

# ANAESTHETIC MANAGEMENT OF EARTHQUAKE VICTIMS

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## INTRODUCTION

Natural disasters with a great potential to adversely affect human life and property are an inevitable and necessary feature of life on earth and

natural disasters is associated with their force, magnitude, and intensity, and it is growing as population density on earth increases. Consequently, natural hazards can have a negative outcome in terms of human and economic cost, the extent and



remain largely unpreventable despite rapid pace of scientific progress in this field. In other words, we must learn to accept and cope with these hazards. There are varying degrees of unpredictability – depending on the hazard type – as to when, where, and how they will occur. The lethality of

severity of which determine whether it becomes a disaster or not.

The definition of a disaster adopted by the World Health Organization (WHO) and the United Nations is “the result of a vast ecological breakdown in the relations between man and his environment, a serious and sudden (or slow, as in drought) disruption on such a scale that the stricken community needs extraordinary efforts to cope with it, often with outside help or international aid.” The management of injuries and illnesses after a massive earthquake differs significantly as compared to normal circumstances.

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Hospitals are damaged, supplies are scarce or limited, large number of patients require medical care, outside assistance will not arrive for 2-3 days, and most preventable deaths occur within the first 24 hours.

An earthquake of the magnitude 7.6 struck the Northern Areas of Pakistan and Azad Kashmir, at 8:52 a.m. local time on October 08, 2005 while most people were getting ready to leave their homes and most of the children and youngsters were attending schools and colleges. It destroyed a vast area and completely devastated cities of Balakot, Muzaffarabad, Bagn, Rawalakot and a large population on mountainous slopes of these areas. The human and physical devastation was enormous, with more than 100,000 people presumed to be dead, tens of thousands injured, and nearly all survivors among the original 7 million inhabitants left homeless. The national and international response was quick but inadequate, considering the magnitude of disaster: ultimately, more than 50 international teams provided search and rescue services, while the Pakistan government coordinated the evacuation effort locally and nationally. Everyone worked together, motivated by the need to help. Medical providers lacked the training to deliver appropriate care under these conditions. Large numbers of injured people were evacuated to hospitals throughout Pakistan, especially in Islamabad, Rawalpindi and Abbottabad, since all major medical facilities and infrastructure in the disaster stricken area had been destroyed, and their doctors and nurses injured or killed.

The land routes to the affected area were severed due to large cracks on the road, collapse of bridges and massive land sliding hence evacuation of casualties was only possible by helicopters. Army Hospitals of Rawalpindi were amongst the first to receive casualties in bulk. At Military Hospital Rawalpindi it seemed an unending flow of seriously injured, mutilated, and amputated patients whose management appeared beyond the scope of the hospital. The ward, verandas, corridors and all open spaces were littered with suffering, bleed-

ing and crying victims, which included all ages, sexes and status.

## ROLE OF ANAESTHESIOLOGISTS IN EMERGENCY RESPONSE

Anaesthesiologists are acute care physicians with special expertise in airway management, physiologic monitoring, patient stabilization and life support; fluid resuscitation, and crisis management. These are the most important aspects of emergency medical care of the trauma or disaster patient. As such, anaesthesiologists can serve crucial roles not only in the anaesthetic management of casualties in the familiar setting of the operating room, but also, if called upon, can function adequately as team members in field medical teams, the emergency room, or in the management of intensive care patients. Other roles anaesthesiologists are well qualified to perform in disasters include but are not limited to the following:

- Sort, triage, stabilize, and resuscitate casualties
- Establish definitive airway control
- Provide external hemorrhage control
- Diagnose and treat life-threatening conditions commonly observed in victims of disasters (i.e. acute respiratory failure; acute renal failure; hemo-pneumothorax, etc.)
- Establish intravenous access
- Guide fluid resuscitation and blood component therapy
- Perform regional and general anesthesia wherever needed or feasible
- Transport critically ill patients
- Manage acute pain
- Alleviate pain and suffering among patients triaged to die
- Manage intensive care patients in the ICU or in non-intensive care areas when the number of intensive care patients exceeds ICU bed capacity

The ability of anaesthesiologists to more effectively participate in emergency medical care in disasters is enhanced by the acquisition of competency in Advanced Trauma Life Support (ATLS), basic principles of mass casualty and disaster management and knowledge of the anaesthetic methods, techniques, and equipment commonly used outside the operating room environment.

From an anaesthesia perspective, the situation most frequently encountered at the disaster site, short of extraction of individuals from rubble, providing first aid, and triaging patients, has to do with ABC; airway management and ensuring adequate ventilation and oxygenation; as well as care of circulation.

Although anaesthesiologists may be deployed in the disaster stricken area, their expertise will most often be required in the operating rooms where the majority of surgical procedures may be limited to life-saving and limb-saving operations. When anaesthetizing these individuals, there are many reasons why it may not be possible to meet our usual standard of care. Frequently, there is no preoperative assessment and often volume resuscitation is limited. In certain circumstances, supplies may be extremely limited, and we must improvise. Depending on the scope of the disaster, there may be an inadequate number of trained assistants.

### TYPES OF ANAESTHESIA

There are a variety of anaesthetic techniques that may be available and appropriate. These include:

- a. General Anaesthesia
- b. Spinal and Epidural Anaesthesia
- c. Local Anaesthesia

We must assume that all of these patients come with a full stomach, hypovolemia, and anemia. Extensive burns that limit IV access, by chest and head injuries, and by undiagnosed injuries, may complicate their care. These patients may not

give an adequate history and their examinations are frequently rushed. Depending on the scenario (e.g., earthquake), up to 10% of patients will have chest injuries requiring surgical intervention<sup>1</sup>.

Most of the intra-venous anaesthetics are central nervous system depressant so abating the sympathetic response may have the potential to produce profound hypotension with resultant morbidity or mortality.

If possible, a local anaesthetic can be the primary technique, and depending again on the environment, an inhalation anaesthetic might be used. Central neuraxial anaesthetics should be avoided and may be frankly contraindicated initially because of concerns about volume status and the potential for exacerbation of hemorrhagic shock, however after volume resuscitation orthopedic operations can be undertaken under spinal or preferably epidural anaesthesia with close monitoring.

As everywhere, at Military Hospital Rawalpindi, the magnitude and bulk of casualties was so large and almost every victim needed surgical intervention or at least examination by a surgeon in the operating room (Table 1). With limited number of operating rooms and supplies the need of the hour was an anaesthetic agent, which gives good analgesia, is relatively safe in hypovolemic and full stomach patients. It should have quick recovery time and patient can be mobilized early.

**Table 1: Anaesthetic Management according to Type of Anaesthesia**

Type of Anaesthesia	Number of Casualties
GA including Ketamine	2185
Spinal	25
Epidural	04
Local	690

Our obvious choice was ketamine, with or without a benzodiazepine. However, the use of a benzodiazepine or opioid in these circumstances

must be done with caution, as many of these patients may be hypovolemic from hemorrhage. Even when using ketamine, one has to be cognizant of co-morbidity that could affect anaesthetic management. There may be an increased risk of awareness, but the consequences of over-sedation with a benzodiazepine or opioid are readily recognized and may lead to increased mortality.

If general anesthesia other than Ketamine was required, a rapid sequence induction was generally chosen with endotracheal intubation. In a few cases laryngeal mask airway (LMA) was used. The intra-operative care of trauma patients is fairly standardized and is well documented in the literature<sup>2</sup>.

Similarly, the postoperative care of these patients is frequently the same as for any other trauma patient who has undergone major surgery. One must not assume that all medical and surgical problems have been resolved. These patients may require continued volume resuscitation, intubation, mechanical ventilation, and frequent reassessment. Similarly, they may require invasive moni-

toring, additional analgesia or sedation, or transport to another facility, frequently with the assistance of anaesthesiologists<sup>3</sup>. During the postoperative period, attention to certain details can greatly facilitate the overall disaster response and the post-hoc analysis of how to improve future responses.

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