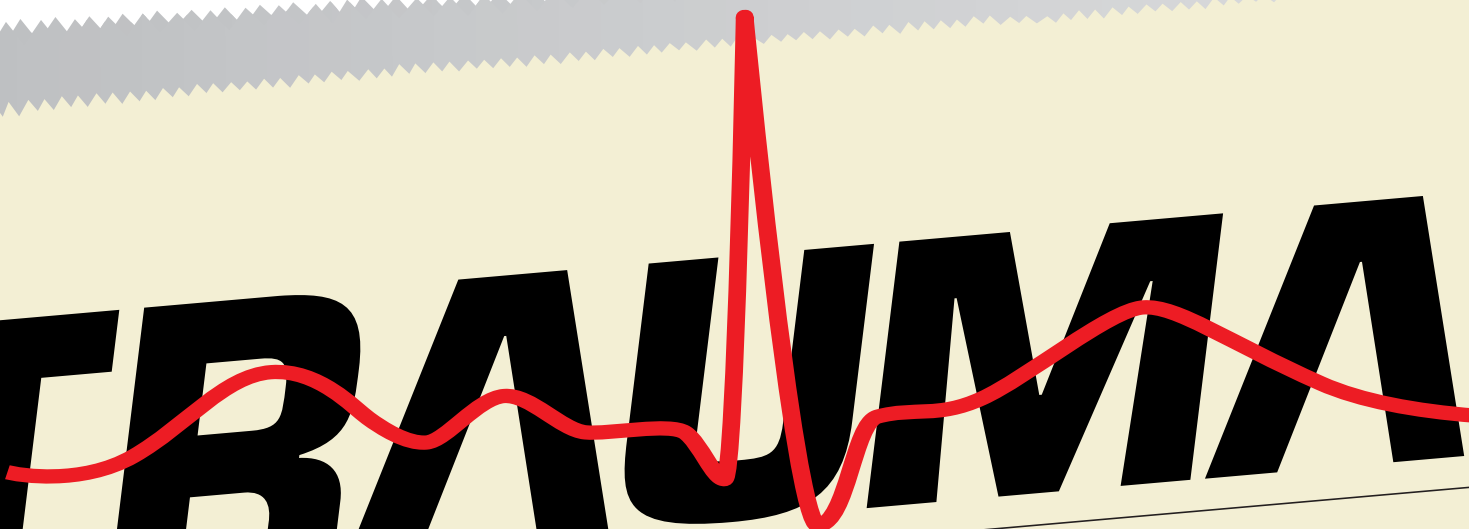


# TRAUMA



**When  
minutes  
count...**

AT ONE MINUTE PAST MIDNIGHT on Christmas Eve, 2005, a phone rings in Bellevue's Emergency Department (ED) with news of an imminent arrival: a man in his 20s with multiple gunshot wounds.

12:05  
WITHIN MINUTES another phone rings, this one at the home of Dr. Maurizio A. Miglietta, Director of Trauma at Bellevue Hospital Center, who is putting his kids to bed after a holiday celebration. As the ambulance races to Manhattan from Brooklyn, Dr. Miglietta begins his own high-speed journey from Edgewater, New Jersey.

12:10  
At 12:10 a.m. the gunshot victim, conscious but unstable, is wheeled into the Trauma Room, a brightly lit inner sanctum where a designated ensemble of doctors and nurses is already in place. When its wide door flies open, the quiet of the room is punctured by loud groans.

12:30  
As the man's clothes are snipped off, the trauma team hustles through its paces, a combination of unthinking protocol and nonstop thinking. In coordination, chief surgical resident Michael Sedrak, M.D., senior emergency medicine resident Raj Gulati, M.D., and attending physician Stephen H. Menlove, M.D., move the team through its ABCs,

ensuring that the patient's airway, breathing, and circulation are all adequate and stable. He can wiggle his toes: a good sign. His oxygen level is very low: a bad sign.

Dr. Gulati employs the time-honored tools of his trade—eyes, ears, and fingertips—to search for signs of hidden trouble. An ultrasound suggests there is no bleeding in the abdomen, but a stethoscope indicates that blood is filling the man's chest. He must swiftly be sedated so that chest tubes can be inserted, adding to the tangle of IVs. An X-ray reveals that two bullets lie in his chest, perhaps more elsewhere.

Despite the frenzy, the scene is one of precise choreography and seamless teamwork. At the moment of trauma, a "golden hour" of opportunity starts ticking away, for the odds of survival are greatest during the first 60 minutes or so. Often, by the time the patient arrives, half of those precious minutes are already gone. The goal is to stabilize the patient within 15 minutes so that he

12:36  
BY THOMAS RANIERI / PHOTOGRAPHY BY RENÉ PEREZ



**“TRAUMA IN THE SLOT!”** BLARES THE SPEAKER IN BELLEVUE’S EMERGENCY DEPARTMENT, ALERTING DOCTORS AND NURSES ON THE TRAUMA TEAM THAT A PATIENT WILL BE WHEELED INTO THE TRAUMA ROOM ANY MINUTE.



**Trauma kills more Americans between the ages of 1 and 44 than any disease or illness.**

A decade ago Dr. Miglietta rotated through Bellevue as a fourth-year medical student. Today, he is Chief of the newly created Division of Trauma & Critical Care, presiding over a staff of surgeons, residents, and physician assistants who divide their time between the OR and the Surgical ICU.

Trauma (the Greek word for “wound”) is defined as a blunt or penetrating injury. The cases Dr. Miglietta and his team of fellow surgeons are called in for are those involving injuries severe enough to threaten the patient’s life or limb. Indeed, trauma kills more Americans between the ages of 1 and 44 than any disease or illness, accounting for nearly 100,000 deaths each year.

At Bellevue, trauma care is a collaborative effort between surgeons



can move on to radiology or surgery.

By 12:30 a.m. the patient’s gurney is escorted from the Trauma Room—or slot, as it’s called—to the OR, leaving behind blue gowns and purple gloves in a puddle of blood. For the doctors and nurses in the ED, the trauma is over. For Dr. Miglietta and his surgical team, it is just beginning.

At 12:36 a.m., up in the 11th-floor surgical suite, the man whose life is on the line and the man whose line is saving lives share an intersection of fates.

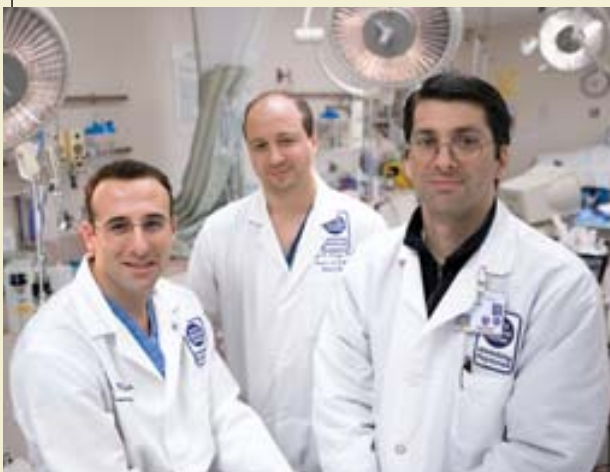
Dr. Miglietta is preparing for surgery without the benefit of a CT scan. There was no time. He must bring all of his training to bear on this delicate reconnaissance mission. Once inside the man’s abdomen, Dr. Miglietta discovers, among other problems, multiple holes in the intestine. The result: the worst contamination he’s ever seen from a gunshot wound—the man had recently consumed a large meal.

Five hours later, Dr. Miglietta meets with the patient’s family. There were four bullets, he explains, and to avoid further harm, none of them were removed—not even the one that missed the man’s heart by less than an inch. Each one did its share of damage, but none of it fatal. Not many people receive a gift like this on Christmas Day, or are able to give one.

who specialize in trauma and critical care, emergency medicine physicians, anesthesiologists, orthopaedists, and other specialists. The hospital handles more cases, and more severe ones, than any other trauma center in Manhattan, treating some 1,800 patients annually, mostly pedestrians. Bellevue is one of 22 Level-1 trauma centers in New York City, but it’s the only such hospital designated as both a Head and Spinal Cord Injury Center and a Limb Replantation Center. A study recently published in *The New England Journal of Medicine* concluded that the risk of death is significantly lower—25 percent—when care is provided in a trauma center.

“Bellevue has had a history of superb trauma care since the Civil War,” notes H. Leon Pachter, M.D. (’71), Chairman of the Department of Surgery, who served as Director of Trauma from 1978 to 1998. “That’s

**Drs. Maurizio Miglietta, Spiros Frangos, and Omar Bholat in Bellevue’s Trauma Room.**



why the New York City Police Department sends its injured to us and why the Secret Service keeps us on call when the President is in town." Dr. Miglietta trains members of both agencies in the basics of trauma care.

A trauma specialist, says Dr. Miglietta, is perhaps the most interdisciplinary of surgeons, for his expertise extends to all aspects of critical care. "We take the patient from the minute he almost dies," he explains, "to the minute he leaves the hospital." Unlike general surgeons, trauma surgeons are trained to prioritize multiple severe injuries, operate on every major body cavity, and deal with the enormous complexities of shock (a life-threatening condition resulting from inadequate blood flow). They must also be adept at earning the trust of a terrified stranger in a matter of seconds.

"There are only a few places in your body where you can bleed to death," notes Dr. Miglietta, "your chest, abdomen, pelvis, femurs, or through

an open wound. Our job is to figure out which one, or which combination, it is—as fast as we can." To control severe bleeding, trauma specialists now have a new tool in their arsenal: a drug called Factor VIIa. This protein, previously reserved for hemophiliacs, is a powerful clotting agent that costs several thousand dollars per dose.

range," he recalls, "that the contents of their pockets would end up in their abdomens." In China, Dr. Pachter learned pioneering techniques to salvage severely damaged livers and spleens, two of the most commonly injured organs because of their size and location. Performing more suture repairs to the liver than any other hos-

## ***The man whose life is on the line and the man whose line is saving lives share an intersection of fates.***

Though currently used at only a few trauma centers, including Bellevue, it promises to save more and more lives—primarily those of patients whose injuries cause them to "bleed out," or ooze, from breaks in the skin.

Some of Bellevue's darkest days for trauma coincided with the first decade of Dr. Pachter's tenure. "Drug dealers would shoot each other at such close

pital in the world, Bellevue has cut the mortality rate for such injuries from 100 percent to 7 percent.

As violent crime has declined, alcohol has emerged as one of the chief causes of trauma, either directly or indirectly. "Alcohol is a devastating problem," laments Lewis R. Goldfrank, M.D., Chairman of the Department of Emergency Medicine and Director of Emergency Medicine at Bellevue. "As many as 5 to 10 percent of Americans are alcoholics," he reports, "and one-third to one-half of all car crashes leading to fatalities are alcohol-related."

The weekday flow of tragedy in Bellevue's ED has an all-too-familiar rhythm: morning pedestrian crashes, midday labor catastrophes, evening rush-hour crashes, and, in the wee hours, post-party incidents. Yet suicide attempts, violent assaults, and other harsh realities of urban life abound, so the beeper can go off anytime, anywhere. The warmer the weather, the busier the beeper.

"Trauma—whether it's mild, moderate, or severe—is a large part of emergency medicine," says Eric L. Legome, M.D., Director of the Emergency Medicine Residency Program. "The volume and variety of



**"At Bellevue, we have some of the best of the best caring for some of the sickest of the sick."**



cases at Bellevue give our residents tremendous experience. They fully participate in the most serious cases as an integral part of the trauma team, as well as less critical ones that go directly to the ED.” As a measure of Bellevue’s renown in this field, earlier this year the *Journal of Emergency Medicine* launched a regular column on trauma. Conceived and co-edited by Dr. Legome, it features Bellevue’s most notable cases.

“In Bellevue’s ED, OR, and ICU, we have some of the best of the best caring for some of the sickest of the sick,” says Omar S. Bholat, M.D., Assistant Professor of Surgery, the newest member of the surgical team. Dr. Miglietta, Assistant Professor of Surgery, is particularly proud of his surgical residents, whom he considers “the top young people in this field in the

hour. It was Shock Trauma’s legendary Physician in Chief, Thomas M. Scalea, M.D., who figured out that the most reliable predictor of survival is not the patient’s vital signs, but the level of lactic acid in his blood.

“Running a trauma unit like Bellevue’s requires a high-energy personality,” says Dr. Scalea, “and Dr. Miglietta has a huge amount of energy. I’ve done that job at Kings County Hospital in Brooklyn, and to do it in a way that’s kind and compassionate—and he’s both—is very challenging. I couldn’t even tell you how many fellows I’ve trained, but I can tell you that he’s right at the top.”

The field of trauma medicine has advanced dramatically in the past decade, thanks in large part to such technology as sonograms and CT scans, which provide a priceless map of the territory. “Now we can scan the entire body in 15 minutes,” says Dr. Miglietta, “pinpointing sites of bleeding, spotting problems we might otherwise have missed, and often avoiding the need for exploratory surgery.”

When surgery is a must, the goal is damage control. “In the 1990s we used to operate on every problem at once,” explains Dr. Bholat, “and after many hours in the OR the patient would die. Now we do the least amount necessary to get the patient out of crisis, and fix the rest later.”

In the OR and beyond, care for the patient is shared between the trauma surgeon and an intensivist (a critical care specialist who may be another trauma surgeon or an anesthesiologist). “A patient may spend 20 minutes in the Trauma Room,” explains J. David Roccaforte, M.D., Co-Director of the Surgical ICU and Assistant Professor of Anesthesiology, “but for every one of those minutes he may spend a day in the ICU and a week in rehabilitation.”

In the ICU comes a second wave of trauma, for it is only then that the patient grasps the full impact of reality

—on his body and his life. Research shows that the more trauma patients recall about their time in the ICU, the more likely they are to develop Post Traumatic Stress Syndrome. During the first week or so after trauma, patients are sedated with drugs specifically designed not only to treat their pain but disrupt their memory. Doctors rarely need to worry about the patient being haunted by memories of the Trauma Room resuscitation or even the traumatic event itself, however, because the patient usually has no recollection of them. “The low blood pressure that results from severe trauma, along with the various medications administered, produces amnesia,” explains Dr. Roccaforte, “and psychologically it’s very protective.”

In about 50 cases each year, trauma results in one or more limbs or digits being severed. When that happens, Jamie P. Levine, M.D., Chief of Microsurgery, and his team of plastic surgeons are called in. “Once we attempt a replantation,” he says, “we’re successful about 90 percent of the time. The field of surgery requires so much deconstruction and removal, that it’s very gratifying to be able to put things back together.”

While trauma surgeons can call in other specialists, the miracle is often theirs to perform. The injuries they dread most are called “soul wounds.” They involve the thoracoabdominal region, where havoc can occur in as many as five visceral compartments at once; the large vein behind the liver, which is fiendishly difficult to expose; and the vascular structures that converge with bowel structures, where bacteria can chew apart vulnerable tissue. “Traumas to the iliac vein and artery, pancreas, and duodenum are a nightmare,” sighs Dr. Miglietta. “They make even the most experienced surgeon sweat.”

His colleague, Spiros G. Frangos, M.D., M.P.H., Assistant Professor of

## **A trauma cuts both ways. It’s a life-altering experience for patient and doctor alike.**

country.” He plans to launch a trauma fellowship program within three years.

Trauma surgery was born on battlefields, notes Dr. Bholat, who recently served in Iraq as a surgeon in the U.S. Army Reserve. He adds that the military is so short of trauma surgeons that those up to the age of 54 are eligible for recruitment. Drs. Bholat and Miglietta received some of their finest training at an urban battlefield in Baltimore, where the University of Maryland Medical Center is home to the R. Adams Cowley Shock Trauma Center. The world’s first and only hospital dedicated exclusively to trauma, it receives an average of one patient per



**While trauma surgeons can call in other specialists, the miracle is often theirs to perform.**



Surgery, explains that some patients lose so much blood in the OR that they enter what's called "the triad of death": severe acidosis (an increased acidity of body fluids), hypothermia (low body temperature), and coagulopathy (the inability to clot). In such cases, he says, "All the surgeon can do is to pack the abdomen to control bleeding and get the patient into the ICU as quickly as possible. The trick is deciding just when to do this, so that you don't lose the patient on the table."

Dr. Frangos describes his work as one of "instant gratification at its highest level, especially when you're able to save a life." But Dr. Bholat explains why the high is bittersweet. "Knowing that you've saved someone's life is very humbling," he says, "because you've only saved their life for now. The patient can survive the systemic effects of trauma only if you're vigilant in the ICU." That sentiment is shared

by Marion Machado, R.N., a Head Nurse of the Emergency Ward, where many patients are monitored after they've been stabilized in the Trauma Room. "If you have a good nurse at your bedside," she insists, "your chances of survival are much greater. Swift intervention is the key."

The overall survival rate for trauma is surprisingly high: about 96 percent (though the rate is lower for the most critical cases). But that other 4 percent clearly haunts these men. "My wife can always tell when I've had a bad day," says Dr. Frangos. Dr. Bholat says he deals with defeat by trying to learn from it, so that "no death goes without some knowledge coming from it."

Trauma strikes—and claims—mostly the young, so it's not lost on these thirty-something surgeons that the lives they save could be their own. "Fortunately, young people have immense reserves that often enable

them to survive massive trauma," explains Dr. Miglietta." But when they don't make it, adds Dr. Frangos, "nothing is harder than telling a parent that their child has died."

A trauma cuts both ways. It's a life-altering experience for patient and doctor alike. "But as much as a loss affects you," says Dr. Frangos, "you must overcome it for the sake of the next patient."

"Seeing patients survive at Baltimore's Shock Trauma Center who most likely would have died elsewhere made me raise the bar," says Dr. Miglietta. "Five days after I arrived at Bellevue, for example, I had a patient who fell seven stories from a rooftop, then landed on the roof of a bus, then landed on the sidewalk. He needed more than 100 units of blood. Some might

say, 'Let him go—we may need that blood for other traumas.' But I'm proud to say that one month later he was released from the hospital."

"The best trauma surgeons," says Dr. Miglietta, "not only have supreme technical skills, but great connections with their patients. Patients don't even need to tell you how grateful they are. You can just sense it. What touches me most is when a family member—a total stranger—hugs me so hard that they can't let go. Even when people survive, of course, their lives are never the same. But for some, just the fact that they're alive is good enough."

*For a profile of Dr. Maurizio Miglietta:*  
[www.med.nyu.edu/miglietta\\_profile.html](http://www.med.nyu.edu/miglietta_profile.html)

*For guidelines about treating trauma:*  
[www.med.nyu.edu/treating\\_trauma.html](http://www.med.nyu.edu/treating_trauma.html)

