Dizengoff Street Shooting: A Hospital under Investigation - Lessons Learned; Tel-Aviv Medical Center

Mohammad Sabbah

ORCID: https://orcid.org/0000-0002-9451-1893
Tel-Aviv Medical Center Poznan university of Medical Sciences
Country: ISRAEL

Abstract:
Tel-Aviv Medical Center (TLMC) is a public medical center located in the center of Tel-Aviv. It is the second largest hospital in Israel, and combines four hospitals: the Ichilov General Hospital, the "Liss" Hospital for Maternity and Genecology, the "Dana-Duak" Children's Hospital and the "Ida Sourasky" Rehabilitation Hospital. TLMC receives and treats casualties and emergency cases as part of its routine work. A multi-casualty event is defined as an event in which the number of casualties, and/or the condition of the injured individuals, exceeds the hospital's ability to cope with in a normal and routine manner. During an emergency, the management of TLMC is responsible for managing the incident and issuing instructions in accordance with the preapproved emergency protocol. At about 14:40 PM on January 1st 2016, a shooter arrived at the "Hasimtah" pub located at 122 Dizengoff Street in Tel Aviv and opened fire with a Specter M4 (Falcon) machine gun. Two persons, who were attending a birthday party at the venue, were killed in the shooting, and seven others were injured. The injury cases from the shooting began to arrive at Tel-Aviv Medical Center (TLMC) Emergency Room (ER), at 15:03, in which a Multi-Casualty Event (MCE) protocol was declared at TLMC to which all casualties injured during the shooting were transferred.
Key-Words: *multi-casualty event, emergency room, emergency protocol, shooting injuries, preparation, investigation.*

I. Introduction:

Over the past two decades, the recurrence of mass casualty shooting incidents has increased drastically. A mass-casualty incident is defined as an incident where the existing hospital and emergency medical services are overwhelmed by the number and severity of the resulting causalities [1]. In an event of mass shooting incidence, hemorrhage is the leading cause of preventable mass casualty event mortality, accounting for 50% of deaths within the first 24 hours. [2]

Emergency preparedness exercises are an important part of emergency preparedness activities for the healthcare community. Emergency preparedness consists of numerous components, including a complex cycle of planning. Planning includes preparing equipment, training staff, exercising, and improvements [3]. In line with the above, the American Nurses Association encourages nurses to strengthen the capacity of the provided health services during emergencies by joining a volunteer registry. During natural disasters or human-made events, there is a need to utilize knowledge and skills to care for persons while minimizing health hazards and life-threatening damages [4]. Emergency department physicians and nurses are the upfront manpower in normal situations; nonetheless, their responsibilities rise several folds during emergency and crisis at hospital sites. High efficacy and proper skills combined with factual capabilities are necessary for saving human lives [5].

As part of its routine work, the Tel-Aviv Medical Center (TLMC) receives and treats casualties and emergencies cases on regular basis. Therefore, and to be able to provide the best services in this role, the TLMC has well organized hospital resources, including skilled personnel, imaging and testing devices, beds and places of hospitalization and, of course, medical equipment. The key to TLMC's dealing with CE are the hospital's internal resources that require reorganization during the event (for example, using of equipment from emergency storage) and some external resources that require alerting or mobilization, such as calling staff from home.

This article presents a realistic CE scenario that provides an assessment for TLMC in response to a shooting incident. The incident occurred in early 2016, where an Israeli shooter opened fire on a group of diners in one of the cafes located in the center of Dizengoff in Tel Aviv. The shooting resulted in many defined casualties. The casuilties were evacuated by Magin-David-Adom (MDA), which is the Israeli emergency first response authority, to TLMC. This article presents an investigation in which the incident is recreated by people who were present at the time of the incident. Moreover, it examines the investigations held after the incident, the

steps that were taken during the incident, the steps that should have been taken but were not implemented during the incident, including the gaps, and conclusions from the incident.

Tel-Aviv Medical Center Preparations:

During an emergency, the management of TLMC is responsible for managing the incident and issuing instructions in accordance with the adopted emergency protocol.

At TLMC, there is an up-to-date emergency protocol that contains individual reference to each emergency scenario, including the details of the reference threat and its reasonableness, as well as the principles of management by the hospital headquarters, laboratory management and pharmacy management. The hospital prepares and updates, on a regular basis, its physical infrastructure, medical equipment, medicines, antibiotics and antidotes for emergency use. The TLMC is monitored and managed according to the instructions of the Ministry of Health, with close cooperation with the Home Front Command (Army), TLMC draws lessons from exercises and relevant truth events.

Standby Modes:

While most MCEs occur out of routine (surprise events), some CEs are related to ongoing emergencies, such as wars or extended mass events. In such situations, a hospital is required to prepare in advance. Emergency preparedness states are defined by the Emergency Division of the Ministry of Health and are reported to the hospital as needed.

The following are the different states of standby in TLMC for MCEs and the tasks derived from each state of readiness:[6]

1- Routine work: Operating according to daily routine protocol.
2- Unspecified alerts:
a- Checking hospital systems to ensure functionality and alertness - inventory levels, equipment and essential elements; checking the calling system of functionary's personnel (networks); ensuring the availability of the needed personnel; briefing and training the key personnel, and growing team working in emergency units and operating rooms.
b- Ensuring the ability to operate in a limited emergency headquarters that will only include a representative of the medical team, the nursing team and a manager within 20 minutes.
c- Ensuring the ability of medical personnel from the fields of surgery / trauma, anesthesia and emergency room to arrive at the hospital within 20 minutes of calling.
d- Ensuring the ability to have the nursing staff in the emergency room, operating rooms within 30 minutes of calling.
e- Checking generators.
3- Specific alert (including the impact zone and estimated time for arrival):
a- Operating a limited emergency protocol.
b- Ensuring the ability of medical personnel, including nursing, from the fields of surgery, trauma, anesthesia, orthopedics, neurosurgery, vascular surgery, chest and heart surgery, pediatric surgery, pediatrics and X-ray to reach the hospital within 20 minutes of calling.
c- Ensuring the ability of key personnel from the fields of maintenance, supply, sterile supply, pharmacy, patient reception and computing, to arrive at the hospital within 20 minutes of reading.
4- An event alert (still without casualties) with high potential to develop into an MCE:
a- Operation of a limited emergency protocol that includes a representative of a medical director, a nursing director.
b- Activation of medical personnel standby from the fields of surgery, trauma, anesthesia and emergency room.
c- Ensuring the ability of the medical personnel, including nursing, from the fields of surgery, trauma, anesthesia, orthopedics, neurosurgery, vascular surgery, chest and heart surgery, pediatric surgery, pediatrics and X-ray to reach the hospital within 20 minutes of calling.
d- Ensuring the ability of key personnel from the fields of maintenance, supply, sterile supply, pharmacy, patient reception and computing, to arrive at the hospital within 20 minutes of reading.
5- Multi-Causalities Event:
Operating according to the MCE protocol.

The Tel Aviv Medical Center has 33 operating rooms, classified as follows:
- 18 general big operation rooms.
- 9-day operation rooms (working according to a daily schedule).
- 4 genecology operation rooms.

-        2 Ophthalmology operation rooms.

Personnel and staffing of the operation rooms - in the morning shifts, full staff presence. The workforce includes anesthesiologists and senior surgeons in all major disciplines.

Imaging division - The hospital has 3 CT devices available 24 hours a day, one of which is located next to the emergency room.

The blood bank - active 24 hours a day and holds a minimum inventory of 200 doses of blood on standby, 60 of which are type O blood doses.[6]

Principles of responding to MCE in ER:
        The ER is the first and main site that becomes active during a MCE. The main focus of decision-making in the first stages following the event is in the ER. The ER staff who are available 24 hours a day are required to manage the response to the MCE, even if it is a team on duty, until a senior team arrives.
        The total number of beds in the emergency room of TLMC is 70 internal emergency room, 65 beds in the surgical emergency room, and 5 intensive care beds. During an MCE, it is possible to increase the number of beds in the emergency department to up to 80 beds in the internal and surgical emergency rooms and 10 intensive care beds.[6]

Preparations for absorption include:
1-   Evacuating current patients from the ER rooms.
2-   Preparing for the unloading of area ambulances - under the responsibility of a security guard at the ER - private vehicles will be evacuated from the entrance to the ER.
3-   Preparing the triage area - The triage area will be located at the entrance to the ER.
4-   In the case of involving children at the event, a senior pediatric doctor from the emergency room / intensive care unit will arrive at the triage area.[6]

The Day of the Event:
        Mass casualty civilian shootings represent an infrequent but recurring challenge to emergency services. Active shooters produce a dangerous and unpredictable environment where the number of casualties can keep increasing.[7]
        On the day of the event, according to the Israeli news report, the shooter arrived at about 14:40 PM at the "Hasimtah" pub located at 122 Dizengoff Street in Tel Aviv and opened fire using a Specter M4 (Falcon) machine gun. Two persons, who were attending a birthday party at the venue, were killed on the spot, and seven others were injured. The shooter managed to escape from the scene, and during his escape he aslo killed the taxi driver.[8] [9]
        The shooter was captured with the help of a security camera located in the area of the attack, and based on the photographs published in the media, the shooter was identified by his father, who reported him to the police. The father discovered that the weapon used in the attack had been taken from the safe in his home, following a phone call that he received from an associate, and informed the Israeli police of the incident.
        After the attack, the shooter fled the scene. Security forces immediately began searching for him in the yards and houses surrounding the area. The shooter fled to "Ibn-Gvirol" Street, where he boarded a taxi and traveled to the north with him. On the beach of the Mandarin Hotel in north Tel Aviv, the shooter murdered the taxi driver, dumped his body, and drove himself in the taxi to "Namir" street, where he abandoned the taxi and later disappeared without trace. Before embarking on his murder spree, the shooter dropped his cellphone near "Redding" Street in Ramat Aviv. The cellphone was found by a girl, and was located in her hands by the police the day after the murder.
        The hunt for the shooter lasted a week. Many forces were looking for him. Fearing that he was hiding in north of Tel Aviv and that he might be returning for another murder. As a result of this fear, parents refrained from sending their children to schools in the area in the days following the attack. Two days after the murder of the taxi driver, investigators learned that the shooter had stolen the smartwatch that the driver was wearing, which enabled police to identify the location of the shooter who was at the time out of Tel-Aviv, and the search for him directed the police there.[8][9]

Investigating the Incident:[10][11]
        The shooting incident of Dizengoff Street began at 14:40. At 14:56, the first wounded began to arrive at the emergency room of TLMC, at 15:03 an MCE protocol was declared. By 15:15, four seriously wounded persons arrived, one of which did not survive, two other were seriously injured, and one was slightly injured, the

wounded were quickly treated. At 15:12, one of the injured individuals with an abdominal trauma was admitted to the operating room, and at 15:35 another person injured with head trauma was admitted to the operating room. In total, 18 wounded arrived to the ER: two of the wounded individuals died afterwards, 14 others were later released, and two were sent to intensive care units for care continuity.

According to the nurse in charge, the deputy ER head nurse, he heard about the shooting incident in the Dizengoff area in Tel Aviv through a device from an MDA paramedic who was at the ER at the time of the shooting. The nurse tried to find out more about the situation from the MDA paramedic who was inside the ER, but was not provided with any accurate information. At 14:42, the nurse in charge called the MDA hotline to ask about the incident, he updated about a severe gunshot wound from Dizengoff, and received a message about another seriously injured from another hotline.

At 14:56, two seriously injured people were admitted to trauma department (surgical intensive care) and were pronounced dead. Prof. Halpern, the ER manager called the MDA to make sure that the MCE was announced - the answer was positive, even though it was not officially announced. At that time another third seriously injured man was sent into trauma department without any notice from the MDA to the ER.

At 15:05, the ER team tried to call the MDA for updates, without any success or information. At 15:07, the ER staff declared a MCE, but this declaration did not reach the hospital's control room. At 15:10, the ER staff succeeded to get MDA on line, and the MDA confirmed the event and informed them about five more wounded people, one of which was evacuated from the scene in critical condition and was connected to artificial ventilation devices.

At 15:15, the ER staff started to evacuate the ER to be able to receive the wounded from the zone. At 15:33 the hospital's control room declaring MCE in TLVMC, sending SMS and piper messages to the hospital staff. Seven more wounded arrived to the Medical Center at 15:49.

The official decision regarding the declaration of a MCE:[10]
The official decision on the MCE was taken at 15:33, which is 53 minutes after the start of the incident, and 37 minutes after the arrival of the first wounded.
Actions taken for assessments:
- Declaring MCE (in delay).
- Computerized calling system: automatic message in pagers, SMS message to VPN (ER staff members).
- Initial back-up at the ER with a small staff - which requires reinforcement by surgeons and nurses.
- Partial or complete cessation of routine activities depending on the size of the event.
- Emergency evacuation - transfer of patients from ER to other departments (internal medicine departments).

Gaps and actions not taken for assessments: [10]
1- Communication: no orderly notifications were received at any stage of the incident from an authorized source; the information was obtained at the initiative of the nurse in charge at the time of the shooting.
2- Declaring a MCE: there was delay of 53 minutes in declaring the event as a mass-casualty event. This delay had the following consequences:
- There was no organized calling personnel list.
- Delay in evacuating the ER to receive wounded from the zone.
- No staff personnel were placed in the triage area.
- There were no mass casualties' events sheets for manual work.
- Staff members worked without identification vests.
- Lack of division of roles.
- There was no an event manager until the arrival of the emergency room manager.
- There was delay in opining the information center for the wounded's families and the press.
3- Information Center: opened at 15:40:
- There was a lacks in the computer system.
- The computerized information did not pass to ADAM system at the beginning of the event. (The ADAM system is a special system that can locate any citizen in any hospital in Israel if the citizen were injured, in case the family or the police wants to know in which hospital the citizen is, this system can locate him/her).
- The details of the wounded individuals were not updated on the computer system, and no correct information was provided to families.
- Signage for information center for families were not unfolded.
- There was a lack in providing information for the families, including update about the situations of the wounded.
4- Registration of the wounded at the triage area:

- There were no medical records in the casualties' manual files.
- One patient's sheet (neurosurgical) was forgotten on CT machine.
- The use of the Iron Number (temporary identification number) for casualties of the event: Contrary to the adopted protocol that requires the use of Iron Numbers, some of the wounded were identified in the report using iron numbers while others were identified using regular case numbers.

5-   Trauma Center:
- Evacuation of trauma center from surplus staff - not done.
- Wounded who were pronounced dead were left in the trauma rooms.

Investigations after the Incident: [11]
Following the incident, the recommendations issued by the hospital's management were:

A-   Declaring the event as a MCE: such declarations means that all systems and resources of the hospital's emergency room start operating according to the specified protocol, this includes specific procedures for logistics, social services, information center, and security. The fact that the initial announcement mentioned that there are three seriously injured people in the emergency room should have been a sufficient reason to identify the event as a multiple-casualties' event, and at that time, a MCE should have been declare immediately. The nurse in charge of the shift received approval, and immediately passed it on to the control room. The alert of declaring MCE must always go through the nurse in charge of the shift.

B-   Trauma event: In the meaning of declaring a trauma event - expanding trauma event messages to the operating rooms, anesthesia, and intensive care units.

C-   Opening of an MCE event in the registry - In any event, even if there is one injured person, the opening of an MCE event on the computer system must be transferred to the ADAM system.

D-   Information center: in case of any casualties' event, the hospital's information center must be opened immediately.

E-   Social Workers: There is a great importance for having an adequate number of social workers at the beginning of the event, in all sites of the hospitals, especially the ER.

F-   Investigations of any event must be conducted on the same day or the next day, and no later than that.

G-   They will not open two MCE events in the medical center, only one, even if two events were known.

II.   Conclusion:

A hospital's ability to care for multiple patients arriving at the same time is predicated by the ability of hospital's personnel to evacuate the emergency department of any existing patients. The volume of patients presenting to a single ED could easily overwhelm the clinical services of that hospital and turn a multiple-casualty event into a mass-casualty event, unless the distribution of patients from the field is carefully monitored. All healthcare facilities should perform a gap analysis on their existing disaster plans to determine the needed improvement measures, in an effort to minimize morbidity and mortality during any upcoming mass casualty event. [12]

The gaps were there from the beginning of the incident, there was a barrier and failure in receiving the information from a qualified source, which in this case is the MDA about the incident. As the qualified authority, the MDA had to inform the emergency room team about a multi-casualty incident, which would have given them time to get organized and run the MCE procedure and prepare the triage area to receive the wounded. The triage is a fundamental concept in the management of MCEs; it involves proper sorting of the wounded according to the severity of their injuries and assigning treatment priorities in light of available resources. [13]

The primary information was received due to the vigilance and initiative of the nurse who was on duty at the time of the incident. There are clear issues in internal communication; MCE was first declared by the secretary in the emergency room, and the message did not reach the hospital's control room. The team did not work according to the defined MCE procedures, did not wear identification vests, did not open MCE manual work sheets, and the information between the computer system and the ADAM system did not match. That was the responsibility of the secretariats. Although there was a doctor in charge during that shift, he did not take a management role to manage the event, until the arrival of the ER manager who took command of the event. Moreover, and according to the well-known practice, in the case of the arrival of victims in critical condition, only essential ER staff can be present at the ER room to deal with the case, all non-essential staff must evacuate the room to give the specialized team the ability to work in an orderly and safe environment. This matter was not taken into account or implemented in this case, which resulted in creating an uncomfortable work environment in the ER.

In addition to the gaps in the medical aspect, there was a gap in the communication with other parties on the event. The number of present social workers or hospital representative at the hospital was not enough; therefore, the press was not properly updated about the conditions of the individuals wounded in the incident.

Moreover, there was no signage inside the emergency department to guide the families to the areas where they can receive information about their wounded relatives. Additionally, the security department at TLMC was not able to properly evacuate the ER from visitors, including photographers.

Various emergency events around the world, similar to the one described in this article, were the starting point for improvement and development of better emergency preparedness in hospitals. For example, the 2017 terrorism attack in the UK tested the emergency response arrangements and put the health system's preparedness to respond to a mass casualty major incident under focus. The attack resulted in the death of 22 people and the injury of 116 others. This event put significant pressure on the health system during and after it occurred, and proved the need for services and personnel that are well equipped and prepared to respond [3].

III. Recommendations and Points for Treatment:

There is a need to update the MCE protocol for the ER staff, including the process of declaring a MCE. Moreover, there is a need to reinforce the roll of social workers in case of MCEs, including in the calling system in the future. More drills and simulations must be implemented involving all ER staff on event of multi-casualties, including the involvement of the security department in such exercises. Furthermore, there is a need to improve communication and coordination between MDA and the ER staff on one hand, and between the external first emergency response teams and the ER staff on another. There is also a need to improve internal coordination between the ER and control room. TLMC must work on improving its digital (computerized) systems, including ADAM system.

The final conclusion: Despite the failure to declare a mass-casualty event at the right time following the shooting incident, and the gaps presented in this article, the response team was able to receive and provide treatment to the wounded in a fast, responsible, professional and good manner.

IV. Summary:

Multi-Casualty Events are a concern in many urban areas, the principles outlined for managing an MCE are also valid for managing terrorist incidents. A MCE will require the identification and adoption of a different rating for evacuation and treatment priorities. This fact, of course, requires the ability to deal ethically and professionally with all casualties. Early preparation of the health system for dealing with MCEs will strengthen the hospitals' resilience upon the occurrence of such events.

One week after the attack, on January 8th, at around 4:20 PM, the shooter was located in an abandoned building in small village in the center of Israel, which is the former home of the shooter's parents. After being captured, the shooter went out and opened fire on the police-forces and was shot to death by snipers. None of the security forces were injured during the operation. According to the news report [14], the shooter was known to the police department, and was previously diagnosed with mental health problems.

As for the TLMC emergency department team, and due to the experience they gained from several past attempts in more severe attacks, and despite all the gaps in management, showed a quick and highly professional response.

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