

Prehospital Care in Rural Settings

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The delivery of prehospital care in a rural setting requires a conceptual framework quite different from that required in urban and suburban environments, given that available resources are limited in the rural setting. The intermittent and episodic nature of seriously ill and injured patients who present to rural emergency medical services (EMS) makes it difficult to plan, staff, and equip in order to provide emergency medical care at the same level seen at higher-volume urban or suburban institutions. The objective of this presentation is to describe the distinctive nature and widely unrecognized features of prehospital care in rural and remote areas, with a focus on clinical, workforce, and economic issues, through a Canadian perspective that adds the element of extreme temperatures. The author presents recommendations for a paradigm shift in thinking, and a call to action on behalf of all prehospital care professionals that are based on a realistic assessment of the current status of emergency medicine, and that are needed to develop and sustain high-quality emergency medical care in rural environments.

Keywords: emergency medical services (EMS); emergency medicine; medical care; prehospital; quality; remote areas; rural; suburban; urban
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Major Incidents in Region Västra Götaland, Sweden, during 25 years

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Region Västra Götaland was created in 1999 by merging three former county councils and Göteborg's decision-making functions concerned with healthcare. The region's main responsibility is to provide its 1.5 million inhabitants with adequate healthcare. Västra Götaland, together with Stockholm and Malmö, are the areas with the highest population densities in Sweden. The infrastructure is complex with high industrial activity and intense communication networks.

Over the last 20 years the region has had several major incidents, for example:

Year	Incident	Dead	Injured
1977	Landslide in Tuve	9	62
1980	Bridge collapse, Tjörn	8	
1987	Train accident, Lerum	9	130
1990	Fire on a passenger ship, Scandinavian Star	158	30
1992	Tram accident in Gothenburg	13	37
1998	Fire at a discotheque, Gothenburg	63	213
1999	Fire on a passenger ship, Princess Ragnhild	1	10
2001	EU meeting, Gothenburg	143	
2002	Gas leak, Skara Sommarland	39 to hospital	

Questions:

How can we prevent such events?

What conclusions can we make?

What have we learned?

Keywords: communications; incidents, major; infrastructure; injured; lessons learned; networks; outcomes; prevention; Sweden
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See What's Going On at the Scene: Remote Controllable, Mobile Video System Using a Cellular Phone

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Introduction: At the time of a disaster, the information from the scene is very limited. If we can see what is going on at the scene or in the ambulance, it may be useful for preparation of the emergency department.

Purpose: To create a remote controllable, mobile video system.

Method: We built up the mobile video system in an ambulance. The equipment on the ambulance includes: (1) a control unit; (2) MediaPoint mobile (NEC Corporation, Tokyo); (3) a remote controllable camera, EVI-D30, (SONY Corporation, Tokyo); and (4) a cellular phone. The camera is controlled by a computer in a remote hospital, and the moving image is transferred to the computer via a cellular phone. The image produced was a slow-moving image at ten frames per second.

Results: Using this system, the direction and magnification of the camera could be controlled without any trouble to the crew on the ambulance, and images of the inside of ambulance could be seen. It was possible to collect a variety of visual information in the ambulance. The information included: (1) The time the patient was loaded into the ambulance; (2) the time and the way a patient was intubated; (3) the medication used; and so on. From this information, we could prepare the ventilator and drugs prior to arrival of the patient.

Conclusion: This system is very helpful in preparing the emergency department at the time of emergency and possibly at the time of disaster.

Keywords: ambulance; cellular phone; emergency department; images; remote control; times; video
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Influence of Levels of SOD, MDA, and NO in Plasma and Tissues by Closed-Chest Hypothermia Cardiopulmonary Bypass (CPB) during Reperfusion Injury

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Objective: To observe levels of superoxide dismutase (SOD), malondialdehyde (MDA), and nitrogen monoxide (NO) resulting from mild or deep hypothermia after cardiac arrest of 15 minutes in dogs.

Method: With our established dog cardiopulmonary

resuscitation (CPR) model, cardiac arrest of 15 minutes was followed by reperfusion with closed chest cardiopulmonary bypass (CPB). Group 1 (n = 5) received mild hypothermia (33–34°C), Group 2 (n = 5) received deep hypothermia (26–37°C), and the levels of SOD, MDA, NO in plasma and tissues were measured during CPR.

Results: After cardiac arrest of 15 minutes, the concentrations of SOD in the plasma of Group 1 (2615.8 ± 57.64 u/ml) was significantly higher than during the pre-arrest period (2586.4 ± 61.78 u/ml) ($p < 0.05$), and for Group 2 (2690.5 ± 35.50 u/ml) also was higher than during the pre-arrest period. The concentration of SOD in plasma at 1 hour of CPB, were lower than pre-arrest ($p < 0.05$) and nearly pre-arrest ($p > 0.05$) at 3 hours of CPB. The levels of MDA and NO were lower than pre-arrest level after cardiac arrest of 15 minutes, at 1 hour, and 3 hours of CPB. There was no difference between the two groups. After 3 hours CPB, the concentrations of SOD in the cerebral tissues in Group 2 (1075.6 ± 11.15 u/ml) was significantly higher than in Group 1 (1057.2 ± 11.80 u/ml) ($p < 0.05$). In the pulmonary tissues, the concentration of SOD in Group 2 (690.6 ± 8.7 u/ml) also was significantly higher than in Group 1 (626.67 ± 23.50 u/ml) ($p < 0.01$), and the levels of MDA (4.72 ± 1.5 u/ml) was lower than in Group 1 (7.32 ± 1.54 nmol/g) ($p < 0.05$). In the cardiac tissues, the levels of MDA and NO in Group 1 were significantly lower than in Group 2 ($p < 0.05$).

Conclusions: In resuscitations using closed-chest hypothermia, CPB may decrease free-radical-induced reperfusion injury after cardiac arrest of 15 minutes in dogs. The cerebral and pulmonary reperfusion injury during deep hypothermia CPB was less than during mild hypothermia, whereas the cardiac reperfusion injury during mild hypothermia, CPB was less than during deep hypothermia.

Keywords: cardiopulmonary arrest; cardiopulmonary bypass (CPB); cardiopulmonary resuscitation (CPR); free radicals; hypothermia; malondialdehyde (MDA); nitrogen monoxide (NO); reperfusion injury; superoxide dismutase (SOD)

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Hospital Disaster Preparedness at a Government-Designated Core Disaster Hospital

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After the Great Hanshin-Awaji earthquake in 1995, the Japanese government designated core disaster hospitals in each prefecture. Nagoya Daini Red Cross Hospital is one of the core hospitals, and should meet the following requirements: (1) have a durable structure; (2) strong life-line facilities; (3) ample storage of medical supplies and equipment; (4) be prepared to accept many disaster casualties; (5) ability to dispatch rescue squads immediately; and (6) have hospital disaster plans and conduct full disaster drills regularly.

In 2001, a new emergency and critical care center of the hospital was established in order to fulfill the role and responsibility as the core hospital. The structure of the center consists of six stories above-ground and two stories below-ground level. It was constructed in such a way that

it would withstand an earthquake of the size of the Great Hanshin-Awaji quake. In the second basement level is the energy center where the life-line facilities are kept. These include electricity and water supplies that can be provided for three days to in-hospital patients, disaster casualties, and hospital staff. The Emergency Outpatient Department on the first floor is large enough to treat many disaster casualties simultaneously.

As for human-related disaster preparedness, disaster relief drills are conducted regularly to encourage the staff to know how to act should a disaster happen. The planning of a disaster relief drill is the most important part of the hospital plan. Disaster preparedness at Nagoya Daini Red Cross Hospital, as a core designated disaster hospital, will be described in this paper.

Keywords: critical care; disaster; drills; earthquake; emergency; hospital; life-lines; preparedness; relief; rescue squads; storage

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Studies On The Prophylactic-Therapeutic Effects of Rhubarb on Lung Injury Caused by Abdominal Infection in Rats

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Introduction: Gram-negative sepsis, of which the bio-activity constituent is endotoxin, is one of the most common causes of acute lung injury (ALI) or of acute respiratory distress syndrome (ARDS). Although the control of infection is easily acquired through administration of appropriate antibiotics, the injury to organs, especially lungs, caused by endotoxin released from dead bacteria, is often difficult to treat.

Methods: The cecal ligation and puncture (CLP) in rats utilized to make the model of lung injury with the abdominal infection. Pulmonary vascular permeability, the lung wet-to-dry weight (W/D) ratio, and the differential cell count both in blood and in bronchoalveolar lavage fluid (BALF) were examined. The concentrations of TNF, IL-8, and PLA2 in plasma, lung tissue, and BALF were measured. The observation of continuous changes of all parameters and the analyses of correlation between all parameters in the blood and in lung tissue were performed to provide a rationale to judge the severity of diseases. Rhubarb was administered upon this animal model in order to prove its prophylactic therapeutic effects on lung injury caused by the abdominal infection in rats.

Results: At the early stage of abdominal infection in rats, the pulmonary vascular permeability and the lung wet-to-dry weight ratio increase significantly. Intestinal bacterial translocation, and the intake of endotoxin into blood may result in high concentrations of endotoxin in the plasma, lung tissue, and BALF. The concentrations of endotoxin, and/or PLA2 in plasma, and/or BALF may reflect those in lung tissues. The sequestration of activated neutrophils into lungs may lead to a significant increase of TNF, IL-8, and PLA2 in them. The differential cell count in lungs, TNF, and IL-8 are not of plasma, but of BALF may reflect those in the lung tissues.

Conclusion: Administration of rhubarb may inhibit the