

Conclusion: A significant population of earthquake victims die prior to hospitalization as a direct result of crush injuries. This fact warrants improved disaster planning for prehospital emergency medical services and a better understanding of the pathophysiology and early management of crush injury.

Reference:

1. Ricci E, Pretto E, et al: *Prehospital and Disaster Medicine* 1991;6:159-166.

314

Impact of the 1989 Loma Prieta Earthquake on EMS Personnel and EMS Activities

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Objective: To characterize the activities of EMS personnel during the 1989 Loma Prieta earthquake.

Methods: Researchers sent a retrospective questionnaire to all prehospital care personnel in the San Francisco Bay area [California, USA]. Researchers interviewed selected personnel based on involvement in earthquake response activities.

Results: A total of 622 (41%) of the 1,508 personnel surveyed responded. Of the respondents, 35% indicated involvement in earthquake-related activities. Although most respondents felt resources were adequate and EMS activities sufficient and effective, numerous problems occurred. These included difficulties in reporting for duty, depletion of critical medical supplies, communications problems, coordination and control problems, jurisdictional conflicts, and incident-related stress.

Conclusion: Overall, emergency medical services (EMS) response was ample and effective although problems were identified. An examination of these problems has resulted in a number of vital considerations for future EMS disaster planning.

315

Sociopolitical Aspects of Disaster Management

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Worldwide attention was focused instantly on the devastating earthquake in Armenia in 1988 and the nuclear disaster in Chernobyl in 1989 as a result of the glasnost policies pursued by President Gorbachev, prior to which numerous major natural and technological disasters were unknown. Media attention facilitated international response in both instances.

The vital process of recovery and reconstruction in Armenia, however, has been halted entirely by a total blockade of the Republic as a result of political turmoil in the region.

PREHOSPITAL MEDICINE

320

Clinical Evaluation of Left Ventricular Asynergy Accompanied by Subarachnoid Hemorrhage

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Objective: To clarify the mechanisms of occurrence of myocardial damage in patients with subarachnoid hemorrhage (SAH).

Methods: A two-dimensional echocardiogram was performed in 494 patients with SAH who were admitted within 24 hours of the onset. Forty-eight patients (Group A) had left ventricular asynergy (LV asyn) and were compared to 446 patients without LV asynergy (Group B). The levels of plasma catecholamines and serum CPK were measured and the hemodynamics were assessed using a Swan-Ganz catheter.

Results: Left ventricular asynergy (LV asyn) was detected in 9.7% of all patients. In Group A, pulmonary wedge pressure was 18 ± 5 mmHg and cardiac index was 2.6 ± 0.5 l/min/m². Left ventricular ejection fraction was $37 \pm 13\%$ on admission and improved to $65 \pm 9\%$ within 15 days (6 ± 4 days) after admission.

| | Group A (n=48) | Group B (n=446) |
|-----------------------|----------------|-----------------|
| Age (yrs) | 57±2 | 55±1 |
| Blood pressure (mmHg) | 147±6**/ 97±4 | 170±3 /96±2 |
| Heart rate (/min) | 95±4** | 83±2 |
| Serum CK (IU) | 550±110* | 340±20 |
| Serum MBCK (%) | 6.4±0.7** | 1.9±0.3 |
| Noradrenaline (pg/ml) | 2,300±780* | 850±120 |
| Adrenaline (pg/ml) | 1,700±480** | 400±90 |

Data are expressed as the mean±SEM. **p*<.05, ***p*<.01

Conclusions: Myocardial dysfunction and damage with necrosis were found in SAH patients with LV asyn. Increases of plasma adrenaline and noradrenaline levels may play an important role in their etiology.

321

Prehospital Treatment of Intravenous Heroin Overdose

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Objective: To investigate if patients treated for intravenous (IV) heroin overdose combine their abuse with other forms of stimulants, and to relate this to the results of the antidote treatment.

Methods: The study was approved by the local Ethics Committee. The patients should show clear signs of heroin overdose (coma, miosis, hypoventilation). Blood samples were taken from the patients during the preparation period for the antidote. The patients were informed, after waking, that the samples were taken and hereby given the opportunity to deny further investigation.

Results: A total of 53 patients participated in the study. The male/female ratio was 43/10. The mean age was 24 years (19–46). Of the 44 patients who did respond to the antidote treatment, 40 declined admission to the hospital, and two responders were admitted. In 49 patients, the IV heroin overdose was combined with either alcohol or minor tranquilizers (benzodiazepine).

Characteristics of Patients with IV Heroin Overdose

| | Not Hospitalized | Admitted To Hospital |
|--------------------|---------------------|-------------------------|
| Pure heroin | 3 | 0 |
| Mixed | 39 | 10 |
| Others | 0 | 1 |
| Alcohol >0.2% | 9 | 1 |
| Naloxone ≤1.0 mg | 4 | 2 |
| Naloxone ≥1.8 mg | 8 | 5 |
| Flumazepine | 4 | 3 |
| Morphine >0.2 mg/l | 6 | 1 |

Conclusion: IV heroin overdose almost always is combined with either alcohol or benzodiazepine abuse. Despite a blood alcohol level above 0.2%, most of the patients respond to the naloxone treatment and reach a state of self-reliance.

322

On-Line Medical Direction

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Objective: To determine how often on-line (direct) medical direction (OLMD) alters therapy in an emergency medical system (EMS) with numerous treatment protocols, and to analyze how time is spent in on-line medical direction.

Design: Prospective study of on-line medical direction over a four-month period.

Setting: A university hospital base-station in a rural setting.

Participants: Ten emergency physicians (EP) gave on-line medical direction to 46 paramedics (EMT-P) in 259 consecutive cases. Fourteen cases were excluded that had incomplete data, leaving 245 cases for analysis.

Interventions: EPs and EMT-Ps were blinded to the study. Radios and closed-circuit televisions were monitored by third-party observers.

Results: The EPs asked EMT-Ps to repeat information in 9% of cases, and to give further information in 23%. Orders for therapy not requested by EMT-Ps were given in 20% of cases. Time intervals for the 245 cases were:

| Time Interval | Mean (minutes) | 95% C.I. |
|----------------------|----------------|-----------|
| EP response delay | 0.7 | 0.6–0.7 |
| EMT-P report | 2.2 | 2.1–2.4 |
| EP query and orders | 1.2 | 0.8–1.7 |
| Total radio time | 4.1 | 3.6–4.5 |
| OLMD-Treatment time* | 11.9 | 11.0–12.9 |

*hospital arrival time minus initial OLMD contact

Time intervals did not vary significantly by EP, EMT-P unit, or call type (trauma, chest pain, other medical). Mean transport interval in this system is 11.9 minutes, the same as the OLMD-treatment interval.

Conclusion: Physician on-line medical direction changes therapy in 20% of cases, requires an average four-minute time commitment per call, and does not delay hospital transport when combined with protocol treatments.

323

A Survey to Assess Ambulance Safety Based on Driver Accident Records

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Objective: To evaluate ambulance safety based on driving accident records of prehospital personnel.

Design: Survey.

Setting: One university hospital and one community hospital serving a population of about 600,000 persons in adjacent rural and urban communities.

Participants: Convenience sampling of 100 emergency medical technicians (EMTs) and paramedics upon presentation to hospital.

Interventions: Not applicable. Responses were analyzed and compared on the basis of age, gender, numbers of accidents, driver's education, driving experience, duration of prehospital employment, and type of ambulance service.

Results: Incidence of accidents was correlated positively with years of experience (up to 10 years). Level of driver training was correlated negatively with incidence of accidents. Paid, full-time personnel were far more likely to be involved in an accident when compared to part-time and volunteer personnel. No significant correlations were noted for the other variables assessed.

Conclusion: Based on this small sample, several factors appear related to ambulance accident frequency. A larger study to determine the statistical significance of these may be relevant to EMS programs.