. When the second plane hit, screams of terror sounded from about every direction. I let out an expletive and returned to my apartment.

Once home, I woke my daughter and her friend. I told the two recent college graduates that the World Trade Towers had been blown up. Meanwhile, my wife, unbeknownst to me at the time, was just finishing a physical therapy session in an office located directly across from the South Tower when the first plane hit the North Tower.

She was out on the street witnessing the flames from the North Tower and the sight of people falling to their death when the second plane hit the South Tower. She immediately joined a sea of humanity making its way northward and eventually caught the last ferry boat over to Jersey. Hours later she returned from Weehawken, NJ, on foot to our home in Jersey City.

My daughter and her friend began photographing the burning towers, when suddenly the South Tower collapsed. Unaware of the theory of a top-down collapse based upon structural failure, I assumed a nuclear device had gone off in the basement of the tower, and I got all of us down behind a wall to avoid the certain blast effect that I thought would blow out the windows of my apartment. Again, no blast effect occurred.

By now I had received a call indicating that the hospital where I chair the department of surgery, Jersey City Medical Center (JCMC), was on alert. I figured that whatever brought the South Tower down would soon bring down the North Tower. Still fearing a blast effect, I instructed the girls to take the two dogs for a walk in the direction of the Jersey City Medical Center. I prepared to go to work to see what could be done, though I considered it a dubious possibility that we would receive many victims of the horrific collapse of the South Tower.

Nonetheless, I got on my bicycle and headed west into a beautiful, crystalline blue sky. Behind me, though, was a growing cloud not unlike what I would imagine a nuclear cloud to resemble. Traffic was horrible due to the flood of commuters fleeing to New Jersey and gapers turning out to view the attack, but being on a bicycle allowed me to weave between cars, and I arrived at the hospital in no more than 25 minutes.

I arrived at JCMC and went to my ninth-floor surgery suite, which is high on a hill and overlooks all of Manhattan. At that point, the North Tower collapsed under my direct vision.

I glanced at a poster for a lecture on "Third World Medicine" I had given many years ago at the University of Padua while on active duty and stationed with the U.S. Army in Vicenza, Italy. The talk was based on my experience with training Afghan mujahideen medics in the mid-1980s. Somehow I sensed these events were related. The hospital chief executive officer soon arrived in my of-

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Left inset: The JCMC emergency room view of unfolding events on 9/11.

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fice, and we discussed plans and began to walk around.

My previous military experience had included being Deputy Commander of the Thirty-First Combat Support Hospital in Saudi Arabia during Operation Desert Storm, Commander of the European Contingency Hospital throughout the Eastern Mediterranean, and having served as the acting U.S. Forces Korea Surgeon during the war games known as UFL (Ulchi Focus Lens). This experience paid off as we attempted to deal with the injured patients that were to come through our doors that day.

### Lessons learned

The following are some of the salient features that went into allowing JCMC to easily and successfully respond to the demands we encountered on September 11, 2001.

- *Don't reinvent the wheel.* Civilian triage isn't based upon military triage. However, both civilian and military triage are designed to increase the efficiency of dealing with disaster.<sup>1</sup> A mass casualty situation is one in which the ability to respond is overwhelmed. The basic principles of responding to a disaster or to a mass casualty situation is to conserve medical personnel and material resources.

- *Prepare for unusual injury patterns.* Military casualties have been defined as killed in action (KIA), wounded in action (WIA), and died of wounds (DOW).<sup>2</sup> KIA are handled outside of the medical practice. Physicians and surgeons attempt to reduce the DOW from the WIA group. Traditionally, the WIA to KIA ratio is greater than five. On 9/11, it turns out that more than 3,000 individuals died, and the number of wounded and requiring hospital admission was less than 500. This reversal of the WIA to KIA ratio is highly unusual in a military or terrorist attack.

Living triage resulted from the mechanisms of injury: massive crushing and extreme heat. The walking-wounded, self-rescued individuals were the first to present for care. These individuals had been more on the periphery of the catastrophe. Most of them would be classified as minimally injured and would be triaged for care outside the emergency department.

A bit later, some rescue workers who had been

closer to Ground Zero and more involved in rescuing people from the towers were brought in. These admissions included delayed injuries—those who could be initially seen and admitted for later care, including patients who had lost consciousness but were awake upon arrival, and a couple of closed fractures of lower extremities. Along with the delayed injuries came a few urgent patients, including an airway-breathing problem and a couple of patients with evidence of blood loss. A final classification of patients would be “expectant patients”—patients who could not survive because of the severity of their injuries and the demands on the health care system given the sheer number of injured. On 9/11, these patients did not materialize.

Echelonment of care is a basic military principle built upon an immediate response to injury in the battlefield by a combat lifesaver buddy and then care at the battalion level by medics, a field PA (physician assistant), or a young general medical officer in the position of the battalion surgeon. From here the wounded go to a collecting area, which may be a clearing company either in the main support battalion or the rear support battalion; then the patient is taken to a Combat Support Hospital, or, previously, to a Mobile Army Support Hospital for complete surgical care. Eventually, military casualties are prepared for evacuation or movement to general hospitals. On 9/11, there were some immediate responders; however, many immediate responders were killed when the towers came down, and the command and control elements of the EMS service were taken out simultaneously. St. Vincent's Medical Center was the nearest trauma-ready hospital and they were quickly occupied with patients. Burn patients were triaged to the local burn unit at New York Hospital.

As communications and transportation fell apart, suddenly and without prior planning, a staging area was set up across the Hudson River. An ad hoc fleet of evacuation boats was assembled. Shortly after the attacks, patients began to arrive at Jersey City Medical Center, a Level 2 trauma center, after being evacuated by ferry boat to Liberty State Park. Other patients, more of the walking wounded self-rescued, managed to leave Manhattan by the PATH train and arrived in Hoboken, NJ, eventually making their way to local commu-

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nity hospitals in Hudson County, including St. Mary's of Hoboken and Christ Hospital of Jersey City.

- *Coordinate evacuation routes.* Coordinated evacuation is difficult to achieve in the best of situations. When planning goes out the door and the communication and transportation systems are suddenly and radically changed, it is even more difficult to achieve. On the battlefield, hospitals first appear within the corps. A corps is a grouping of three to five divisions and has a separate corps support command. The corps support command may comprise up to 50,000 to 70,000 soldiers and is commanded by a Brigadier General. Under this individual is a Medical Brigadier General who commands a medical brigade. The medical brigade will have a couple of subsidiary commands called medical groups, and each medical group, in addition to evacuation helicopter assets, will include a multitude of hospitals. To avoid overwhelming any given hospital, the medical brigade will have a medical regulating officer who knows the moment-to-moment bed and blood availability status of all the hospitals and is able to direct patients to the facilities that are most accessible and ready to receive casualties.

No such system was in effect 9/11. Communication was out, and the ability of New Jersey to serve as a medical reserve asset for New York City had not been tested. In fact, when phone service was possible, the State Commissioner of Health was in touch with the CEO of JCMC and plans were detailed to send less severe patients to other local hospitals and to facilities further from the waterfront. The intent was to keep JCMC more available for the most seriously injured.

- *Physicians and nurses rise to the challenge.* This is a fact that I have seen proven time and again. Physicians and nurses respond without question. JCMC had good internal coordination and more than 100 percent staffing was immediately obtained. As a result of department of surgery initiatives implemented throughout the year, there was good teamwork with emergency department members and with other staff, including nursing, ophthalmology (which became important when the number of injuries from glass fragments in the air became apparent), operating room, orthopaedics, medicine, and laboratory and imaging.

- *Develop minimal care out of the emergency department.* A standard goal is to keep the walking wounded and more seriously injured patients separated. On 9/11, the hospital auditorium was where we sent the walking wounded for triage and transfer to the emergency department (ED) if their injuries warranted the move.

It is also imperative to develop some sort of quick-and-dirty field medical card to track patients and for database development. This turned out to be a difficult process at JCMC.

- *Minimize time in the emergency department.* This principle requires that clinicians be better skilled in times of need. In particular, the number of X rays obtained should be kept to a minimum. Many fractures can be diagnosed clinically and if not open, proper splinting reduces them to a delayed category and can save time and supplies from radiology. By the same token, laboratory tests should be kept to a minimum. Type and cross should be the main laboratory test in addition to tests for occult bleeding in urine or stool and arterial blood gases when clinical acumen and oximetry isn't adequate. It is also very desirable to enforce unidirectional flow through the ED. This requires that when a patient leaves the ED for an imaging study, that patient doesn't return to the ED but instead goes either to the OR, the pre-op holding area, the ICU or the ward. Generally, patients can be triaged and treated in the ED within 10 minutes.

- *Conserve resources.* It is imperative not to rush the first delayed patients to the OR. If they are delayed, they need to wait because urgent patients may well be on the way. If overwhelming casualties develop early, blood must be conserved by identifying expectant patients, and this process can be difficult.

Triage is more than sorting patients by injury; it is deciding the order of treatment based upon the injury, the availability of personnel and material resources, and the changing nature of the tactical situation. The JCMC, by encouraging the State Health Commissioner to arrange for less injured patients to be mobilized further from the scene, worked early on to conserve resources.

Finally, delayed and emergent patients should be transferred further away as soon as they are stable.

- *Be alert for chemical and biological agents.*

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Conventional weapons may also include chemical and biological agents. Decontamination should be a civic function done in the field, yet every hospital must have plans to re-decontaminate patients before admission to the hospital. This step was not taken on 9/11, and it will be a challenge to carry out in the future. Additionally, beware of acts of terrorism in your immediate area of operations. All patients should be cleared of weapons. Ideally this is a police function, but in combat and in civilian catastrophes, the local and military police are usually tied up with other matters, so hospitals need to develop plans to fulfill these requirements.

### Final observations

By the end of the day on 9/11, JCMC had seen 148 patients in about a six-hour period. A questionable number of other patients had been seen in minimal care. Only 26 patients were admitted, and there were no deaths. Three orthopaedic operations were eventually performed, and three patients ended up in the ICU including one inhalational injury on a ventilator. Specific injuries included flying glass eye injuries. (Having an eye service with slit lamp exams in the ED is a valuable goal in future catastrophes.) Crush injuries were noted along with one significant burn and many emotional injuries. Of the 26 admissions, 21 were to the surgery service, and five were to the medical service, including nonventilator inhalations.

Later I was asked to address "Lessons Learned on 9/11." In preparing these remarks, I consulted my notes on lessons learned with the Thirty-First Combat Support Hospital in Operation Desert Storm<sup>3</sup> and my after-action report from UFL. I observed that the lessons learned from 9/11 were the equivalent of lessons learned in Desert Storm and in UFL war gaming. These lessons include:

1. Control beds and blood in the overall area.
2. Coordinate which patients go where.
3. Nurses and physicians always rise to the occasion.
4. Need stronger administrative support for re-supply.
5. Need better communications (the Internet functioned throughout).
6. Need better record keeping.

7. Need plans for nuclear, biological, and chemical attacks.

8. Need plans to disarm possible combatants or terrorists.

9. Need police support to secure the immediate perimeter.

10. Need to formulate plans and rehearse them at regular intervals and at unannounced times. □

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### References

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