ANAESTHETIC MANAGEMENT OF MASS CASUALTIES-WHAT SHOULD BE THE DRUG OF CHOICE?

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ABSTRACT

Background: Based on the experience of earthquake 8th October 2005 choice of best anaesthetic management for mass casualties was determined. Patients were subjected to all types of anaesthesia and then best out of these came out to be ketamine.

Duration of the Study: One month.

Patients and Methods: A total of 180 patients were anaesthetized by different methods during one month after earthquake.

Results: Out of 120 patients 80 received general, 74 ketamine, 22 spinal and 4 regional anaesthesia. 41% who received ketamine anaesthesia showed uneventful recovery without any complication.

Conclusion: It is concluded that ketamine alone can be used very safely in case of mass casualties as also recommended in literature.

Keywords: Disaster, mass casualties, mass trauma, ketamine, anesthetic management.

INTRODUCTION

At about 0850 hours on 8th October 2005 an earthquake with intensity of 7.6 on Richter scale hit the Northern areas of Pakistan and Azad Jammu & Kashmir. The epicenter of the earthquake was 10 Km North of Muzaffarabad. The worst hit cities were Muzaffarabad, Bagh, Rawlakot and Balakot. The Combined Military Hospital at Muzaffarabad was the only tertiary care hospital in the area. This hospital collapsed completely with no structure standing. Thirty seven staff personnels including two lady doctors, three nurses and 57 patients were crushed to death. For the first 6 days the hospital remained completely paralyzed. On the first day of earthquake only some minor stitching and wound dressings could be carried out with the help of some instruments which were retrieved from collapsed buildings. From the second to sixth day there was no activity as far as medical treatment was concerned. A team of French doctors with a self sustaining surgical unit arrived at Muzaffarabad on 12th Oct and within two days they established surgical facilities containing, O.T. Post operative recovery and 50 bedded wards under the Canvas in the premises of C.M.H. With collaboration of the remaining staff of CMH Muzaffarabad they started taking care of casualties on the 14th of October, 05.

Management of mass casualties in a disaster like situation like this is a specialty in itself and needs much discussion [1]. Proper planning and preparation can markedly change the mortality and morbidity following these events [2]. In our case there were no available guidelines for dealing with such a massive degree of trauma. The hospital building itself along with its staff was badly affected and the whole medical setup was shattered. The road access to the other cities and even to evacuation point was completely blocked. A number of injured patients with surgically treatable conditions died inside the hospital premises without getting medical

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help. Thereafter the main problem was trauma to limbs and spine. The idea behind writing this article is to share and learn from this experience of managing such a degree of casualties under awfully restricted conditions. The pattern of operations and anesthesia given during the first month after the earth quake is discussed and recommendations are given for managing such disastrous situations.

PATIENTS AND METHODS

This is a descriptive study carried out at Combined Military Hospital Muzaffarabad after the disastrous earth quake of October 8, 2005. The duration of study was from October 14 to November 13, 2005. The study was carried out on a total of 180 patients who received surgical treatment at this hospital. These patients reported to our hospital from all the adjoining areas of Muzaffarabad city. Documents of all such patients were collected and analyzed. All the earthquake affected trauma patients were triaged and primary survey of the injury was carried out. After fluid resuscitation and optimizing the patient's condition, he or she was shifted to the operation theatre. The amount of fluid administered was based on clinical signs, particularly blood pressure, pulse pressure and heart rate, along with urinary out put.

RESULTS

Operations were started on 14th Oct 2005. On the first day 8 major operations were performed (table-1). Subsequently on an average 6 operations were performed daily on subsequent days (table-2). The anesthesia given was spinal, local, regional and general anesthesia including dissociative anesthesia (table-3). In our study we operated upon 180 patients in post earthquake era out of which 74 patients were operated upon under Ketamine anesthesia and these included closed reductions, debridments, below knee amputations, closure of extensive wounds and incision & drainage. It was used as induction agent in two laparotomies.

DISCUSSION

Regional Anesthesia is usually impractical in hemodynamically unstable patients with life threatening injuries. It is advisable and if possible hypovolemia should be corrected prior to induction of anesthesia. Commonly used induction agents for hypovolemic patient include Ketamine along with Midazolam [3]. The key to safe anesthetic management of patients in shock secondary to trauma is to administer small incremental doses of Ketamine.

Ketamine produces a most useful state of Dissociative Anesthesia. In 1959 the search for a safe but potent sedative agent led pharmacologists to the phencyclidines and Ketamine was introduced into clinical practice in 1970 in time for use during the Vietnam War [4].

With the administration of Ketamine the patient goes into a trance like state. He becomes unconscious, amnesic and deeply analgesic. His airway is remarkably preserved. Ketamine is especially useful if there is no recovery ward and there is lack of trained anesthetists [5]. This drug is remarkably safe and is certainly the safest anesthetic. Nevertheless, it is not absolutely safe, so one has to be vigilant. Ketamine produces neither hypotension nor respiratory depression; therefore it is ideal for use in emergency cases in which patients are in mild to moderate shock [6]. Low dose of the drug adds anxiolytic effects to analgesia [7], making Ketamine useful during minor procedures, such as wound debridement and painful dressing. In lower doses it is useful for brief emergency procedures. In higher doses Ketamine is useful single agent for nearly all types of emergency surgery.

The peripheral adrenergic response to Ketamine is characterized by catecholamine release and norepinephrine reuptake inhibition. Mean arterial pressure is typically elevated by approximately 25 mm of Hg. Pulse rate, stroke volume and cardiac out put also increase. The common use of ketamine is

sedation in field area for emergency amputations and emergency orthopedic manipulations [8]. Ketamine has a wide therapeutic range, making overdose improbable. Patients have recovered uneventfully after receiving 10 times the normal dose. I/V slow bolus injections are the most commonly used though it can effectively be used I/M in higher doses [9]. Intramuscular use of Ketamine has been recommended in emergency pediatric surgery for intubation and short duration surgical procedures as a sole agent for anesthesia as well as analgesia [10]. It is given initially at 1 mg/kg I/V. Onset of action characterized by glazed eyes and nystagmus, usually occurs with in one minute and surgical anesthesia lasts about 15 minutes with full recovery in about 60 minutes. Booster doses of 0.5-1mg/kg I/V every 10 minutes may be administered if initial sedation is inadequate. The maximum dose for routine use is 3 mg/kg body weight I/V and 8mg/kg body weight I/M. Potential adverse effects of Ketamine administration include, hyper-salivation, muscle hypertonicity, transient clonus, transient strider, emesis and agitation, but they can be corrected easily. In our experience Ketamine proved to be a very safe and adequate anesthetic agent as shown in the other studies. There was no complication seen in any case and recovery remained quite smooth and uneventful. Surgeons remained satisfied with this anesthetic agent and faced no problem.

Table-1: Operations performed on day one(14th October, 2005).

Nature of operation	Number of cases
Debridement of leg	1
Below knee amputation	2
Above knee amputation	1
ORIF fracture radius ulna	1
ORIF fracture tibia	1
Amputation of hand	1
Laparotomy	1

Table-2: Distribution of operations performed in one month.

Nature of operation	Number of cases
Closed reduction	11
ORIF	60
Above knee amputation	05
Below knee amputation	14
Debridement	44
External fixation	23
Laparotomies	06
Inscision and drainage	08
Closure of major wound	08
Amputation hand	01
Total	180

Table-3: Type of anesthesia.

Type of anesthesia	No of cases	Percentage
General Anesthesia	80	44.44
Ketamine alone	74	41.11
Spinal anesthesia	22	12.22
Regional anesthesia	04	2.22
Total	180	100

CONCLUSION AND RECOMMENDATIONS

Major disasters of such magnitude as of this earthquake are rare but it is very difficult to plan for such disasters. However based on this experience following are the recommendations:-

- Very little reliance on local medical setup. It could be affected and entirely collapsed. In such situation air evacuation to other cities is the most appropriate answer.
- Field anesthesia equipment along with drugs for anesthesia and qualified anesthesia team should be made available as soon as possible.
- Ketamine has been found to be a safe and adequate anesthetic agent in most of the operations especially in patients with hemorrhagic shock. Hence it is recommended to be used in such situations with very little apprehension regarding side effects.

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