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Mass Casualty Management in the Emergency Department – Lessons Learned in Beirut, Lebanon - Part II

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INTRODUCTION

The first article in this series (Part I) discussed the abundant exposure of our emergency department (ED) to mass casualty incidents (MCIs), particularly over the past 14 years. This experience led us to define practical strategies that emergency departments can use to develop their own MCI response plans. In the first part, our main focus was to highlight the abrupt nature of MCIs and the subsequent need to use disaster drills. Additionally, we discussed the importance of having a tiered response and activation as well as other lessons learned from our experience to maximize the preparedness of the emergency department to receive mass casualty.

In this article, we discuss the optimal way to triage patients. In addition, we will tackle the best methods for documentation and communication, which are vital yet overlooked during mass casualty incidents. We will also elaborate on what we learned from dealing with outbursts of anger and violence in the ED during MCIs and how to ensure the safety of the ED staff.

Lesson 1: Define and tailor your MCI triage categories to the context of conflict and developing nations.

In developed nations, although several mass

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causality triage systems are available, there hasn't been a consensus on the single best system to triage patients during MCIs.[1] One widely used MCI triage system, called the Simple Triage and Rapid Treatment (START), categorizes casualties as follows:

Red (Immediate): for life-threatening but treatable injuries requiring immediate or prompt medical attention. This includes neurologically altered patients and those demonstrating cardiovascular or respiratory signs of instability.

Yellow (Delayed): for potentially serious injuries that are stable enough to wait a short while for medical treatment. These can deteriorate, causing significant mortality and morbidity and require frequent evaluation.

Green (Walking wounded): for minor injuries that can wait for longer periods of time for treatment. These are patients who can and should wait if resources are scarce and no staffing or resources are available due to the other critical needs in the ED.

Black (Deceased/expectant): including casualties with signs of life but injuries that are incompatible with survival in austere conditions. Examples include victims with major burns (>85% BSA), head injuries with poor Glasgow Coma Scale, or multisystem trauma with unequivocal signs of impending death.[1,2,3]

A new triage system, called SALT (sort, assess, life-saving interventions, treatment and/ or transport), was proposed in 2008. This new triage system integrated different features from the available triage systems into one mass casualty triage system based on evidence and consensus opinion.[1]

In Beirut, other developing nations and conflict zones, those injured and their companions are

not members of the armed forces of a developed country or international alliance.

Our experience has shown us that ED team members that turn their back on casualties labeled as "black" turn into victims. Therefore, in developing nations and conflict zones, all MCI responders should be alerted to express enthusiastic interest upon the arrival of casualties labeled as "black" to the ED. As such, these casualties should always be designated as "Red," to avoid any conflict and prevent any harm to the MCI responders. Of course, ED medical providers should understandably run a reasonably short non-invasive "soft code" to appease the patient's companions.

Lesson 2: Consider using additional zones within the ED.

In addition to the red, yellow, green and black zones traditionally used, consider adding orange and blue zones. These added zones are transitional zones rather than new triage categories.

Over-triaging patients to the red zone (assuming a higher acuity level) will increase the need for ED resuscitation space. Consequently, an orange zone can be used to place patients who have been resuscitated in the red trauma bay. This will allow for emptying the red zone after completing the primary and secondary surveys and relatively stabilizing identified injuries. Once in the orange zone, patients can be sent for their secondary interventions, to the operating room (OR), to the ward or intensive care units or to the morgue

Also, a blue zone should be considered for a final check before discharging a patient home. This zone is for patient clearance including verifying that there have been no errors or omissions and that accurate charting has been completed.

Lesson 3: Identify a team leader for the different zones.

Red Zone Section Leader: This may be an emergency physician (EP), a trauma surgeon, a senior surgical resident, or an EM resident. He/she needs to oversee prompt resuscitation, often of multiple victims simultaneously. Accordingly, calmness and experience play a role in relaying confidence and an open embrace to all the distressed volatile companions that might barge into the resuscitation room. He/she should be able to stay in the red zone. This should be taken into consideration when a shortage of surgeons or surgery residents may require them all to head to the operating rooms. The red zone section leader is also expected to call-off resuscitation efforts, assign personnel to patients, and decide on the extent of invasiveness in a resuscitation attempt. He/she may need to make the call to send patients to the OR and out of the ED. This may be necessary to separate angry militiamen or family members from the patient and to defuse a volatile dangerous situation.

Orange Zone Section Leader: This may be a critical care fellow, a senior EM resident or an EM specialist. He/ she needs to complete the secondary survey for all patients resuscitated in the red zone. Senior surgical residents, surgeons, and traumatologists may assume this role too, but are likely going to end up in one of the ORs during an MCI.

Yellow Zone Section Leader: The person assuming this role is required to evaluate and re-evaluate patients with complex injuries and provide resuscitation and disposition to those who deteriorate in the yellow zone. He/she should complete work-up of complex or serious injuries to ensure proper care and disposition are provided.

Green Zone Section Leader: This leader should attend to the needs of those with minor injuries, make sure their injuries are indeed minor and stable, and provide the care needed to get these patients out of the ED.

Blue Zone Section Leader: This could be a primary care physician. He/ she should ensure that all required care has been completed and ensure that no error or omissions occurred due to the overwhelmed resources.

Lesson 4: Identify a DMO, DNO, EDCO, and MTO.

Assign a medical provider to serve as section team leader in the following order of priority when there is a shortage in the actual number of providers on-site:

ED Disaster Medical Officer (DMO) and Disaster Nursing Officer (DNO): preferably the most senior EP and nurse on duty. They are expected to assign

teams, team leaders and tasks, prepare zones, ensure adequate supplies and drugs (including what they need from within the ED or other parts of the hospital), communicate with the Chief of Staff or the Nursing Director (or their designees) to secure resources from outside the ED and address issues when they come out. Additionally, they must move across all zones to ensure all is going smoothly and according to the MCI plan, secure adequate staff, identify needs and resources, identify shortages, and foresee potential problems and needs. Most importantly, the DMO and DNO must not involve themselves in the care of patients but rather assign and secure the provider or needs identified. Clear lines of communications should be maintained between the DMO and DNO with a clear separation of their roles. The DMO should be focusing on the physician performance, challenges and needs while the DNO would maintain oversight over needs and challenges faced by the nurses and support. The DMO would communicate with the Chief of Staff or Chief Medical Officer or their designee, while the DNO would work with the Hospital and Nursing Director or his/her designee.

ED Clearance Officer (EDCO): Ideally, this is assigned to the EP on-duty who is aware of all the patients who were already in the ED before the arrival of the casualties. He/she is expected to empty the ED by either discharging patients home when possible or liberally admitting them when in doubt - to move them out of the ED and create space for the incoming mass casualty victims. Optimally, the ED should be cleared to the best of the EDCO's ability in less than 30 minutes. At this point, the EDCO can assume another role in one of the zones.

ED MCI-Triage Officer (MTO): This should be designated to either a senior RN or an EP who is clinically experienced, wise, flexible and sharp. The MCI triage officer interfaces with incoming victims and their companions, barging crowds trying to break through the ED door, and potential security issues at all times. He/she must immediately recognize the red zone patient when seeing the stretcher or companions rushing through the ED door. Likewise, the MTO must be senior enough to recognize, by a quick look at the walking wounded, those who are potentially unstable from the ones with minor injuries. Additionally, the MTO should consider the available medical resources and

maximal utilization of medical assets.[4] He/she should not to allow first aid in triage. Last but not least, the MTO's role extends to ensure expeditious and proper preparation of the casualty in the triage with the help of an assistant. This includes having a proper color band stapled unto the uninjured extremity as well as assigning the patient with a pre-prepared clipboard. The clipboard should include a pre-labeled ED chart, an order sheet, radiology request forms and lab request forms. If the patient is labeled red, for example, the MTO's assistant should tag and attach clipboard while the patient is heading to the red zone.

Lesson 5: Ask the hospital director to allocate a deputy as liaison to the ED.

The hospital director should designate and assign a deputy to the ED to observe, collect and communicate information to the disaster committee meeting in the director's office such as casualty count, identified casualty names, and secure additional resources and troubleshoot issues that are not related to physician or nursing duties. This can include security issues, supplies, access issues, etc.

Lesson 6: Provide nurses and EPs with color tags or vests.

Distribute color tags to the ED nurses to clearly identify them to all hospital staff who may be in the ED as section team leaders. Similarly, color tags should be given to the EPs and trauma surgeons as physician team leaders. Such designation and visibility for the ED nursing and medical providers will facilitate their capacity to coordinate activities and teamwork within their assigned area. ED providers know how and where to access supplies, medications and equipment. They are more likely to know or remember how to function in an MCI response, are familiar with each other and can more effective in leading the team within their sections or the ED. This is particularly important during level I activations, when the mobilized staff are not familiar with each other, with the ED, and the details of the plan.

Lesson 7: Position the ED triage location carefully.

Expect to have human waves torpedoing through the ED Doors. When ambulances or vehicles arrive

with casualty, expect the companions or crowds gathered in front of the ED to push the stretcher and victim through the ED doors.

To slow down that mechanized human torpedo, one cannot rely on glass and wooden doors or on the handful hospital security officers. Moreover, local or national armed forces will be occupied at the scene of the MCI where the casualties are coming from. By the time they respond to the ED with additional resources, odds are the institution would have already deactivated its MCI response. Expect them to take no less than 3 hours to send protection officers to help. This is further complicated in situations when the casualties are the result of attacks against the armed forces or police.

Based on our experience, we found out that using human barriers to slow down the human waves can be helpful. The DMO can quickly form these barriers with the help of volunteers who come to the ED to offer to help. Once instructed to assist the ED security officers in restricting entry into the ED, volunteers will comply, particularly those who are there out of curiosity or to see the action firsthand. The DMO should designate one or more team leaders to organize and represent a group of volunteers. This will play a key role in providing ED security if and when the tsunami crowd of relatives and friends will arrive.

Lesson 8: Prioritize the security of the ED team and patients.

The following are proactive strategies that have been tested in Beirut:

Secure the ED perimeter: Be creative using what you have available. Begin by using the human barrier of protection officers and volunteers we described earlier. However, if and when large crowds are pushing through the ED barrier line, the DMO or DNO should head out to the crowd and identify the leaders from the crowd, who can command a number of them to put order in the crowd. Once identified, the DMO or DNO can ask for their help and give them the responsibility of securing the ED perimeter. Here again, you and your ED team become part of the clan and the unofficial "network" of paramilitary, gang or militia dominating the neighborhood of your ED. The crowd will typically listen to them and not to you. The worse that can happen is that your ED may end

up with a few more victims from the crowd, but that would be in situations where the alternative would have been a thousand individuals from the crowd injuring and disrupting the patients and staff within the ED after breaking through the volunteers you may have gathered as a shield in front of the ED entrance.

Relief workers in conflict zones have described this process as "auto-delegation." Sometimes, more than a thousand family and relatives will be looking for their beloved ones and for anyone missing at that time. They will promptly show up at the closest facilities to the scene of the incident where the victims are typically dispatched. They will arrive hours before any adequate numbers of regular armed forces or police, if those are available or safe to have around anyway.

The DMO may try to divert this crowd by posting on a nearby wall outside the ED the names of all patients who have arrived to the ED. They can also ask the designated leader of the human barrier at the ED entrance to indicate to the crowd other hospitals where patients may have been transported to. This will distract a number of them, but they will not be satisfied for long. They will sooner or later return, until they reach their beloved ones. However, one can reduce the number of those who will persist in their intent by successfully diverting away those who are merely curious or not closely related to the potential or actual victims.

Your ED may receive victims who belong to two conflicting or warring parties. Discretely separate them, and preferably do it all the way from arrival to ED triage. Routinely remove all militia or military clothing or identifiers.

Make sure ED team members do not ask any sensitive questions about the context, background or circumstances that led to the injury, mass casualty or conflict.

Political discussions should not be allowed or tolerated. Promptly send any violators home.

Don't address the media for this can only waste precious time and risk the team and patients' lives. Delegate this to the hospital director and the disaster committee gathering in the command center.

Last but not least, communicate early on with the first prehospital providers who arrive to your ED

and with their on-scene leaders. Ask them to send patients who are already pronounced dead on scene directly to the morgue. This shouldn't be done through ED doors. Ideally, patients pronounced dead should be sent to hospitals away from the institutions that are receiving the injured.

Lesson 9: Avoid outbursts of anger.

To avoid outbursts of anger and grief delineated as violence, abuse and bodily harm against the ED team upon pronouncing a victim dead, here are additional lessons we recommend:

Do not declare anyone dead or dying on arrival to ED triage.

Promptly manifest clear compassion and a welcoming attitude to the companions and family members bringing in the casualties of an MCI. Use statements like "come this way" or "hurry this way" or "let me help you…" Never block their entrance but rather slow it down with the human barrier, while 3-4 volunteers head to the ambulance or car to bring in the casualty with brief sympathetic sentences to the companions. Help them move the victim, but discretely instruct them to do so appropriately to avoid further harm the patient.

The MTO should identify the leader of the group and next of kin. This can be done by asking the arriving group of companions who is in charge. Ask him/ her whether there is a next of kin. They would want you to identify and address them on arrival. Comfort them while tagging the patient and help them into the Red Zone while introducing it to them.

Reduce the number of companions. Inform them that the patient will likely need blood. Do that as early as upon arrival to the triage zone. Probably, they will all offer to donate. This is your opportunity to send most of them, except the group leader and the next of kin, to the blood bank. This will hopefully keep them away from the ED for a couple hours.

Engage the clan leader and the next of kin in the resuscitation of their loved one. You can give them the ventilation bag to compress manually for a couple minutes. This is a part of the "soft code" and can be done for patients with obvious deadly injuries. Discretely tell them that the patient is not responding while expressing sadness or grief. The companions will not assault you or direct any anger

or distress towards you. All they want to see is that the team tried and cared. This image will stick in their minds forever and will dearly thank you for your efforts whenever they got the chance to.

Lessons 10: Safety stock of supplies and medications

Maintain a "safety stock" of supplies and medications in or close to the ED. Plan the list carefully, as if you will receive "300 patients in 3 hours." Aim to address the ED needs if and when it faces large numbers of blunt or penetrating trauma and hazardous material exposure. Consider expiration dates and monitor replacement strategies as applicable. This includes stocking specialized burn care equipment and supplies as well as blood stocks. During MCIs, existing stocks serve as the main supplier rather than blood donations, which are a part of the forward planning to replace the depleted stocks.[5,6] Disaster drills are one way to assess proper stocks of drugs and other consumables.[7]

Lessons 11: Maintain an electronic log of pre-registered patients with matching pre-labeled clipboards.

Maintain an electronic patient log of 300+ pre-registered patient records with mass casualty identifier "case numbers." Prepare matching pre-labeled clipboards that contain pre-labeled ED charts, nurse order sheets, radiology request forms, lab request forms, as well as two sheets of patient identification labels. There is no sufficient time neither enough staff to do all this when mass casualty victims arrive. Therefore, assigning one of these numbers to every arriving patient saves time and workforce.

The pre-labeled clipboards should be stored close to the ED, preferably with the "safety stock." Furthermore, employing clipboards of a different color for MCI casualties compared to regular ED patients allows the ED personnel to differentiate between the two.

Lessons 12: Empty the ED before MCI casualties arrive.

The ED clearance officer will quickly round on the patients present in the ED at the time of the MCI. When in doubt, over-admitting patients is acceptable. Patients will need to move up to the

floors, even if inpatient beds are not ready. They are to be placed in hallways or doubled or tripled into private rooms when necessary.

Lesson 13: Switch to paper documentation.

During an MCI, it will be impossible to rely on computerized orders and charts. The patients' locations will become confusing as ED cubicles, medical providers, and spaces assigned to patients will change too frequently and cannot be accurately or safely reflected on an electronic system. It is therefore recommended to switch to paper documentation. Paper documentation includes only critical information such as triage status, provided care, and patient disposition. Advantages of paper documentation during MCIs include ease of use and rapid availability. However, it is important to keep in mind the limitations of paper documentation including limited documentation space and the fact that these papers can be lost or destroyed easily, especially with the chaos witnessed during MCIs.[8,9] Nonetheless, new wireless technologies that can be used for documentation during MCIs are now emerging.[8]

Lessons 14: Keep patient records with the patient at all times.

Patient identification and potential errors constitute a major issue in an MCI response. This can be attributed to the chaos resulting from the continuous flow of patients as well as the rapid change in patients' and providers' locations. Frequently, the names, gender, age, and injury types are very close to each other. After a certain number, the casualties will all look and sound the same. Therefore, it is important for the provider to double check if he/she is dealing with the right patient. When a companion is available, use him/her as a surrogate parent. ED records and clipboards should be kept with the patient at all times rather than leaving them on the counter or carrying them around by the treating nurse or physician. Moreover, the charts should be sent with the patient to radiology department or to any new section they might move into.

Lessons 15: Keep shortwave radio transmitters available.

Expect and be prepared for communication troubles during an MCI. The network will be overwhelmed or intentionally disrupted. For example, in Lebanon, the cellular network used to be lost for 3-4 hours with every car bombing. One way to overcome this issue is to keep shortwave radio transmitters available and charged 24/7 for all the key team leaders and hospital administration.

Lessons 16: Plan ahead sustainability for ED operations

Disaster and mass casualty response planning are modeled using the paradigm that when medical needs outstrip the immediately available resources, additional resources will become available with time.[10]

In reality, however, this is not always true. Mass casualty responders might find themselves with no additional resources and should carefully consider and prepare for such an unfortunate scenario. Team leaders and disaster committee officers should always plan and execute a mass casualty response, keeping such a harsh possibility or reality in mind.

CONCLUSION

Although our institutional experience might seem atypical for secure developed countries, we genuinely believe that the lessons we presented above are fully applicable in sustained terror or conflict incidents across all countries, regardless of their phases of development.

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