Chemical and biological attacks: medical preparedness

Joe Charlaff explores the emergency plans and healthcare resources that have been put in place for dealing with a mass casualty incident in Israel, and in particular one caused by a Chemical, Biological, Radiological or Nuclear (CBRN) attack.

The potential use of chemical, biological, radiological and nuclear weapons by terrorists, and the potentially devastating effect of such an attack, has resulted in an ever-increasing awareness that there is an urgent need for effective medical preparedness. This is particularly true in Israel.

The Israeli Fire and Rescue Service, Emergency Medical Service (EMS), law enforcement agencies and the military, all of whom must prepare to meet an attack of this nature, are well aware that the characteristics of CBRN weapons make them more difficult to manage than conventional attacks. A CBRN attack might cause significantly higher numbers of casualties, affect larger areas and require the utilisation of detection and identification equipment. An effective response also requires specially trained personnel using protective equipment including suits and gas masks.

Medical preparedness and training

Israel takes such medical preparedness very seriously. The majority of its hospitals are well prepared to deal with chemical and biological warfare and to carry out real time drills on a regular basis.

At the Sheba Medical Centre on the outskirts of Tel Aviv, the Israel Centre for Medical Simulation (MSR) is a 1,600 square metre facility designed as a virtual hospital with multiple clinical in-hospital environments, including an emergency room, operating room and intensive care units. Outpatient facilities have the additional ability to create various environments that the casualties might have encountered before reaching the hospital, such as a simulated battleground.

MSR has developed a wide range of simulation-based programmes in collaboration with Israel's civilian and military medical authorities to improve emergency preparedness for conventional and non-conventional threats. Just taking the simulated in-hospital emergency room environment, for example, more than 1,000 participants from hospitals, specialised military and police units dealing with CBRN, as well as civilian paramedics, have participated in these programmes. Scenarios have included staged biological warfare using actors cosmetically made-up to simulate anthrax exposure, who have been admitted to emergency rooms complaining of a bizarre rash.

During such simulations, ER teams are expected to diagnose and identify the source of the symptoms and to respond accordingly, sealing off the emergency room, putting on gas masks, putting 'patients' in isolation and informing the authorities of the incident. The whole action is videotaped and, afterwards, shown to the team in a debriefing session. Initially the programme was limited to instructors at the MSR only but at a later stage the project was expanded to include responder institutions and organisations from other parts of the country.

The Israeli Defense Forces Medical Corps undergoes ongoing training routines in both conventional and non-conventional warfare at the Centre and rooms are converted to a battlefield environment with sounds of explosions, gunfire and a gaseous substance creating the appearance of a chemical attack. Paramedics are trained to carry out specific tasks, such as administering intravenous fluids, while wearing a gas mask and chemical suit.

KEY POINTS

- CBRN incidents require a specialised response for which emergency services staff need specific training.
- Rapid identification of CBRN substances can be key to ensuring an effective response.
- Realistic drills and regular training can help to prepare responders for this type of attack.

International interest

MSR has attracted attention worldwide. Every year, doctors from the USA in particular come to train at the Centre. Dr Alan Schorr of St Mary Medical Center near Philadelphia was one of twenty American physicians who took part in a week-long course in emergency and disaster management, under the auspices of the American Physicians Fellowship. 'I've never experienced anything comparable to the simulation center in Israel', he says. 'It's amazing how difficult these simulations are and how frightening it could be to the unprepared'.

The Hadassah Medical Organisation in Jerusalem, known for its innovative approach to emergency medicine, also runs week-long mass casualty event workshops in collaboration with the International Institute for Counter Terrorism (ICT).

At Hebrew University School of Public Health, Deputy Director-General Professor Samuel Shapira has initiated and runs workshops that combine the principles of terror medicine and disaster management. Topics covered include Principles of Mass Casualty Management, Pre-Hospital Strategy, Chemical,

Israeli medical responders are well trained in dealing with casualties involved in CBRN attacks and should be able to spot signs and symptoms of contamination.

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Biological and Radiological Events, and Medical Implications of Biological Terror.

Live drills are timed to see how quickly they can be executed and how long it takes to diagnose the substance used. The exercises monitor how personnel use protective equipment, as well as the time taken to don protective gear.

In addition, surprise drills are carried out to test the alertness of emergency room staff. In one such drill, a soldier appeared in the emergency room with symptoms suggesting anthrax exposure. She succeeded in passing through all the procedures until reaching the x-ray department, at which point her symptoms were finally recognised. Had the situation been real, by that time the emergency room staff would have been seriously affected, highlighting a particular area in which further training is needed.

The 2001 anthrax scare in the US highlighted the need for rapid testing of suspicious substances such as powder found in envelopes; swift identification of symptoms and effective decontamination facilities are vital in the case of biological or chemical attacks. Hadassah Hospital has at least fifty outdoor showers and dozens of metal stretchers.

There is also an increasing demand for the technology that will provide an early warning, followed by the crucial information needed for immediate action; effective treatment should be administered within two hours of exposure. This has led Professor Nathan Citri, a Professor Emeritus at the Faculty of Medicine at the Hebrew University of Jerusalem, to invent a kit for the rapid detection of anthrax. In particular, it can be used when a patient is admitted to the emergency room of a hospital suspected of exposure to a harmful substance. The invention is designed to provide all relevant information in less than sixty minutes and is based on new concepts incorporated into two existing kits, the first of which informs staff within minutes whether the suspicious substance might be anthrax. If the answer is positive, the second kit will test for the presence of a drug-resistant variant and identify the antibiotics that should be used against it. The two kits can be used concurrently, consecutively or independently.

Self-protection

Perhaps just as importantly, since the first Gulf War in 1991, the Israeli Government has taken preventative measures on a scale not seen in the UK since the end of the Second World War. The entire population has been issued with free emergency kits consisting of individually fitted gas masks and auto-injectors containing nerve-agent antidotes. Personal instruction on how to don the gas masks and use the atropine injector is given to members of the public by soldiers at designated training centers.

Israel has also strengthened civil defence under the Homefront Command (a division of the Israel Defense Forces) to co-ordinate IDF and civilian emergency services to respond to CBRN attacks in the event of war and to distribute booklets instructing the civilian population on how to cope with threats.

'It's a fact of life that medical systems all over the world with responsibilities for dealing with mass casualties are facing the reality of the question being when and not if', says Professor Shapira, Director of the Hebrew University School of Public Health. It is a view shared by many other Israeli medical academics.

'A year after September 11, 2001, when the threat of non-conventional weapons became imminent, Israel took such a threat very seriously. We immediately began to develop training programmes for chemical and biological warfare in conjunction with experts in the field', says Dr. Amitai Ziv, Head of the Israel Centre for Medical Simulation. 'The medical profession has always been conservative in its clinical training, so the type of training we offer is a very powerful tool to train professionals for nightmare scenarios that no-one is really prepared for. It represents a major revolution'. ■

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