

The Second Annual Soviet-American Conference on Emergency Medical Care May 2–10, 1990

Leningrad, USSR, May 2–3

Tlibisi, Georgian SSR, May 4–6

Moscow, USSR, May 7–10

Sponsors

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The N. V. Sklifosovosky Institute for Emergency Medicine, Moscow

The I. I. Djanelidze Emergency Medicine Research Institute, Leningrad

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The changes taking place in Eastern Europe these days are keeping the world on the edge of its chair. With peace and democracy breaking out all over, it is a very heady time. This opening of borders and communications between East and West has given us a golden opportunity to establish relationships and dialogue with our colleagues in the Soviet Union. The second Soviet/American Conference on Emergency Medical Care (SACEMC II) is the vehicle with which we hope to start an ongoing tradition of professional exchange and communication between the emergency care providers of our countries.

American participants in this conference will have a front-row seat for, and perhaps even a supporting role in, the drama now being played out in the Soviet Union. The first SACEMC, with an American delegation led by Dr. Kathleen Handal, was such an inspiring success that it led to the formation of the Society for International Advancement of Emergency Medical Care (SIAEMC), an organization committed to the international exchange of professional literature and personnel. The United States and Soviet members of SIAEMC jointly planned and organized SACEMC II. This planning has culminated in a new, expanded conference schedule which we hope you will find exciting and interesting.

SACEMC III is now in the planning stages. Mark your calendars for next May.

—Theodore E. Harrison, MD

Tentative Itinerary (American Delegation)

April 29

Meet in New York City at JFK International Airport,
Depart for Frankfurt, FRG

April 30

Arrive in Frankfurt, FRG, Depart for Leningrad, USSR.

May 1

May Day in the USSR. Arrive in Leningrad

May 2

Conference at Djanelidze Institute.

May 3

Conference at Djanelidze Institute. Gala farewell dinner.

May 4

Fly to Tblisi, capital of Georgian SSR.

May 5

Tblisi Medical Institute and University

May 6

Emergency Medical Station Tours and Free Time

May 7

Fly to Moscow

May 8

Conference at Sklifosovosky Institute

May 9

Conference at Sklifosovosky Institute

May 10

Conference at Sklifosovosky Institute/Free Time. Gala
farewell Dinner

May 11

Depart for United States

2 and 3 May 1990 Leningrad
The I. I. Djanelidze Emergency
Medicine Research Institute

Day 1 Leningrad

0800–Noon

Presentation and Discussion of Papers

Prehospital Specialization for the Treatment of Traumatic Shock

Grinev MV

An Overview of The US EMS System

Forbuss R

The Use of Prognostic Data to Determine Surgical Tactics in Multi-Trauma Shock

Grinev MV, Frolov GM, Kachansky YB, Deshev GM

Patterns and Mechanisms of Injury in Vehicular Trauma

Koe FG

Predicting the Prognosis of Traumatic Shock

Tsibin YN, Galtseva IV, Grinev MV, Shirokov VM

Does Alcohol Confer any Protective Advantages in Trauma?

Blair PJ

The Use of the Extracorporeal Spleen in the Treatment of Traumatic Shock

Grinev MV, Tarekina MN, Tfybin YN, Frolov GM

The Role of Aeromedical Transportation in Disaster Health Care

Yancey AH

An Earthquake Happens: What Did We Learn?

Blair PJ

Noon-1300

Lunch

1300–1500

Demonstrations of I. I. Djanelidze Critical Care Areas

1500–1700

Round-Table Discussion

Topic 1: Trauma Scoring Systems

Topic 2: Prehospital Care of Traumatic Shock

Day 2 Leningrad

0800–Noon

Presentation and Discussion of Papers

Sensitivity and Specificity of a Rapid CK-MB Assay

Green G, Fleetwood D, Hansen K, Chen D, Kelen G

Intravenous Laser Therapy in the Treatment of Ischemic Heart Disease

Maximov VA, Mazhara YP, Olesin AE, Skorodumova EA

Simplified Scheme for the Use of Automatic External Defibrillators by Lay Persons

Briggs N

Endogenous Digoxin-Like Factor: Possible Emergency Implications

Bagrov AY

Platelet Function in Thrombolytic Therapy

Lewis B

Prehospital Thrombolysis in Acute Myocardial Infarction

Varshavsky SYu

Intensive Training for Non-Physician Emergency Personnel

Fowler R

The Intraosseous Infusion Technique

Totten VM

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Noon–1300

Lunch

1300–1500

Demonstration of Leningrad Dispatch Center

1500–1700

Round-Table Discussions

Topic 1: *Antiarrhythmic Drugs***Topic 2:** *Prehospital Thrombolytic Therapy*

7, 8, 9, 10 May 1990 Moscow
The N. V. Sklifosovsky Institute for
Emergency Medicine

Day 1
Moscow

0800–Noon

Presentation and Discussion of Papers

Overview of US EMS System*Forbuss R***Development of an EMS Quality Control System in the USSR***Teriaev VG, Stazhadze LL, Kostomarova LG, OleynikVA, Nikulin BI, Buk TN, Chervochkin EN***A Simplified Scheme for the Use of Automatic External Defibrillators by Lay Persons***Briggs N***Specialization of Prehospital Emergency Services***Shmatov AV, Stazhadze LL, Kostomarova LG, Elkis JS, Chervochkin EN, Vdovina G***Sensitivity and Specificity of a Rapid CK-MB Assay***Green G, Fleetwood D, Hansen K, Chen D, Kelen G***The Role of Hepatic Injury in Death Following Multipee Trauma***Vladimorava ES***Patterns and Mechanisms of Injury in Vehicular Trauma***Koe FG***Noon–1300**

Lunch

1300–1500

Demonstration of the Sklifosovsky Critical Care Areas

1500–1700

Round-Table Discussions

Prehospital and Disaster Medicine**Topic 1:** *Specialty Ambulances***Topic 2:** *Prehospital Quality Control*

Day 2
Moscow

0800–Noon

Presentation and Discussion of Papers

An Earthquake Happens: What Did We Learn?*Blair PJ***Logistics of Fluid Resuscitation During Mass Casualty Situations***Khbabov BP, Olvenik BA***The Role of Aeromedical Transportation in Disaster Health Care***Yancey AH***Organization of Temporary EMS Systems During the Armenian Disaster***Teriaev VG, Gazetov B***Does Alcohol Confer Any Protective Advantages in Trauma?***Blair PJ***Platelet Function in Thrombolytic Therapy***Lewis B***Intensive Training for Non-Physician Emergency Personnel***Fowler R***Noon–1300**

Lunch

1300–1500

Demonstration of Moscow Ambulance Dispatch Center and Specialty Ambulances

1500–1700

Round-Table Discussions

Topic 1: *Disaster Equipment and Supply Logistics***Topic 2:** *Disaster Transportation*

Day 3
Moscow

0800–Noon

Polyclinic Tour and Demonstration of Sklifosovsky Institute

Prehospital Specialization for the Treatment of Traumatic Shock

Grinev MV

The organization of prehospital medical care and development of specialized trauma centers has caused a significant decrease in major trauma mortality. According to Baxt and Moody (1987) prehospital treatment of these patients resulted in stabilization of the vital functions in 98% of the injured. In 1983, Tscherne reported that initiation of treatment within the first 22 minutes of severe trauma reduced mortality from 50% to 39%.

We retrospectively analyzed the case histories of 2,195 trauma victims with shock who were admitted to the Djan-elidze Institute in Leningrad. Seventy-three percent had multiple traumatic injuries. Prehospital care was provided either by specially trained ambulance teams (66.2% of victims) or by regular ambulance teams (32.9%). Prehospital treatment included analgesia, immobilization, and fluid resuscitation in 59.7% of cases. In 18 patients with grade III shock, vasopressor agents were used. Three cases of cardiac arrest were successfully resuscitated.

The results of the specialized and regular ambulance teams were compared. Overall, mortality was 20.5% (predicted mortality 27.3%). In victims treated by the specialized ambulance teams, mortality was 21.9% (predicted mortality 27.3%), but at the same time the mortality in the victims treated by the regular ambulance teams was 18.7% (predicted 24.8%).

We conclude that specialization of ambulance teams does not improve outcome for victims with multiple traumatic injuries.

An Overview of the United States Emergency Medical Services Systems

Forbuss R

This paper offers an overview of ambulance services in the United States and their present role of providing prehospital care and transportation. Even though most ambulance services are not owned or directly controlled by hospitals or physicians, hospital-based, emergency physicians provide support and supervision through the use of telemetry and radio communication and through the development of prehospital medical protocols.

Ambulance services in the United States are generally established at two levels—Basic Life Support (BLS) and Advanced Life Support (ALS). Virtually all of the major cities now have advanced life support ambulance services.

Ambulance deployment strategies can result in significant reductions in mortality. Computer modeling of ambulance call demand can predict where and when ambulances are needed. The resulting improvement in ambulance response has been shown to improve survival to hospital discharge from 4% (in systems with poor response times that function at a basic level) to 12-16% (in systems with rapid response and ALS capability).

The Use of Prognostic Data to Determine Surgical Tactics in Multitrauma Shock

Grinev MV, Frolov GM, Kashansky YuB, Besaev GM, Tsibin YuN

Since 1975, we have based our treatment of traumatic shock on the prognostic index developed by Tsibin and Galtseva which uses the condition of the victim and an estimation of the gravity of the injuries to predict outcome and duration of shock. In the present study we used this quantitative method to select groups of patients with equal clinical acuity and predicted outcome. We classified 1,350 patients into three groups.

1. **Favorable prognosis**—these patients were deemed stable enough to undergo full-scale surgery including osteosynthesis, reconstructive and plastic surgery operations, and reimplantation of limbs.

2. **Doubtful prognosis**—these patients were not thought stable enough for major surgery and so were treated mainly by nonoperative methods. External fixation was used for musculoskeletal injuries. No plastic or reimplantation operations were performed.

3. **Unfavorable prognosis**—these patients were too unstable to undergo any kind of surgery. They were treated conservatively except for the occasional necessary amputation or wound revision for hemostasis.

Fifty-five percent of the victims were determined to have a favorable prognosis, six percent had a doubtful prognosis, and 39 percent had an unfavorable prognosis. Therefore, some 61% of patients with traumatic shock were candidates for surgical repairs of some extent. Using these data we were able to increase our surgical activity from 12% to 39% without raising either total mortality (29–30%) or postoperative mortality (12–10%). The mortality in the operated favorable prognosis group was almost half that of the nonoperatively treated unfavorable prognosis group (7.7% vs 13.3%).

Thus, using prognostic data to determine the extent of surgical intervention helped more than half the victims of multi-trauma shock to get needed surgery performed within the first 48 hours without increasing the death rate and with improved results.

Patterns and Mechanisms of Injury in Vehicular Trauma

Koe F

In the United States, trauma is the leading cause of death up to age 44 years and is responsible for more deaths in the one- to 14-year age group than all other diseases combined. Motor vehicle accidents account for the largest share of trauma deaths. In 1985, about 50,000 people were killed in crashes. For every death from trauma, there were two victims who sustained permanent disabilities.

The process of assessing a motor vehicular accident and determining what injuries might have resulted from the forces and motions involved is addressed by the study of impact biomechanics and occupant cinematics. The information presented comes from a comprehensive search of the literature and will touch upon methods and results of studies which involved a variety of professionals such as trauma and emergency physicians, pathologists, public health officials, automotive engineers, and researchers worldwide. Acceleration and compressive forces produce predictable injury patterns in each of the following types of motor vehicular accidents: head-on or frontal impact; rear impact; lateral or side impact; rotational impact; and rollover.

Awareness of the various mechanisms of injury in vehicular crashes enhances the assessment skills of the health care provider when he or she is confronted with a crash victim. Thus, it is likely that the prehospital emergency provider will triage the crash victim more accurately to the most appropriate facility. The emergentologist and traumalogist will command a heightened index of suspicion which will in turn lead to a more prompt working diagnosis resulting in the earlier initiation of life-saving and resuscitative measures. Awareness of preventable injuries hopefully will lead public officials, safety design automotive experts, and other concerned entities toward a safer motor vehicle.

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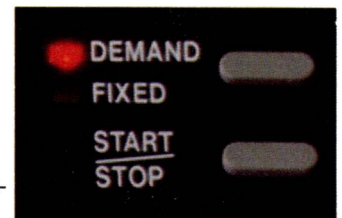
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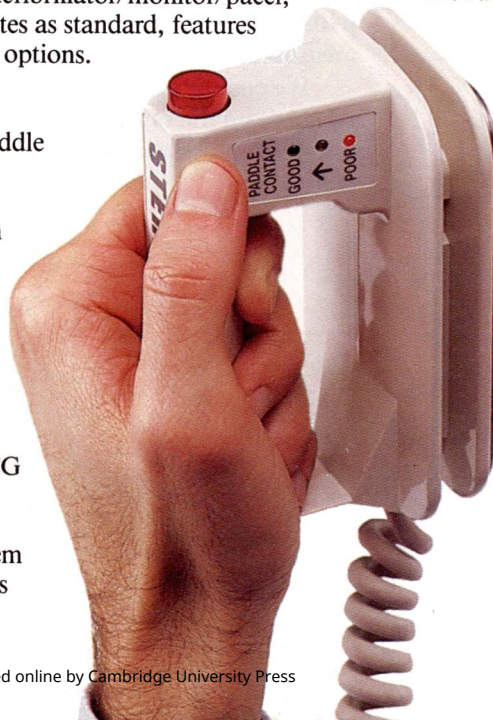
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Predicting the Prognosis of Traumatic Shock

Tsibin YuN, Galtseva IV, Grinev MV, Shirokov DM

We present our experience in the development of algorithms for the prediction of the prognosis in traumatic shock. Our formal $\pm T$ -index predicts the expected continuing duration of shock or the time until death. A positive value for the index indicates that the patient will live and gives the number of hours that the shock state can be expected to continue before stabilization. A negative T -index predicts that the patient will die and gives the number of hours expected to death. The algorithms are based on simple anatomical and functional signs—trauma score, pulse rate, age, and systolic blood pressure. The formulas were determined by multiple regression analysis. The formula for prognostic determination of admission to the hospital is:

$$1/T = 0.317 - 0.0039 \cdot K + 0.00017 \cdot BP \cdot K - 0.0026 \cdot P \cdot A/BP$$

Where: K = Trauma Score
 BP = Systolic Blood Pressure in mmHg
 P = Pulse
 A = Age

Testing of these algorithms showed that real outcome coincided with predicted outcome 97% of the time for the prehospital algorithm and 85–90% of the time for the hospital admission algorithm. A further algorithm predicting fluid resuscitation requirements has been developed from this experience. These results show that traumatic shock can be successfully described by computer simulation.

Does Alcohol Confer Any Protective Advantages in Trauma?

Blair PJ

Popular belief asserts that alcohol consumption increases the incidence but decreases the severity of traumatic injury. We studied the relationships between blood alcohol level, patient characteristics, severity of injury, length of stay, and hospital charges.

We reviewed the charts of all patients sustaining traumatic injury in Santa Clara County from 1 January 1988 to 31 December 1988 who were triaged to a Level I trauma center in Santa Clara County ($n=3712$). Detectable blood-alcohol levels were found in 24% of this cohort (886 patients). The average blood alcohol level was 0.2 mg%, with a peak value of 0.9 mg%. Eighty percent of the patients with positive tests had levels greater than 0.1 mg%, the legal limit.

Comparing the group of 886 patients with detectable blood alcohol levels to the group of 2,826 patients with no detectable blood alcohol demonstrated some important relationships. The two groups have the same age distribution (average age = 29.1 vs 29.3), but males are over-represented in the group with positive blood alcohol levels (% males = 85% vs 64%, $p<0.005$). The trauma scores of the two groups were almost identical (average trauma score = 10.6 vs 10.4), as were the corresponding Glasgow coma scores (12.9 vs 13.2). Interestingly, the injury severity score (ISS) demonstrated a significant difference between the two groups suggestive of an increased severity in the group with positive blood alcohol levels (average ISS = 12.3 vs 11.4, $p<0.005$).

The process of care for the two groups appeared similar from a statistical perspective. Total length of stay was about the same (3.7 days vs 3.4 days), as was average length of stay in the ICU (0.9 days vs 0.9 days). Unexpectedly, however, the average hospital charge was 27% higher in the group with positive blood alcohol levels (\$5,600 vs \$4,400 [US \$], $p<0.005$). Clinical outcomes remained comparable, as measured by similar survival rates (95% vs 96%).

We conclude that alcohol consumption has a detrimental effect on the severity of traumatic injury independent of its effect on incidence.

The Use of Extracorporeal Spleen Hemoperfusion in the Treatment of Traumatic Shock

Grinev MV, Tarelkina MN, Frolov GM, Tsibin YuN

We report our experience of 212 treatments in 86 patients using extracorporeal hemoperfusion of pig spleen to help treat severe traumatic shock and its complications. In this technique, a fresh, aseptically removed, pig spleen was perfused with heparin and saline and transported to the hospital. The spleen was then attached to the patient through a vein to vein shunt and the patient's blood circulated through the spleen with a roller pump. Treatments lasted 30 to 60 minutes.

The clinical effects observed were reduction in temperature and degree of encephalopathy. Laboratory investigation showed decline in "middle molecules," fibrinogen levels, leucocyte intoxication index, and the number of circulating immune complexes. Plasma creatinine remained constant. Thrombocytes actually increased in number by the second day.

Extracorporeal spleen hemoperfusion also was found to have effects on the immune system consisting of phagocytosis, increased chemokinesis, and increased chemotaxis.

The Role of Aeromedical Transportation in Disaster Health Care

Yancey AH

Unique aspects of aeromedical transportation exist that render it vital to the overall management of disaster emergencies. Valuable time can be saved in moving medical expertise and supplies into the disaster area as well as moving victims out of the hazardous area quickly and in large numbers to the institutions of definitive care. Frequently observed chaotic ground traffic situations at the disaster scene as well as environmental obstacles en route can be avoided. Large numbers of disaster victims can be more efficiently cared for en route by proportionately fewer health care personnel due to the concentrations of patients in one aircraft. Patients with similar injuries (i.e., burns) can be routed to and concentrated in specialized institutions that specialize in the care of these specific injuries. The possibility for execution of the foregoing should include the use of military troop-transport aircraft that are easily converted for patient transport. Also, military personnel should be involved as they are already part of a highly organized structure that is more easily and swiftly mobilized than can most civilian organizations. The United States Air Force aeromedical evacuation policies and management structure will be reviewed briefly with attention directed toward additions and adaptations of and alterations in this system which will serve a global disaster response. Such a highly evolved system will require a governing body with global reach for purposes of coordination and management. The resources for such a system currently exist and are in operation but such an organization has yet to be formed.

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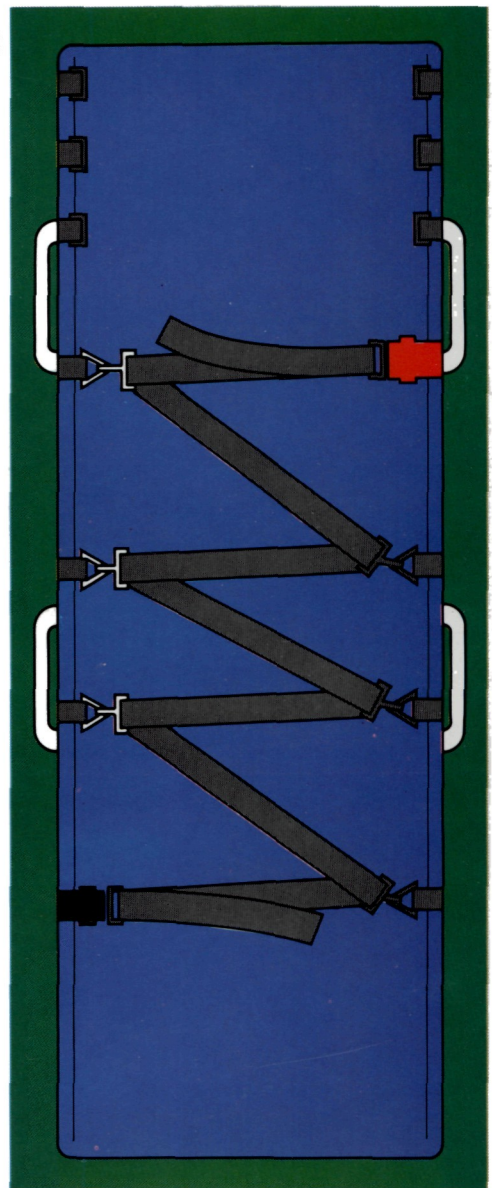
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*Schou J, Jerger M.: "Technical Rescue in Spinal Injury." *Emergency and Disaster Medicine*. Xiaohong S., Moles M. (Eds). Beijing International Academic Publishers, 1989.

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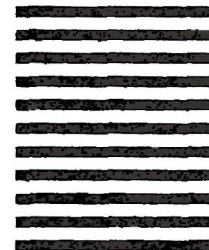
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An Earthquake Happens: What Did We Learn?

Blair PJ

Natural disasters represent infrequent events of enormous magnitude. We studied the response of the Emergency Health Care System (EHCS) to the recent Loma Pietra—San Francisco Earthquake (magnitude 7.1 on the Richter Scale).

We reviewed the performance of all hospitals in the four county region affected by the earthquake (Santa Clara, Santa Cruz, San Mateo, and San Francisco). Such hospitals had pre-planned disaster protocols for managing mass casualties. However, these plans exclusively focused on disasters occurring outside of the hospital. This approach assumed the integrity of the hospital's structure, function, and personnel. The fifteen seconds of intense vibration showed that hospitals are not immune to such devastation. Many hospitals sustained ruptured gas mains, shattered glass, leaking pipes, and falling walls. Heating, lights, communications, plumbing, and elevators all failed to function in at least one hospital. Crucial health care workers were compelled to go home in response to family obligations. The overwhelmed Emergency Medical Services (EMS) paramedic communication systems had significant difficulty adapting either to the increased community needs or to the decreased hospital capabilities. The public media provided the most effective means of mass communications

We conclude that hospitals are ill-prepared when natural disasters affect their structural integrity.

Intravenous Laser Therapy in the Treatment of Ischemic Heart Disease

Maximov VA, Mazhara YuP, Olesin AI, Skorodumova EA

During the last several years, it has been demonstrated that intravenous (IV) and intracardiac (IC) radiation of blood by a neon-helium laser may cause several beneficial effects in patients with ischemic heart disease, especially in the acute stages. These include: antiarrhythmic and antifibrillatory activity; stimulation of tissue and humoral immune responses; enhancement of the microcirculation; and anticoagulant activity (Meshalkin and Sergievsky 1982, Kipshidze et al 1988). We report our experimental and clinical results suggesting the efficacy of this method.

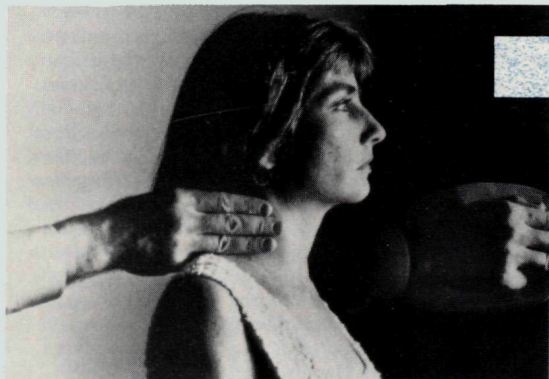
Experiments were set up using rabbits, male cats, and mongrel dogs. The effects of low-energy (6W, 9J) laser IV radiation were studied. Compared to control animals, radiation produced a lowering of blood cholesterol level, anticoagulant action, and increased myocardial contractility. In experimental groups in which the arrhythmias were produced by barium chloride, stophanthin, or acute coronary ligation, the antiarrhythmic effect of IV laser radiation caused a reduction in frequency and duration of cardiac rhythm disturbances. In experimental myocardial infarction (MI), the laser treatment significantly decreased the size of infarction and lowered the serum concentration of products of membrane lipid peroxidation.

We studied 158 patients with ischemic heart disease, including 60 with acute myocardial infarction (MI). In all patients, the treatment inhibited platelet aggregation and lowered lipid peroxides. In patients without MI, there was a 75% decrease in SVT, A-Fib, and A-flutter. In patients with MI, treatment lowered the risk of ventricular fibrillation (V-Fib) by 2.5 times, prevented LV failure and recurrent chest pain, and reduced PVCs by a factor of 1.5. No complications or side effects were observed.

These data suggest the efficacy of IV radiation by neon-helium laser in ischemic heart disease. Further study of the biological effects of laser radiation should provide more definitive information about the basis of its therapeutic effects.

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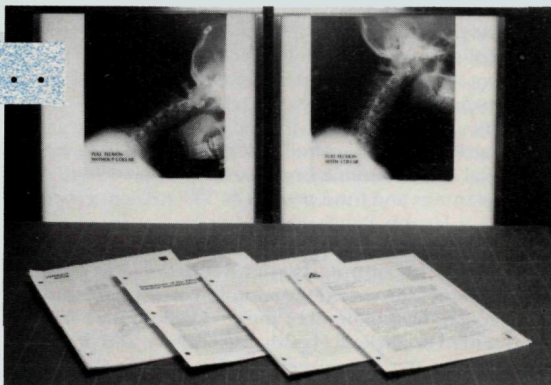


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Simplified Scheme for the Use of Automatic External Defibrillators by Lay Persons

Briggs N

The 1986 American Heart Association (AHA) standards for Advanced Cardiac Life Support (ACLS) emphasized that the most important factor in successful conversion of patients in ventricular fibrillation (VF) was the speed at which defibrillation could be provided following the onset. The AHA standards recommend the use of both conventional defibrillators by personnel trained to recognize VF and automatic external defibrillators (AED) by lay persons.

The potential of the use of AEDs by lay persons both in industrial and public settings, and in the homes of high risk patients has been examined. Automatic external defibrillators are devices programmed to identify rhythms which meet a predetermined set of criteria such as VF. The device then delivers the appropriate level of electricity and reassesses the rhythm. Since the operator only is required to properly attach the device to the patient and operate an on/off switch, this device can be used in settings such as industry and public gatherings as well as in the homes of high-risk patients by persons with minimal training.

Several studies have investigated the results of placing AEDs in these settings for use by lay persons. However, problems have been identified which interfere with their proper use. Cummins et al (1985) found that the most difficult area of their protocol was the integration of CPR steps with the steps of using the AED.

To simplify the protocol for use by lay persons, it may be necessary to adopt a scheme similar to the ACLS algorithm for VF when a patient already is being monitored. In this protocol, CPR is not started before defibrillation if a monitor is available. The protocol directs that three shocks be given in sequence before CPR is started. The time necessary for the AED to be retrieved, attached to the patient, turned on, and the shock delivered is the factor determining the feasibility of dispensing with the CPR sequence prior to AED use. Moore et al (1987) determined a mean time of 4.1 minutes for completion of the entire cycle of AED use by trained lay persons. However, one cycle of CPR and the first shock could be delivered in about two minutes. If the initial cycle of CPR is deleted, it may be possible for the first shock to be delivered much more rapidly. Although no specific time limit has been identified during which application of defibrillation without prior CPR is as effective as (or more effective than) delaying defibrillation to deliver a cycle of CPR, it is possible that it will lie within the time frame of successful AED use.

Endogenous Digoxin-Like Factor: Possible Emergency Implications

Bagrov AYa

Endogenous digoxin-like factor(s) (EDF) is an as yet unidentified circulating substance that plays an important role in water-electrolyte homeostasis and is involved in the pathogenesis of some forms of hypertension. Data have suggested a direct cardiac effect of EDF. Because of the sensitivity of ischemic myocardium to the arrhythmogenic action of the digitalis glycosides we hypothesize that EDF plays a role in the occurrence of ventricular arrhythmias during acute myocardial infarction (AMI).

Our experiments in coronary-ligated male cats showed that the acute administration of antidigoxin antibodies (AA) caused a fivefold increase in the fibrillation threshold. In another experiment, we monitored the plasma concentration of digitalis and EDF in experimental AMI in Wistar rats. We observed a significant correlation between erythrocyte ATPase inhibition (indicative of digitalis/EDF activity) and ventricular arrhythmia incidence ($r = -.84$, $p < 0.001$). Administration of AA increased enzyme activity and decreased the incidence of arrhythmias. In a study of 25 AMI patients during the first 24 hours we observed a marked increase in digitalis/EDF concentrations as compared to 18 healthy controls and 11 patients with progressive angina pectoris. There was a correlation between the erythrocyte ATPase activity and the plasma ATPase inhibitory potency in patients with AMI ($r = .65$, $p < 0.001$). This inhibitory activity was blocked by AA. Similarly, in 47 patients with AMI, we observed a 2.5-fold increase in plasma digoxin-like immunoreactivity compared with that of healthy and with unstable angina controls. High EDF levels remained elevated four to five days following AMI and these gradually decreased. Interestingly, in eight patients with AMI complicated by pulmonary edema EDF levels were significantly lower than even in healthy subjects.

These data indicate that besides its generally accepted natriuretic role, EDF is involved in "emergency" cardiac regulation and probably participates in the pathogenesis of ischemia-induced arrhythmias. Antidigoxin antibodies (AA) and other EDF antagonists may prove useful in the acute treatment or prevention of cardiac arrhythmias in AMI.

Platelet Function in Thrombolytic Therapy

Lewis B

The widespread use of thrombolytic therapy in the treatment of acute myocardial infarction has directed increased attention to the relationship between platelet activity and fibrinolysis. In vitro and animal studies show that platelet activity can delay reperfusion and mediate reocclusion. Limited but clinically useful information is available from human trials to suggest the adjunctive efficacy of antiplatelet therapy during thrombolysis. These data are presented in the context of current techniques of thrombolytic therapy.

Intensive Training for Prehospital Non-Physician Personnel

Fowler RL

North American emergency medical services (EMS) systems are predicated upon the existence of a variably-trained, non-physician, medical provider. This type of provider was first trained formally following a national Congressional Act in 1973 that funded training throughout the United States.

Curricula for emergency medical technician (EMT) training programs have been variable in format, minimally coordinated across the United States, and available from numerous entities over the past 17 years. The Department of Transportation (DOT) has released curricula for both EMT-A (basic EMT) and the EMT-P (paramedic). Most states accept the DOT Programs as the basis for standards of training. The American Society for Testing Materials (ASTM) has established a voluntary standard accepting the DOT EMT-A program as a minimum standard for training the EMT.

Originated in 1982, the Basic Trauma Life Support (BTLS) program is a highly focused, intensive program designed to provide aggressive training in patient assessment and the management of the trauma victim. Studies before and after BTLS training indicate that the patient assessment skills of EMTs are subject to decay. Thus, it is necessary for constant assessment of the medical provider's skills and frequent provider retraining at appropriate intervals.

This paper discusses the history of non-physician, pre-hospital provider training, presents current studies of performance skills and retention, and offers suggestions for proper training, retraining, and future studies.

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Bartholomew Tortella, MD

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The Intraosseous Infusion Technique

Totten VM, Bielenstein J

This paper describes the history and method of intraosseous infusion (IOI). Its indications, contraindications, complications, and use as a route for the administration of medications are reviewed. This technique permits rapid access to the vascular space in adults or children even in the presence of conditions which obliterate the peripheral veins. It has proven value in burn victims, patients in convulsions or in shock, and in the obese or severely edematous.

The intraosseous infusion technique requires little more than a steel needle, preferably one with a stylet, with which to penetrate the bony cortex. The use of sternal and tibial sites are discussed in depth. This paper provides step-by-step instructions on the establishment of access to the tibial bone marrow and discusses the special requirements associated with the use of the sternum. The steps in the technique are: 1) select and prepare the site; 2) local anesthetic (if time allows); 3) introduce the needle through the bony cortex with screwing, boring motion; 4) aspirate and flush the needle; and 5) connect intravenous (IV) fluids.

The intraosseous infusion technique has been shown to be relatively free of complications, even in unskilled hands. It permits much the same infusion of fluids and medications as does the IV route. Its use can be life-saving when peripheral venous cannulation can not be achieved rapidly.

Two cases are reviewed.

Development of an EMS Quality Control System in the USSR

Teriaev VG, Stazhadze LL, Kostomarova LG, Oleynik VA, Nikulin BI, Buk TN, Chervochkin EN

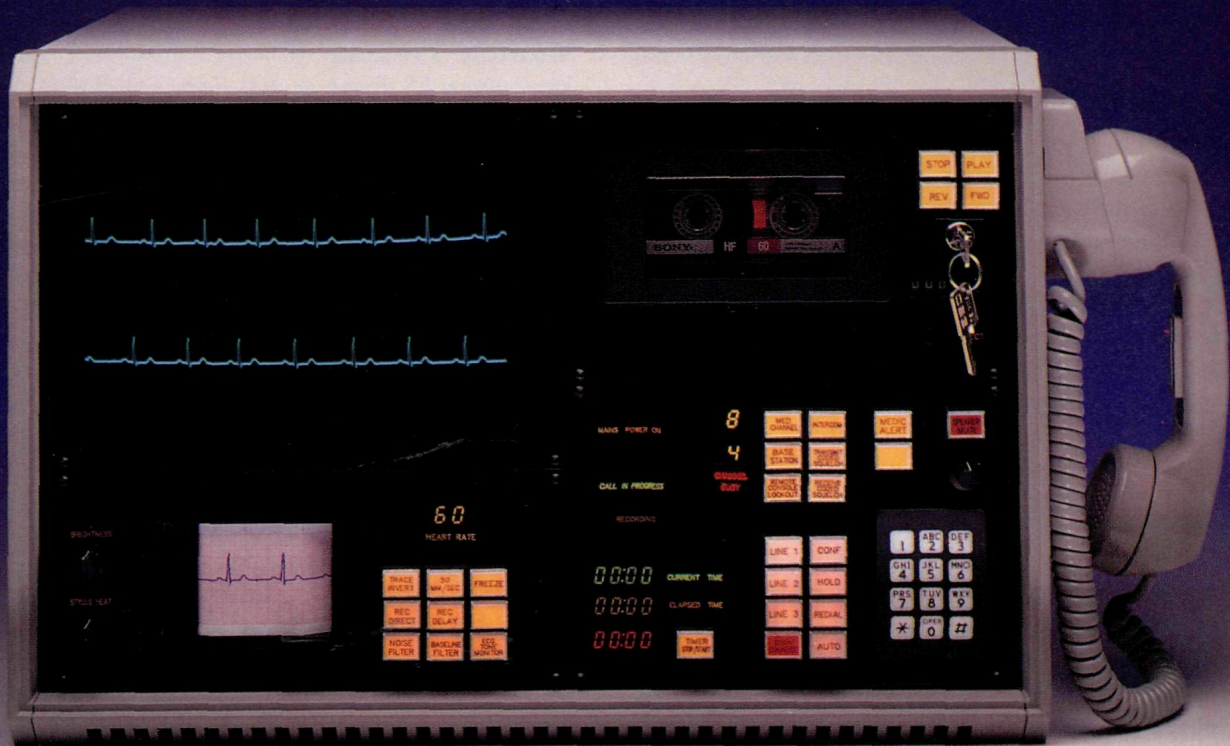
One of the important problems of Public Health Management is the quality assessment of medical care. The most universal measure of quality assessment is the effect of the activities of the health-care system activities on mortality, morbidity, etc. In practice, this can be accomplished for each medical facility by establishing indices of ultimate outcomes which reflect the quality criteria and are the control indicators and tools for quality assessment of medical care. Such indices should be established for each patient category (diagnosis-related group) depending on the type of medical facility and the stage of medical care delivery.

We developed a quality assessment system for EMS delivery within a region. The system passed through five developmental stages. The stages include the development of:

1. Standards of prehospital and hospital emergency medical care for various types of emergencies. The standards include all diagnostic, medical, organizational, and tactical measures required to ensure the established minimal level of care.
2. A criteria list reflecting the ultimate outcomes of prehospital and hospital EMS activities.
3. Normative meanings of outcome criteria for both the EMS activity as a whole and its subdivision's activities. The standard should exceed the current level by 5% but remain within the bounds of possibility of achievement with the effective use of resources, organization, diagnostic tests, and treatment.
4. A list of possible errors.
5. An assessment scale which includes both the assessment of each normative index and points depending on its functional value and the quantitative assessment of the degree of deviation from the normative meaning of each criterion.

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Specialization of Prehospital Emergency Services

Shmatov AV, Stazhadze LL, Kostomarova LG, Elkis JS, Chervochkin EN, Vdovina G

Improvement in the quality of and the accessibility of high quality emergency medical care to the population is the leading task of the Emergency Medical Care Service. As the Emergency Medical Care Service developed in the past, specialized mobile teams (cardiologic, toxicologic, traumatologic, etc.) were organized and staffed with highly skilled personnel and provided with supplementary equipment. It has become evident, however, that such an organization leads to a number of difficult problems, such as guaranteeing the high specialization of these teams and the appropriate use of the specialized team.

The greatest difficulty is with the dispatch of the appropriate specialized teams to calls. Our study shows that only 60-62% of the time is the special team the appropriate one for the final diagnosis. Further, as the population requires more specialized medical care at the prehospital level, the formation of these highly specialized teams becomes much more costly, as the cost of one call of such a team is two to five times the cost of a regular mobile team.

In response to this problem, we have started to organize "polyvalent teams" of intensive therapy staffed with personnel possessing wider knowledge and skills. The Moscow Station of Emergency Care, along with the N.V. Sklifosovosky Research Institute of Emergency Care, has created "teams of intensive therapy." This is done by combining personnel and equipment from the highly specialized teams with those of the ordinary mobile teams. Doctors and feldshers from the regular teams are given special education in order to qualify to serve on the intensive therapy teams.

At present, the emergency medical care in Moscow has 31 functioning intensive therapy teams with broad specialization. Our analyses have shown that, in 91.6% of cases, the methods of diagnosis, resuscitation, and intensive therapy applied by these teams in the acute situation do not differ by the methods use by the highly specialized teams. These results were confirmed by independent expert evaluations of the quality of care rendered by the highly specialized and intensive therapy teams. Discrepancies in diagnosis were noted in 4.8% of cases attended by highly specialized teams and 5.3% of cases attended by the teams of intensive therapy. Thus, it seems that the teams of intensive therapy are much more cost efficient.

The Role of Hepatic Injury in Death Following Multiple Trauma

Vladimirova ES, Romanov PA, Evdokimov VN

Over a one year period (1988), we saw 264 prehospital deaths due to multiple trauma. In 140 (53%) cases, there was associated blunt hepatic trauma. These cases were reviewed retrospectively to clarify the contribution of liver injury to mortality. In order to estimate the severity of liver trauma, 40 post-mortem investigations were carried out with detailed examination of the hepatic vascular system and parenchyma. X-ray contrast investigations were carried out as well. The data were used to categorize the types of hepatic trauma into five classes:

- I. Complete rupture of the organ.
- II. Central rupture with deep lacerations extending from the hilus along the hepatic veins formation of intraparenchymal cavities.
- III. Multiple medium and minor lacerations of both lobes.
- IV. Ruptures of peripheral parts of the liver.
- V. Subcapsular and intrahepatic hematomas.

Analysis of the 40 cases showed that the injuries were distributed as follows:

<u>Class</u>	<u>Patients</u>	<u>Percent</u>
I	8	20
II	3	8
III	8	20
IV	18	45
V	3	8

Prehospital and Disaster Medicine© Vladimirova, et al

On an angiogram, patients with type I injury had extensive damage of the major hepatic vessels. Other classes of liver trauma had vascular damage at parenchymal and lobar levels.

Results demonstrate that blunt hepatic trauma plays a leading role in the cause of death in approximately 20% of patients with lethal traumatic injuries.

The Logistics of Fluid Resuscitation Planning During Mass Casualty Situations

Khvatov VB, Oleynik VA

Fluid resuscitation is an effective and necessary therapy in the treatment of most survivors of natural disasters or industrial catastrophes. We have studied the efficiency of fluid resuscitation therapy in survivors after the Armenian earthquake (75 patients with crush syndrome), after the catastrophe in Bashkiria (187 burn patients), and in patients with industrial trauma (119 cases with chemical injury, 88 cases with multi-trauma). Seventy-five to 85% of patients brought to the Institute either were critical or of moderate severity. Therefore, in mass casualties, it seems conservative to assume that all patients admitted to the Institute were in critical condition. Previously, his assumption has been used to calculate the required institutional fluid needs in a mass casualty situation.

On the basis of our investigation and the cost of complex intensive infusion therapy, the optimal ratio of whole blood, its components, blood preparations, and blood substitutes have been calculated (see below).

Anuria from renal failure may complicate these conditions and make fluid resuscitation more difficult. Therefore, removing fluid from the body by hemodiafiltration may be necessary in order to provide effective fluid therapy. The DIC syndrome and secondary immune deficiency may require the use of plasmapheresis, hemostaziotics, and immune correctors.

	Whole Blood	Blood Components	Blood Preparation	Blood Substitutes	Length of Therapy	Cost (Rubles)
Multiple Trauma	1	3	4	15	2 days	350-390
Chemical Trauma	1	6	6	79	3 day	90-100s
Burn						
Toxemia	1	12	20	68	10 days	600-700
Crush Syndrome	1	10	9	54	4-5 wks	1200-1500

Prehospital and Disaster Medicine © Khvatov, et al


Organization of Temporary EMS Systems During the Armenian Disaster

Teriaev VG, Torosian RR, Gazietov BM, Kizhajkin VS, Saakian ES

During the 1988 earthquake in Armenia, all treatment and prophylactic centers in Leninekan (except clinic N1) were destroyed and could not admit patients. Under these circumstances, extracted patients initially were brought to the city emergency station and kept on an open air ward on its grounds. Medical staff of the station did everything they could under those conditions to help the injured. Later, as transportation and communication facilities became available, survivors were evacuated to hospitals in neighboring towns.

The establishment of a temporary emergency medical system was the main task in the difficult situation. Research workers of the Disaster Medicine Department of the Sklifosovosky Institute in the Emergency Medicine Service faculty worked in close cooperation with Armenian specialists to organize a workable Emergency Medicine system. The city was divided into ten sections, depending on where the most active rescue work was needed and where the greatest concentration of people was found (such as the Railway Station and Bus Station). In each section, ambulances and passenger buses always were ready to transport patients. Buses were converted into mobile hospitals with fifteen stretchers in each bus. Special radio communication systems were established to communicate with Disaster Relief Headquarters. One-hundred-fifty to two-hundred patients received care in each mobile hospital each day.

With this temporary EMS system, we were able to deliver urgent medical care to casualties of the earthquake. The temporary hospitals also gave us a chance to lighten the workload on other medical teams and allow them to reopen hospitals and outpatient departments as they again became usable.



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