

The medical management of civil disasters in Hong Kong

RA Cocks

Civil Disasters (major incidents) are events which place stress on the emergency services, both in the pre-hospital and hospital phases. There is often intense media interest, and staff must cope with additional pressures while trying to create order from chaos. The need for special arrangements to cope with the large number or severity of casualties defines disasters and distinguishes them from the normal peaks of Accident and Emergency workload. Good organisation of the medical response at the scene requires an efficient medical manager, the medical control officer (MCO), and also the presence of trained staff, who are commonly provided by the Hospital Authority and Auxiliary Medical Services. The need for training and the value of full-scale disaster drills as well as regular table-top exercises is emphasized. (*Hong Kong j.emerg.med.* 2000;7:179-184)

Keywords: Disasters (MeSH term), major incidents, multiple casualty incidents, emergency services

Introduction

When considering civil disasters, otherwise known as major incidents, the first difficulty is to establish a definition. Certainly, the number of casualties alone does not offer a good indicator of what sort of incident is "major".¹ Hong Kong's 14 main Accident and Emergency departments are accustomed to handling a high turnover of patients, and the arrival of fifty or more lightly-injured patients may not cause difficulty. In contrast, ten severely burned patients with respiratory problems might overwhelm a single hospital's facilities. These examples draw attention to a more important concept - the effect of the incident on normal services, and whether those services can cope without special arrangements.

The Hong Kong Civil Disaster plan, 1994 defines disaster as:

"A serious disruption of life arising with little or no warning, causing or threatening death or injury to numbers of people in excess of that

which can be dealt with by the public services operating under normal conditions, and requiring special mobilisation and organisation of these services"²

This definition applies to all of the public services, and when applied specifically to the Hospital Authority, could be summarised as:

"Any incident which, because of the number, severity or type of live casualties, requires special arrangements by the hospital"

The special arrangements referred to in these definitions might depend on the degree of pressure exerted by the incident on the hospital facilities, and therefore a grading of disaster severity is needed. For example, maximum mobilisation of a hospital's resources in response to a vague report of a disaster might be wasteful and disruptive, particularly if the report turned out to be a false alarm. An agreed grading system for the HA hospitals includes:

Disaster Grade 0 - This is a standby grading only and is activated in response to an initial report (from the Police or Fire Services Department) that a potential disaster has occurred. Key staff are informed and preparations are made by the Accident and Emergency department.

Correspondence to:

Robert A Cocks, MD, FRCS, FHKAM (Emergency Medicine)

Prince of Wales Hospital, Accident and Emergency Medicine Academic Unit, The Chinese University of Hong Kong, Rooms G05/06, Cancer Centre, Shatin, N.T., Hong Kong

Email: robert-cocks@cuhk.edu.hk

Disaster Grade 1 - The number and/or severity of casualties is light, and can be absorbed by the normal A&E service without significant changes to staffing levels or infrastructure.

Disaster Grade 2 - The number and/or severity of casualties is moderate, and special arrangements are required to establish entry and exit points to the A&E department, to segregate disaster victims from the normal workload, and to supplement A&E staffing levels.

Disaster Grade 3 - The number and/or severity of casualties is great, and significant changes in A&E department infrastructure and staffing become necessary. Hospital bed capacity becomes an important issue, and a control room is established.

Disaster Grade 4 - The hospital is overwhelmed with casualties and has to consider diversion of further casualties from the incident to other hospital. The hospital "cluster" concept in Hong Kong assists in minimising the risk of this eventuality.

Types of disaster

Disasters may be natural or man-made, and in the Hong Kong context the commonest incidents in these categories include typhoons and landslides (natural) and transport accidents (man-made). Major fires are an additional man-made hazard, and although hill fires may appear to be a natural phenomenon, most are caused by people.

Some disasters may involve disruption of the health-care system. Flooding, earthquakes and landslides may damage hospitals, or may block access to them. Such disasters are termed compound disasters, reflecting the fact that they are made worse by degradation of the emergency services and health-care system.

Disaster	Dead	Injured
1991 DB29 Oil Barge Capsize	17	23
1992 Shek Kong Arson (VBP camp)	24	116
1993 Lan Kwai Fong Crush	21	50
1996 Pat Sin Leng Hill Fire	5	11
1996 Garley Building Fire	40	81
1999 China Airlines Crash	3	206

Mobilisation of the emergency services response

The initial warning of a disaster normally comes via a "999" emergency call from the public to the Police emergency switchboard, from which the call is then passed to the Fire Services Department (FSD) Control centre in Kowloon. For some locations, for instance an incident is an industrial location or a hospital, the level of response is pre-set by the FSD. For other incidents, an ambulance will be dispatched to the scene, and if the crew find a genuine disaster situation, they will report back the details and remain on-scene as the temporary control facility. The content of the initial report contains details of the precise location, access, type of incident, type and approximate number of casualties and any hazards (e.g. toxic materials). The crew will request appropriate mobilisation of resources to handle the incident, and the supervisor will take on the role of Ambulance Incident Officer (AIO) until relieved. The FSD control will notify receiving hospitals of the incident, and if appropriate will request an emergency medical team ("E-team"). Arrangements for the appointment of a Medical Control Officer (MCO) from a hospital in the same cluster would normally be made whenever an E-team is mobilised. For historical reasons, all alerts to the Hospital Authority concerning aircraft crashes are initially channelled through the telephone operator at Queen Elizabeth Hospital.³

Casualties who are not trapped would, in the early stages of an incident, be triaged by the FSD Ambulance Command and dispatched to hospital.⁴ When a hospital E-team arrives, the team assumes overall responsibility for field triage and on-scene treatment. The MCO would normally arrive separately and at a slightly later stage, and takes over responsibility for ensuring that adequate triage is taking place before patients are transported to hospital.

Organisation at the scene

The Fire Services Department (FSD) and Police will establish cordons around the disaster site, both for safety reasons and to prevent unauthorised access. The inner cordon will demarcate the immediate area of the disaster, and only essential rescue personnel

are allowed inside. Usually, the identity of all staff working in this area is logged. More remotely, an outer cordon is established to control the general area in which the disaster has happened. Members of the public are prevented from entering the area. The emergency services would normally establish their control vehicles in the area between the two cordons, and casualties would be brought out from the inner cordon to a Casualty Clearing Station (CCS) for triage and initial treatment. The Airport Authority, FSD and the Auxiliary Medical Services provide shelter (Airesheltas or conventional tents) for these activities. Hospital Authority E-teams normally work in these areas (see section below).

Preparation of the hospital

At the hospital, depending on the initial grading of the disaster, arrangements will be made to receive the disaster victims and if necessary to establish a control room and entry/exit control points in the A & E department to keep track of admissions, discharges and transfers of patients. A Civil Disaster Hospital Coordinator (CDHC) will be appointed according to the hospital's disaster plan. This officer is responsible for the overall coordination of the hospital's response and for communications with the Hospital Authority Head Office, the MCO, and with other agencies involved.

Training for the Medical Control Officer

To be effective as a Medical Control Officer (MCO),

it is essential that a doctor receives not just training in the role, but also the opportunity to practice it. He or she must know the roles and responsibilities of the incident officers of the fire, police and ambulance services, and must be familiar with their terminology. This can only be achieved by participation in joint tabletop and practical exercises which cover a range of scenarios and problems that might be encountered.

The absence of a competent medical manager can render the whole medical response at the scene ineffective. Medical and nursing staff, with their own hierarchies, may not be natural players in a multi-disciplinary team, particularly when placed in an ad hoc group and when undertaking tasks which are unfamiliar to them.

The MCO must cope not only with the uncertainties of his or her own role, but also with the need to direct the activities, at arms length, of an unfamiliar group of doctors and nurses. These staff will probably come from different hospitals and organisations, and few will have much prior knowledge of what they are expected to do or where they should go. The MCO must therefore identify, at an early stage, what skills the staff can offer, and who amongst them could be relied upon to supervise activity closer to the patients.

The MCO should be trained in the use (and appreciate the limitations) of every available means of communication with receiving hospitals and with deputies on the scene. These would include ambulance radios, cellular telephones and facsimile machines.



Figure 1: Casualty Clearing Station - Mobile Casualty Treatment Centre in background.



Figure 2: Fire Services Department - Fire and Rescue Boat. Exercise Chek Lap Kok 2000.

The training of the MCO centres on developing a detailed understanding of the role, together with emphasis on personal and technical communication skills. Hand in hand with this, the most essential part of the training is regular practice

Accident and Emergency department staff

The prospect of dealing with a major incident worries the majority of medical and nursing staff in any A&E department. Practices, if they do occur, are usually organised to take place at quiet times or with extra staff available in order to avoid conflicts with the ongoing work of the department. This is safe practice, but does not realistically stretch the abilities of the staff.

More regular training may be possible with a tabletop model of the A&E department and simulated casualties. Various situations and scenarios may be used to challenge the resourcefulness of the nursing and medical staff taking part. Space constraints, staffing problems, demands for an additional mobile medical team, equipment shortages and sudden heavy interest from the press can all be introduced as stress factors. The floor plan of the A&E department can be drawn onto a linen sheet to make a suitable tabletop exercise at negligible cost. "Casualties" may be represented by clinical details written on wooden tongue-depressors or lolly sticks.

These exercises may be of real benefit in identifying potential problems in stock levels of equipment and disposables, and in planning how to obtain additional staff and equipment in the event of a real incident. These lessons can be fed back into the disaster plan for the benefit of others.

Emergency medical teams

If training time or resources are limited, the members of staff most deserving of full attention to their training needs are potential members of E-teams. Experience shows that even highly skilled staff, at SMO level and above in A&E and anaesthetics, find it hard to function normally the first time they are required to operate in the

pre-hospital environment. Patient assessment and simple techniques such as the establishment of an intravenous infusion become difficult merely because of the alien setting and the psychological stress this engenders, and it is important to emphasize basic principles which must be followed.

Firstly, potential team members must be trained in the basic administrative issues of where to gather when called, what equipment to collect, and where to report at the scene. Secondly, training in safety issues is vital, including considerations about how long team members can work effectively in various adverse conditions.

In Hong Kong, the Auxiliary Medical Services maintain an Emergency Response Task Force (ERTF), which includes doctors and nurses trained in rescue.⁵

The possibility that the MCO may not be present in the initial stages of the incident means that the leader of the E-team leader must be familiar with the essentials of the MCO role. The final authority of the MCO should be emphasized, and also that this authority overrides considerations of different hospitals of origin and individual status or rank. Additionally, the need to respect the decisions of fire and ambulance safety officers must also be underlined.

In terms of clinical training, medical and nursing staff benefit from coverage of the principles of triage, and of immediate assessment of the injured. This training can follow the principles taught on the Advanced Trauma Life Support course and the Field Triage course. Teams should ideally undertake tabletop exercises with the MCO and representatives of the police, fire and ambulance services at least annually, with a full practice once every two years. Clearly, not all staff will be able to participate in a full exercise, and a video of the exercise can become a valuable training tool for others.

Health and safety

Contemporary Health and Safety legislation emphasizes the need for employers to provide appropriate training for their workers to enable

them to identify and avoid hazards which may arise during the course of their work.⁶ In addition, employers must provide appropriate protective clothing which workers, in turn, are obliged to use.⁷ These principles apply to the medical and nursing staff who might have a role in a major incident, even though that role may fall outside their normal duties (for example, staff acting as members of an E-team). In the past, a lack of adequate training has exposed such staff to the risks of both physical and psychological injury. Current health guidance in the UK lays a responsibility upon the hospital Chief Executive to ensure, in liaison with senior professional staff, that hospital staff receive training, regularly updated, to prepare them to handle major incidents. Sadly, the provision of such training has never received a high priority and, even where it has been provided, has concentrated on clinical issues to the exclusion of personal safety, team welfare and organisational aspects. In Hong Kong, there is a specific A&E COC sponsored Field Triage course which addresses some of these aspects.

The hazards likely to be faced at a major incident scene are largely predictable, a fact which has long been recognised by the uniformed emergency services, which all train their staff to manage potential dangers.

Major incident exercises

Airports, chemical industry facilities and several other agencies are obliged by law or by licensing regulations to undertake annual or bi-annual major incident exercises. Often, these are full-scale exercises involving simulated casualties and transport, and are designed to test local plans. There are opportunities for the hospitals to request involvement in both the planning stage and at the actual exercise.

Inter-agency co-operation makes the running of a single, comprehensive exercise not only cheaper but much more realistic and effective. Planning for this type of exercise may require at least six months.

An alternative way of exercising involves participation of medical teams in providing the medical cover at mass gathering events, for example

providing medical services to a sports club or a medical team to a marathon run.

Telemedicine

Telemedicine promises to revolutionise scene-to-hospital communications in the near future.⁸ Recent developments in wireless internet connection make the transmission of still images from a digital camera a viable procedure, and future developments may make video transmission feasible. Hong Kong is well advanced in testing these technologies - Alice Ho Miu Ling Nethersole Hospital A&E staff received rapid digital images from the scene of a disaster drill in Tai Po, as long ago as 1998. In this case, a land-line was used from a Regional Council garden supervisor's office near the scene.

Post traumatic stress disorder

All members of staff need to be aware of the features of post traumatic stress disorder, in order that they may appreciate the risk to themselves and recognise the condition in colleagues. They might need to be directed toward help in the aftermath of an incident. Basic knowledge of Critical Incident Stress Debriefing (CISD) is a must.

Press liaison

Whilst it is unlikely that any members of the mobile medical team would be authorised or required to give press statements, the MCO may need to do so. Ideally any such statements should follow a format agreed at a co-ordinating meeting of all the Incident Officers. Key figures within the receiving hospital, including the Hospital Chief Executive and General Managers, and the Civil Disaster Hospital Coordinator will need more formal media liaison training.

Debriefing and report writing

Potential MCOs and E-team leaders should be made aware of the value of debriefing following an incident, and indeed after an exercise. Key staff

will need detailed guidance on how to conduct a debriefing session and record the discussion. Formal reports and statements are often required from those who hold leading roles, and all exercises should include the writing and critique of such documents.

References

1. Ong KL, Tan TH, Cocks RA, et al. Major incident - what is major? *Emergency Medicine* 1998;16(25):72S.
2. Hong Kong Government. Hong Kong Civil Disaster Plan. Government Secretariat, 1994.
3. Hospital Authority. Hong Kong International Airport Contingency Plan for Major Aircraft Accident, 6 July 1998.
4. Ambulance Command, Fire Services Department. Ambulance Aid Note No. 59 - Triage and Disaster Management, 22 August 1995.
5. Cocks RA. Prehospital Care in Hong Kong. *Prehospital Immediate Care* 1997;1(1):8-11.
6. Health and Safety Executive. Personal protective clothing at work. Guidance on regulations. London: HMSO, 1992.
7. Cocks RA, Chan TYF. Protective clothing for the emergency services - a study of fire safety. *Prehospital Immediate Care* 1998;2:63-5.
8. Plischke M, Wolf KH, Lison T, et al. Telemedicine support of prehospital emergency care in mass casualty incidents. *Eur J Med Res* 1999;4(9):394-8.