SPECIAL ARTICLE

The Friday of Rage of the Egyptian Revolution: A Unique Role for Anesthesiologists

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The 2011 Egyptian revolution began on January 25, 2011, and although predominantly peaceful, it was not without violent clashes between security forces and protesters. Reportedly, at least 846 people were killed and 6400 injured. On Friday, January 28, called by some "the Friday of Rage," hundreds of thousands of Egyptian people assembled to protest, and Internet and cellular phone services were shut down by the government. Throughout the day, police fired tear gas, rubber bullets, shotgun shells, and live ammunition at protesters, and within a matter of hours, police stations were burned, the security of prisons was breached, violent criminals escaped into the streets, and the country's vast police force vanished, creating a security vacuum (Fig. 1).

During the first week of the revolution, most of the casualties were treated at the Cairo University Hospital Kasr Al-Ainy, located near Tahrir Square, the epicenter of Cairo and of the Egyptian revolution. Cairo University Hospital is the largest and oldest hospital in Egypt and the Middle East, with a capacity of 5500 inpatient beds and 72 operating rooms (ORs). It is the tertiary referral center for all Egyptian hospitals. However, on a Friday, a nonworkday in Egypt, only 8 emergency ORs are usually functioning.

MASS CASUALTIES

On Friday, January 28, >3012 newly injured patients overwhelmed the capability of our hospital. Of these, 453 patients were admitted as inpatients, and 339 patients needed urgent surgical intervention within 6 hours of arrival. More than 93% of the injuries were caused by firearms (422), with the remaining caused by rubber bullets (3), stabbings (16), thrown rocks (12), tear gas bombs (2), and a motor vehicle accident (Fig. 2). Table 1 shows the type and severity of injuries.

TRIAGING

Early in the day, neither family members nor friends were allowed into the resuscitation rooms. However, with the disappearance of the security forces, together with the rapid influx of patients, control over resuscitation rooms was lost. The decision was thus made to deploy attending anesthesiologists to the resuscitation rooms, facilitating assessment and triage of patients, either to the surgical intensive care unit (SICU) or the wards before surgery. Patients were admitted to SICU if they had one or more of the following: (1) systolic blood pressure <90 mm Hg, (2) arterial oxygen saturation (Spo_2) <85% on room air, or (3) Glasgow coma scale <10. Although it has been recommended that the score for sequential organ failure assessment (SOFA) should be incorporated into the triage protocol for critical care,[1] this was not practical in this case, given the need to assess arterial blood gas and to have a venous blood sample for each patient to calculate the SOFA score. Instead, we used pulse oximetry as a surrogate for arterial oxygen tension.

COMMUNICATIONS

Until several years ago, our hospital used a pager system to communicate between doctors. However, with the widespread use of cellular phones, most doctors now use their cellular phone to communicate, and the pager system is no longer used inside the hospital. However, because the government had shut down cellular phone and Internet services, we initially communicated with each other using the internal telephone service. However, this proved inadequate, and house officers were assigned to act as "runners" between different departments. This episode emphasizes that personal phones should not be the sole official mode of communication within a hospital.

SECURITY VACUUM CONSPIRACY THEORY

A countrywide lack of security began when police withdrew from the streets. Police personnel who should have secured the hospital had vanished by Friday night. At the same time, the prisons were opened, and it was suspected that counterrevolutionary forces were releasing criminals to terrify the population so that they would lament the absence of the relative safety during the rule of the ex-president.

ATTACKS

After opening of the prisons, violent criminals attacked the hospitals, intimidating both doctors and patients and forcing doctors to treat their relatives at gunpoint. Groups of relatives, porters, and physicians were organized to drive off looters, and robbers remained active until the military police were sent to guard the hospitals. The criminals were armed with knives and sticks, and the porters, relatives,

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Figure 1. Police violence during Friday of Rage (available at http://commons.wikimedia.org/wiki/File:Flickr_-_%D0%B2%D0%BB%D0%B0%D1%81%D1%82%D1%8C_%D1%81%D1%82%D1%80%D0%B0%D1%81%D1%82%D0%B8_-_the_March_of_Anger_Friday.jpg).

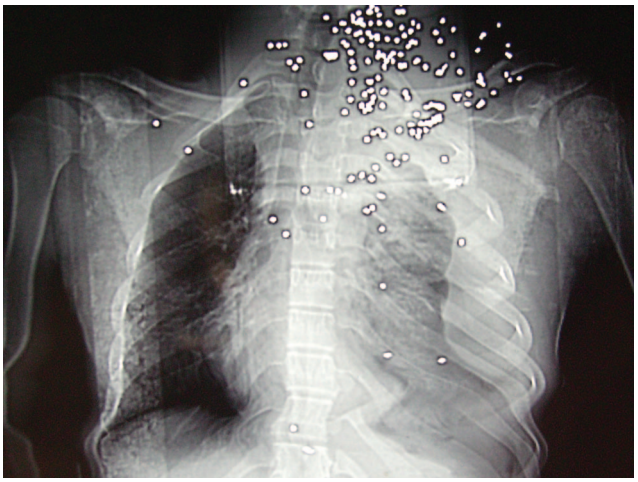

Figure 2. Gunshots to neck and chest causing carotid artery injury and hemothorax.

and doctors were armed with IV poles, sticks, and kitchen knives.

DISRUPTION OF SCHEDULES FOR PHYSICIANS AND NURSING STAFF

On Saturday, January 29, most of the physicians and nursing staff scheduled for duty did not arrive because of insecurity owing to the media describing a picture of wanton destruction, uncontrollable chaos, and fear. Many, including physicians, formed vigilante groups to protect their homes, a situation forcing physicians to decide between duty to their family and that to their patients. Moreover, a curfew was declared between 2 PM and 7 AM, and finally there was a problem with transportation because taxis and passenger cars in Cairo faced a shortage of fuel.

We therefore altered the multiple-shift scheduling system, dividing ourselves into 4 groups, each consisting of 15 to 20 anesthesiologists working 24 hours at a time.

MEDICAL GASES

An oxygen shortage occurred because large numbers of patients were in respiratory failure and as a result of damage to oxygen storage and delivery facilities. We therefore limited the use of added oxygen in intensive care patients to those with oxygen saturation <92% on room air.

Table 1. Type of Injuries in Trauma Patients

	Critically injured	Noncritically injured
Head injuries (n = 76)		
Brain contusion	11	5
Extradural hematoma	8	3
Subdural hematoma	7	7
Skull fracture	15	20
Neck injuries (n = 15)	5	10
Eye injuries (n = 140)	124	16
Chest injuries (n = 41)		
Neumothorax	3	21
Lung contusion	5	3
Hemothorax	5	3
Myocardial injury	1	0
Abdominal injuries (n = 62)	55	7
Extremities (n = 82)		
Upper limb	24	20
Lower limb	25	13
Combined injuries (n = 28)	28	0

Table 2. Operations During the First 36 Hours of Major Incident at Cairo University Hospital

Operations	Number of patients (n = 310)
Ophthalmic surgery	139
Primary closure of rupture globe	123
Foreign body removal	15
Veterectomy	1
Neurosurgery	33
Compound depressed fracture	12
Extradural hematoma	8
Subdural hematoma	7
Simple depressed fracture	3
Gunshots of brain and spine	3
General surgery	84
Laparotomy	55
Vascular surgery	29
Orthopedic surgery	49
External fixation of fracture	24
Internal fixation of fracture	25
Thoracotomy	5

ANESTHESIA

Only 8 anesthesiologists (4 residents, 3 assistant lecturers, 1 assistant professor) and 19 surgeons from different specialties were on duty on Friday, January 28. An additional 10 volunteer anesthesiologists who had participated in the protest came to the hospital when they observed the increased rate of violence against the protesters. Table 2 shows the list of operations during the major incident. During the first hours, abdominal, thoracic, vascular, and neurosurgical procedures predominated. At that time there was 1 anesthesiologist in each OR. After several hours, minor operations involving fractured bones and soft tissue injuries resulted in a shortage of available anesthesiologists. This necessitated a single anesthesiologist supervising care in 2 ORs but assisted by house officers to monitor the patients.

Anesthesiologists in our university were not involved in the hospital's mass casualty plan, and this might have

caused our lack of preparedness regarding experience, training, and deployments of anesthesiologists. However, because our department does serve the largest hospital in Egypt, flaws in the management of mass casualties were minimized somewhat by our 6-month supply of disposable surgical and anesthesiology items (e.g., drugs, IV fluids, surgical sterile supplies).

The most common sites of injury were the head and neck, chest, and abdomen, which made regional anesthesia often not feasible. Spinal anesthesia was performed in 30 patients with lower-extremity injuries. Other local–regional blocks were not performed because neither ultrasound nor nerve stimulators were available.

There were 2 operative deaths: the first in a patient with gunshot injuries involving the liver and vana cava and the second in a patient with a gunshot injury involving the liver, diaphragm, and right lung.

One hundred eighty units of blood products were used in the first 12 hours of the major incident including 140 U of packed red blood cells, 28 U of fresh frozen plasma, and 12 U of platelets. Acute transfusion reactions were encountered in 2 patients. One reaction occurred because of a blood testing error, and the cause of the other one could not be found because of missing data.

Although the potential limited availability of blood products was an important concern, the volume of blood products available was augmented by contributions from the patients' relatives and 7 attending anesthesiologists. Moreover, all nonurgent requests for blood cross-matching and typing were postponed. Several authors have demonstrated that the greatest volume of blood products is required during the first few hours after an incident that causes mass casualties.[2,3]

Experience around the world has repeatedly shown that blood waste remains a greater problem during mass casualty than in normal times.[4] During disaster, hundreds of people crowd collection facilities. Moreover, the qualified staff are in short supply with higher risk of screening errors. This may jeopardize supplies and storage capabilities, with the risk of some blood being inadequately processed and stored. On January 29, hundreds of people rushed to donate blood and within 24 hours, blood banks ran out of storage space.

INTENSIVE CARE

Cairo University Hospital has 30 SICU beds (12 for trauma, 4 general, 6 neurosurgical, and 8 cardiothoracic). The ICU was used as an overflow area for primary triage, and because of the limited number of ICU beds, a step-down unit, with 12 beds, was converted into an additional ICU, in which each bed was equipped with a ventilator. A further obstacle was that we did not have a staffing schedule balancing available staff and skills with current clinical demand, a situation exposing our staff to significant risk of sleep deprivation and exhaustion.

Forty patients were admitted to the SICU postoperatively, of whom 8 died. The causes of death were as follows: laceration of the frontal lobe; bilateral injuries of the internal iliac artery; secondary hemorrhage after repair of the femoral artery; irreversible shock caused by massive hemorrhage from an injury of the popliteal artery; lung and heart injuries caused by a gunshot wound to the chest; injuries to the liver and iliac veins; pelvic gunshot wounds causing severe hemorrhage from the paravertebral plexus of veins; and septic shock after gunshot injury to the liver, right hepatic vein, diaphragm, and lung.

Figure 3. Battle of the Camel (reproduced with permission from al-Youm al-Sabea).

BE PREPARED FOR POLARIZATION

Over the course of the Egyptian revolution, the ruling regime used a variety of techniques aimed at wearing down the protesters' resolve and dampening public support for the uprising. For example, the state media disseminated rumors about roving gangs of looters and criminals terrorizing residents, causing them to stay in their homes. Meanwhile, life for the general populace of Cairo was made much more difficult by an evening curfew, a general shortage of supplies, and bank closures. The state media deftly used the situation as a propaganda weapon, placing all blame for the turbulent state of affairs on the ongoing demonstrations.

This strategy was not without effect. It did turn more people against the movement. The widening social polarization was illustrated on February 2, 2011, when Internet connections were restored. Several pro-"stability" and antiprotest groups had been created on Facebook, and many individuals who had been posting anti-Mubarak materials on their Facebook profiles a week earlier were now severely critical of the protest movement.

THE TURNING POINT (BATTLE OF THE CAMEL), AND PHYSICIANS JOIN THE FIGHT

On February 2, thugs armed with swords, whips, clubs, stones, and rocks attacked antigovernment protesters in Tahrir square. The incident came to be known as the "Battle of the Camel" because at one point in the attack, pro-Mubarak thugs made use of horses and camels, charging through the square and assaulting protesters (Fig. 3). More than 1500 protesters were injured. A group of doctors from Cairo University went with ambulances to Tahrir Square; however, the ambulances found it difficult to reach the wounded inside the square. Instead of being taken to the hospital, the wounded protesters were taken to a mosque near the scene of the battle that was turned into a makeshift hospital.

Despite efforts against the revolution, the protesters at Tahrir remained steadfast in their resolve calling for a million-strong protest each Sunday, Tuesday, and Friday until their

Figure 4. Over 2 million protesting in Tahrir Square on February 10 (available at http://commons.wikimedia.org/wiki/File:Tahrir_Square_-_February_10,_2011.png).

demands for the president's resignation were met. We started to rearrange our schedule of anesthesiologists so that those wanting to join the protest were off-duty on those days.

On February 10, 2011, 3000 doctors, nurses, and students streamed out of the Cairo University Teaching Hospital, heading towards Tahrir Square. They joined more than 2 million people gathered in and around Tahrir Square to demonstrate opposition to the government (Fig. 4).

LESSON LEARNED FROM EGYPTIAN REVOLUTION

In addition to the lessons highlighted above, there should be a declared disaster plan, and all health care professionals involved in emergency management, including anesthesiologists, should be trained to deal with mass casualty.

KNOW YOUR ENEMY

We hope that the lessons learned during the Egyptian revolution will assist other emergency medical service agencies during events with mass casualties. It should be noted that even if plans are in place for mass casualty incidents, these plans may need to be altered when the conflict is against the governing regime.

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