On July 6, 2013, a Boeing 777 operating as Asiana Airlines Flight 214 struck a seawall at San Francisco International Airport while on final approach to runway 28L. Flight 214 was operating a scheduled transpacific flight from Incheon International Airport, Seoul, South Korea. During final descent, the main landing gear and tail clipped a seawall short of the tarmac and were ripped off, sending the plane skidding down the runway. The aircraft spun into a 330-degree counterclockwise rotation, pivoting around a wing with the nose sharply inclined to the ground. The plane finally came to rest nearly 2,500 feet from impact. The staff and passengers had just begun to evacuate when a fire ignited within the separated right engine adjacent to the fuselage. Of the 307 people onboard, 305 survived and nearly 187 were injured. Injured persons were rushed to surrounding San Francisco hospitals, including San Francisco General Hospital (SFGH).

Geoffrey T. Manley, MD, PhD, Chief of Neurosurgery at SFGH, was present on the day of the event and participated heavily in the triage and treatment of patients arriving to SFGH. Dr. Manley is a seasoned trauma neurosurgeon with clinical interests in traumatic brain injury, spinal cord injury, and neurocritical care, and has published over 120 manuscripts on the topic of traumatic brain injury and neurocritical care.

Dr. Geoffrey Manley: It was Saturday morning. Another SFGH neurosurgery attending was operating that morning on a VIP patient, and I was on my way in to SFGH to meet with the patient’s family. I received a call from one of our nurse practitioners that there was rumor that a plane went down at the airport with close to 300 people on it. As I was driving in, the story changed multiple times, from rumor that it was a transport plane to a passenger plane. Finally it was confirmed that it actually was a passenger plane. I got to the hospital before any ambulances had arrived. Given the proximity of our hospital to the airport, the majority of the traumas were coming to SFGH. It was pretty ominous being told that we’ll have around 25 ambulances coming in back to back. We were told they’ve been triaged in the field. I remember telling the team what we needed to do to prepare for it.

Congress Quarterly

What were you doing the morning of the crash, and how did you initially hear about the crash?

Dr. Geoffrey Manley: It was Saturday morning. Another SFGH neurosurgery attending was operating that morning on a VIP patient, and I was on my way in to SFGH to meet with the patient’s family. I received a call from one of our nurse practitioners that there was rumor that a plane went down at the airport with close to 300 people on it. As I was driving in, the story changed multiple times, from rumor that it was a transport plane to a passenger plane. Finally it was confirmed that it actually was a passenger plane. I got to the hospital before any ambulances had arrived. Given the proximity of our hospital to the airport, the majority of the traumas were coming to SFGH. It was pretty ominous being told that we’ll have around 25 ambulances coming in back to back. We were told they’ve been triaged in the field. I remember telling the team what we needed to do to prepare for it.

How did you triage the neurosurgical/spine patients?

Dr. Geoffrey Manley: Three of our seasoned trauma surgeons were all there at SFGH. One trauma surgeon and I stayed down at the emergency room to observe and help with triage as patients were coming in. We were able to immediately identify patients that required operations. Within minutes of a patient coming in, we were able to triage, get pan-scans, and get them to an operating room when needed. Neurosurgery as a specialty does its own critical care and trauma in training, and we are comfortable with evaluating and managing these patients. I think a trauma background makes you much more in tune with what’s going on.

Approximately how many arrived at San Francisco General Hospital? What number of those involved neurosurgical consults?

Dr. Geoffrey Manley: I’m not sure of the actual number that arrived to SFGH—possibly 60. Neurosurgery examined all patients that came in, but neurosurgery was asked formally to consult on about 26 patients.
How was neurosurgery integrated into mass casualty activation at San Francisco General Hospital?

**GM:** We had so many things going on I felt that it was important to bring the whole team together—not just our neurosurgery team, but all the teams. A team patient review was organized in radiology, where we had an attending radiologist who went through every patient that came in. We had radiology, plastic surgery, orthopedic surgery, neurosurgery, trauma surgery, maxillofacial surgery—we had nearly 40 doctors all in one room. We went through everyone, patient by patient, and made a list of everything we needed to do so nothing fell through the cracks. Communication was really important. It was probably one of the greatest days I had as a physician. You really saw the whole system click. The teamwork was amazing. To navigate that scale of mass casualty was probably one of our proudest days as doctors at SFGH.

**CNSQ** What were some examples of common injuries you saw in patients?

**GM:** We saw traumatic brain injuries, scalp injuries, and several traumatic spine injuries including a fracture-dislocation. Several spine injuries required surgery.

**CNSQ** What mass casualty training or preparedness assisted management of the event?

**GM:** Normally, you make sure your family is safe and then figure out what to do from there. Staff surgeons involved with leading the triage and management were seasoned trauma surgeons. It was a case of “all hands on deck” and people moving quickly to help get things done. Many other people from anesthesiologists to surgical residents were showing up to SFGH and were available to help. For example, we had enough anesthesia staff to open eight operating rooms at once. Normally there is anesthesia staff to open only two emergency operating rooms at any given time.

**CNSQ** In an interview with CBS News, you and Dr. Okonkwo noted the spine trauma observed from force of the crash and lap belts standard to airplane seats. How much operative spine trauma did you see as a result?

**GM:** There were several operative spine cases at SFGH as a result. It’s hard to say if injuries were a result of lap belts or force of the crash. During rescue of passengers, many were frozen in their seats and needed the lap belts cut free to evacuate. Imagine how much more difficult the rescue would have been with the fuselage on fire if more complex harnesses were used instead of lap belts. I know I’d rather have one on than not if I were on that plane.

**CNSQ** To your knowledge has any association been made between pattern of injury and seating assignment on the plane?

**GM:** Not that we know of. It has been hard to get that information. With investigation and litigation, information regarding seating assignment has not been forthcoming.

**CNSQ** What afterath did the event and patient load have on San Francisco General Hospital?

**GM:** The impact of the event didn’t stop that day. There were spinal surgeries, exposures to gas, and ICU stays lasting from 72 hours to months for some patients. This really required intensive effort for patient care by all teams.

**CNSQ** What impact did neurosurgical resident involvement have on this day?

**GM:** Interdisciplinary cooperation and resident involvement was huge that day. We had residents who heard the news on the radio and showed up. Many staff physicians and residents came to work on their day off to offer assistance.

**CNSQ** Lee Gang-guk, pilot in charge of Flight 214’s landing, had never flown a Boeing 777 nor had he previously worked with instructor Lee Jeong-min. Is there a correlate from this experience to neurosurgical residency and/or surgical simulation?

**GM:** It’s difficult to train for an event like this, for instance, being surprised by things you would not expect in elective cases. In trauma, you often don’t know what you’re dealing with until you’re in the moment, but experience prepares you for this.

**CNSQ** What advice can you give to fellow neurosurgeons involved with initial trauma management and potential mass casualties?

**GM:** The commonality of brain injury and frequency of these events reminds us why trauma is important. Successful response in trauma management is dependent on previous experience. This speaks to the need for neurotrauma training and involvement with these events. Neurosurgeons should remain interested in and stay abreast on trauma and critical care training within our specialty.