The Medico-legal Organization of a Mass Disaster — The Air India Crash 1985

C T DOYLE, MD FRCPI FRCPath
M A BOLSTER, MB MRCPATH DMJ DFM
Dept of Pathology, Cork Regional Hospital, Cork, Ireland

INTRODUCTION

On Sunday 23 June 1985, an Air India flight AI-182 travelling from Toronto to Bombay crashed into the sea off the South West coast of Ireland with the loss of all 329 passengers on board One hundred and thirty-two bodies were recovered from the sea, 39.8% of the total number of victims. There is no evidence that whatever happened was anticipated The cockpit voice recorder, the air traffic tapes, meteorology reports all appeared to indicate that everything was normal at the time of the crash. This led to intense speculation that a bomb caused an explosive break up of the aircraft in the air. Wreckage and bodies spread over a five-mile area supported the speculation (*Sunday Times*, June 1985).

The 600-bed Regional Hospital in Cork, Ireland, became the centre for investigation of the disaster. The Department of Histopathology has a medical staff of four consultants and four trainees. The mortuary has storage facilities for nine bodies and has two necropsy tables. Five local pathologists, the State Pathologist and a visiting specialist aviation pathologist completed the team of pathologists Four forensic odontologists were also enlisted and the Radiology Department of the hospital was closed from 2 pm each day to allow for detailed X-raying of the victims The Irish Army provided the necessary transport and assistance with moving the bodies.

The purpose of the medical investigation of an aircraft accident is.

1. Identification of the cause of death of each person
2. Identification of the remains.
3. Identification of the causes of the crash
4. Prevention of fatal accidents by identifying fatal injuries and thus indicating specific needs for improved safety features (Mason, 1984).

The Air India disaster provided many lessons in the organization of a major disaster. With one exception, all 132 bodies were identified and returned to their families within approximately six weeks. A full necropsy was carried out on each case and all the bodies were completely X-rayed and dental findings recorded. The major advantage in dealing with this accident was the space and facilities available in a large teaching hospital.

THE ORGANIZATION

Body recovery at sea was co-ordinated by an Irish Naval vessel, *L. E. Aisling*; 88 bodies were landed by helicopter, 38 by the vessel *L. E. Aisling* and five by a local lifeboat. The last body was recovered after four months, on 25 October, when part of the aircraft wreckage was recovered from the ocean floor.

The bodies were stored in body bags, some of which were from the Royal Air Force and some from the Southern Health Board. All the body bags were previously unused and those from the Royal Air Force were certified as being free from explosive residues, which is important when attempting to establish the cause of the accident

On recovery a number was assigned to each body and this number only was used throughout all subsequent procedures to identification This system proved very satisfactory as it avoided the possible confusion of different

numbering systems being used by the different investigating groups. The numbers with other details were recorded in a register at Cork Airport. This register also contained information on the removal of bodies to the Cork Regional Hospital and the identity of the Gardai accompanying them. A second register was opened at the hospital which documented the identity of the person into whose custody each body was delivered and the movements of the body through the various stages of necropsy, radiology and identification procedures

Initially cardboard labels were used to identify each body but these soon became wet and torn and had to be replaced with plastic-covered cards attached to a limb by a plastic tie.

The bodies were stored in five refrigerated containers hired by the Southern Health Board. Each 40 foot long container stored 30 bodies when fitted with three tiers of shelves The temperature was kept at 5°C.

Three rooms in the hospital, all of which had running water and floors covered with plastic sheeting, were taken over for the post-mortem examinations. The hospital necropsy room with two tables was found to be too small, consequently the physiotherapy gymnasium and a recreation hall in the Psychiatric Department were utilized. Rooms were also provided close to the necropsy area for Garda communication and identification procedures. Both of these areas were close together and well away from the main stream of the hospital.

All of the rooms were at ground level, a point worth stressing in the organizational plan of a major disaster. It must be borne in mind that each body weighs in the region of 9–12 stones and moving hundreds of bodies amounts to several tons and a lot of work

A production-line approach was deemed necessary as the Coroner ordered a necropsy examination on all 132 bodies The possibility that a bomb was the cause of the crash made the search for forensic evidence of vital importance There was also pressure for quick identification of the bodies and early return to the relatives. Teams of workers were organized under the direction of the Chief Pathologist and Superintendent of Gardai to perform the examination of the bodies. Each team was composed of:

1. Pathologist.
2. Medical assistant to pathologist
3. Mortician
4. Garda photographer.
5. Garda fingerprint member.
6. Garda ballistics member.
7. Garda to complete post-mortem documentation.

Dental details of the deceased were recorded by three forensic odontologists. The bodies were subjected to total body X-ray examination and an age estimation by the radiologist also proved useful.

The assistance of the Irish Army personnel in providing the 'muscle' to move the bodies proved invaluable. Adequate X-ray equipment including facilities for dental X-rays on site in the necropsy rooms, would be far more suitable but was not practicable in this instance

Bodies were photographed by a Garda photographer on removal from the disaster bag following removal of clothing and again after embalming Many of the photographs could not be shown to relatives as an aid to identification because of the extent and severity of the injuries. The standard Interpol Victim and Missing Person forms were used throughout

Relatives of the victims were flown in by Air India. Interview rooms were set up in the Nursing School which was on the other side of the hospital from the necropsy area. Here relatives were counselled and prepared for the identification process. Many of the relatives did not have photographs of the deceased, or medical or dental records with them and it was felt that interviewing relatives in their own homes, where all personal data would be available to a policeman, would be a better procedure for future major disasters. Identification commenced with relatives filling out Missing Person's forms and noting any unusual or particular identifying items or features. They were then introduced to photographs of the most likely victim Only when this evidence indicated almost certain identification were relatives allowed to view the body and then only if facial injuries were not too severe. Identification in all cases was based on more than one prime identifying feature. A large display board erected in the Garda office gave pertinent details on each

body. Cards with details of body number, estimated age, sex and prominent identifying features were grouped on the board by sex and age.

Following unequivocal identification a certificate was issued to the Coroner stating the body number, the name and address of the victim, the medical cause of death and a statement from the Chief Pathologist that no further medical examination was necessary. The Coroner then informed the undertaker that the body was ready for release

DISCUSSION

A major disaster can be defined as an incident involving multiple fatalities of such magnitude as to require special arrangements to be made (Busuttil and Jones, 1990) It is an event which all pathology centres should plan for (Pounder, 1985) In an era of increasing travel in ever larger aeroplanes, larger and faster trains and boats and more congestion on the motorways, the question is not whether there will be another major disaster but when and where it will occur. This was the third and largest major disaster which the Cork Regional Hospital dealt with over a six-year period. The other two were the Whiddy Island oil disaster in 1979 in which there were 50 fatalities and the Buttevant rail crash with 17 victims in 1981. In any significant aircraft accident nowadays the possibility of an act of terrorism as the cause must be considered (Barbash et al., 1986). The crash of the Pan Am jet in Lockerbie in December 1988 is one such example Pathologists should bear this in mind when drawing up a major disaster plan so that procedures are in place to gather the necessary evidence efficiently and with meticulous attention to detail.

A disaster plan should include the 'disposition of personnel' to make the best possible use of resources and a plan for the orderly identification of a large number of deceased victims (Hollander, 1987). A 'conveyor-belt type approach' is necessary with bodies proceeding in an orderly fashion from X-ray to dental charting, fingerprinting, to necropsy and embalming. A small but absolutely vital part of the organization is to ensure that body number labels are firmly attached, that one number only per body is used and that the labels are waterproof.

The necessity of a complete autopsy on the victims of an airline crash has been the subject of much controversy. Mason argues very strongly in favour of a complete necropsy including toxicology as part of a uniform system of forensic investigation on a world-wide basis (Mason, 1984) The purposes of the necropsy are:

(a) to establish the cause of death,
(b) to resolve medico-legal problems concerning payment of insurance policies, including the degree of life expectancy and the disposal of estates when members of the family apparently die together (Mason, 1984),
(c) to investigate the cause of the crash;
(d) to try to establish a pattern of injuries so as to prevent if possible the same injuries in future crashes.

A chain of command must exist with the senior pathologist in the area having the ultimate responsibility for the organization of the necropsies. Lack of recognition of this chain of command can lead to serious organizational difficulties, as was found in the Manchester Airport disaster on 22 August 1985 where the outside fire brigade men could not or did not recognize the airport senior fire officer with the result that the chain of command was impaired (Samuels, 1987)

The provision of adequate mortuary facilities is an absolute necessity in the organization of a major disaster. Running water in the room, adequate lighting and ventilation are absolute necessities. Also the facilities should be all on one level, remembering the work involved in moving 9–12-stone bodies. Adequate X-ray facilities should also be available on site

Following any major disaster relatives tend to travel immediately to the disaster area Despite their natural concerns, they should be kept well away from the area of activity until the necropsies have been completed and the evidence for the identification process has been assembled. It is important that a relative or acquaintance who knows the deceased well should be available for identification. Many of the relatives who arrived in Ireland had not

seen the deceased for several years and were little positive help with identification.

A good supply of body bags must be available. The body bags should be unopened and certified as free from contamination. If this is not done then it renders any forensic trace evidence questionable and therefore useless in a Court of Law. Adequate protective clothing must be available to all personnel handling the bodies.

The emotional effects, especially on the young and unexperienced, of dealing with such a large number of bodies in a short space of time must not be forgotten It is recommended by Jones (1985) that older, more experienced people should be employed where available and emotional support should be provided by mental health professionals for the workers involved in a major disaster

In conclusion, it is a sad fact of life that most pathologists at some time in their professional lives will be involved in a major disaster. It is incumbent on departments of pathology in their own and the public interests to have plannes advance for such an eventuality.

REFERENCES

Barbash G I , Yoeli N., Ruskin S. and Moeller D (1986) Airport preparedness for mass disaste proposed schematic plan. *Aviat Space Envi Med.* **57**, 77–81

Busuttil A. and James J S P. (1990) *Deaths in Mi Disasters — the Pathologist's Role.* The Royal (lege of Pathologists, p. 24

Hollander N (1987) Air crash disaster planning (ter) *Am. J. For Med. Path.* **8**, 183–4

Jones D. R. (1985) Secondary disaster victims. emotional effects of recovering and identify human remains. *Am. J. Psychiat* **142:3**, 303–7

Mason J. K. (1984) The importance of the auto examination in major disasters. *Ann Acad. M Singapore*, **13**, 20–4.

Ritzliv R and Gauther J. H. (1987) Scene investi tion, identification and victim examination foll ing the accident of galaxy 203 disas preplanning does work. *J. For. Sci* 32, 983–7

Pounder D. J. (1985) Natural disaster potential a counter disaster planning in Australia *Am. J I Med. and Path.* **6**, 347–57.

Samuels A. (1987) The Manchester Airport disast *Med. Sci. Law*, **27**, 18–20.