Review

The World Trade Center Attack Similarities to the 1988 earthquake in Armenia: time to teach the public life-supporting first aid?

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Abstract

On 7 December 1988, a severe earthquake hit in Armenia, a former republic of the Soviet Union (USSR); on 11 September 2001, a manmade attack of similar impact hit New York City. These events share similar implications for the role of the uninjured survivor. With basic training, the uninjured survivors could save lives without tools or resuscitation equipment. This article makes the case for teaching life-supporting first aid to the public in the hope that one day, should another such incident occur, they would be able to preserve injured victims until formal rescue occurs.

Keywords Armenia, disaster, earthquake, resuscitation, terrorist

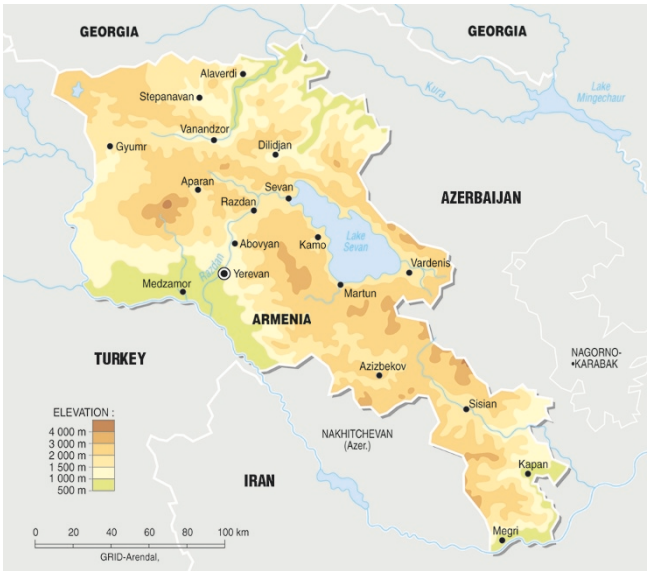
Comparing the 1988 earthquake in Armenia, the former republic of the Soviet Union (USSR) [1], with the attack in New York on 11 September 2001 reveals similarities in the potential resuscitation of victims. The Armenian earthquake, which was close to its capital Yerevan (see Fig. 1), was unimaginably catastrophic. The 20 s earthquake was estimated to be as destructive as 120 atomic bombs, destroying 21 towns and 302 villages in seconds (Gazetov B, personal communication, 1989). The earthquake killed 25,000 people, injured 19,000 and rendered 540,000 homeless (Gazetov B, personal communication, 1989). Virtually every public service, including water, electricity, transport, fire rescue, and health care, was either destroyed or damaged beyond use. Communication evaporated instantly. Considering the circumstances, however, the local public services' response to the injured was rapid and reasonably effective. Rescuers maximized whatever facilities were available, set up first aid centers, triaged patients, and transported the injured back to areas outside the immediate damage area by whatever means were available.

There had been no widespread 'first aid' training of the Armenian public prior to the event. In general, they simply did not know what to do immediately following the earthquake. Survivors initially began digging their relatives out from the rubble with their bare hands, resulting in severe lacerations and bleeding that only added to the casualties. Little, if any, meaningful first aid was attempted by the uninjured. The less injured were seen to console, but not actively aid, other more injured people. Many victims died from the effects of uncontrolled bleeding once removed from the rubble.

The earthquake in Armenia in 1988 was much larger in scale than the attack on the World Trade Center in New York on 11 September 2001, but there are some similarities. The attack was totally unexpected, and resulted in mass confusion and terror. Communication and transportation were instantly disrupted. It took time to get experienced rescue personnel to the site and many victims died before they arrived. It is also possible that simple life-supporting first aid (LSFA) rendered by uninjured or minimally injured bystanders might have resulted in lives being saved. Perhaps the lessons from these two events suggest the time has come to teach the public a range of simple life-saving first aid techniques through more advanced resuscitation protocols, to help save those potentially salvageable patients injured in mass disasters. To further explore this potential, we must first under-

LSFA = life-supporting first aid.

Figure 1



The earthquake in Armenia, near its capital Yerevan, killed 25,000 people, injured 19,000 and rendered 540,000 homeless. Reproduced with permission from UNEP GRID-Arendal/The Times Atlas of the World.

stand what kinds of victims there are and what they could realistically recall in moments of disaster.

Classifying the injured

The victims in Armenia and New York can roughly be divided into four categories [2]. First, class 1 includes those victims killed outright, or expected to die within a few minutes from irreversible injuries. Class 2 are those that have either sustained serious traumatic injuries, are trapped in the rubble, or will require difficult, time-consuming manipulations to be extracted from the rubble and then need advanced life support maintenance until they can be transferred to a tertiary care facility for surgery and intensive care. The third category (class 3) includes those victims potentially salvageable if rendered immediate, simple first aid, such as hemostatic measures, stabilizing fractures, or maintaining the airway until further care is available. Finally, class 4 includes victims with minimal injuries that are trapped in protected coves where they will have some protection from further trauma until rescued.

The victims in class 1 are clearly unsalvageable, as pointed out in the current Advanced Trauma Life Support protocol [3]. In the Armenian earthquake, those in class 2 ultimately proved unsalvageable because no immediate follow-up technology was available; this was especially true of those requiring cardiopulmonary resuscitation. Spending time on the victims in class 2 was therefore a false economy because those in class 3 or class 4 were more likely to benefit from assistance with fewer resources.

The victims in class 3 would stand to gain the most. Brief but effective first aid, given by uninjured survivors, could stabilize them, making it more probable that they will survive extraction from the rubble and transfer to hospital. This application of LSFA by uninjured survivors would enable health care workers to make 'secondary sweeps' some time later, when patients are transferred to secondary health care centers. LSFA is thought to improve mortality if initiated within seconds or minutes of impact [4].

In the Armenian earthquake, the victims in class 4 fell into a process of 'natural selection'; whether they survived until extraction relied solely on serendipity. In such cases, the work of sniffer dogs and structural engineers would be more important than medical technology.

Teaching the uninjured survivors

Given that anyone could become an uninjured survivor, the population in general should be taught the six basic steps of LSFA:

1. Airway control using head-tilt and/or jaw-thrust plus manual clearing of the mouth and throat.
2. Exhaled air ventilation (mouth-to-mouth or mouth-to-nose).
3. External hemorrhage control by compression.
4. Positioning for coma.
5. Positioning for shock.
6. Rescue pull without adding injury.

Triage should be designed so that the simplest treatment is available at the center of a disaster, becoming more diverse as victims are shipped away. Having uninjured bystanders administer LSFA is therefore ideal. Once victims are stabilized and health care workers have arrived, some Advanced Trauma Life Support measures, such as administering oxygen and intravenous fluids, can begin if the victim's face or arm is free. If the victim is then extracted from the rubble and is stable, he/she should be transported away from the scene to centers where more specialized treatment and stabilization techniques can be administered. It seems clear that advanced technology has little place in the initial hours after a disaster. There is little reason to have 'specialists' directly in the disaster zone. High technology at the scene is difficult to both mobilize and use under confused and difficult circumstances.

Clear thinkers required

In any rescue effort, clear thinking individuals are essential. Survivors are usually unable to do anything other than react to the loss of relatives and property. In this 'shocked' and confused state, however, people are still able to follow sensible directions with greater success than if they were trying to create those same directions. They can therefore still be useful in initial aid attempts, and previous training is of paramount importance.

Getting in and out of a disaster scene is also essential. Roads that are quickly clogged with relatives or those with

good but uncoordinated intentions severely obstruct the efforts of the rescue teams. Clear thinking people, therefore, are also required for traffic control and this is best achieved by martial law, which should be imposed immediately by an armed, authoritarian, highly mobile and authoritative faction; presumably the military.

Conclusion

Every major disaster warrants retrospective studies so we can learn how to improve all levels of Emergency Medical Services [5]. The problems, needs and challenges no longer differ between countries, and creating specialized search and rescue teams, including physicians and structural engineers, might be useful. However, only experience will tell whether they are affordable. Perhaps a more cost-effective approach is to teach LSFA to the general public. Basic airway maintenance, pressure applied to bleeding, splinting of unstable fractures, and body temperature control can all be easily taught and learned. Also, none of these skills require technological hardware, which would not be immediately available at the scene of a major disaster.

DC studied the medical response to the earthquake in Armenia on 7 December 1988 as part of an on-site collaboration between the International Resuscitation Research Center of the University of Pittsburgh, USA, and the Institute of Reanimatology of the USSR Academy of Medical Sciences in Moscow, Russia [1].

Competing interests

None declared.

Acknowledgement

This article, and the series it is part of, is dedicated to the first responders – fire, police and medical personnel – who attended the World Trade Center disaster of 11 September 2001. They did not hesitate to place themselves in harm's way to rescue the innocent, and without their efforts many more would have perished. They will not be forgotten.

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