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 15minutes, the concentrations of SOD in the plasma of Group 1 (2615.8 ±57.64u/ml) was significantly higher than during the pre-arrest period (2586.4 ±61.78u/mi) ($p$ <0.05), and for Group 2 (2690.5 ±35.50u/mi) 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 ±11.15u/mi) was significantly higher than in Group 1 (1057.2 ±11.80u/mi) ($p$ <0.05). In the pulmonary tissues, the concentration of SOD in Group 2 (690.6 ±8.7u/mi) also was significantly higher than in Group 1 (626.67 ±23.50u/ml) ($p$ <0.01), and the levels of MDA (4.72 ±1.5u/mi) was lower than in Group 1 (7.32 ±1.54nmol/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 bioactivity 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

increase of pulmonary vascular permeability and of lung water, attenuate the sequestration of neutrophils into lungs, alleviate the endotoxemia, decrease the concentrations of THF, IL-8, and PLA2 in plasma, lung tissue, and BALF.

**Keywords:** acute lung injury (ALI); acute respiratory bacteria translocation; distress syndrome (ARDS); endotoxemia; infection, abdominal; lung injury; mechanism; mediators; model; rats; rhubarb; sepsis
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## Computer Simulation for Planning the 3 Ts: Responding to an Airport Disaster

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The purpose of this study was to develop a guideline for the 3 T's: triage, transportation, and treatment in the case of a disaster with large-scale casualties such as a plane crash or explosion at the Kobe Airport. In the aftermath of the Kobe Quake in 1995, Kobe City initiated a new project to build an airport located on the sea next to the artificial Port-Island in the Kobe Bay area. As the airport will be open in 2006, the emergency plan must be developed for medical disaster response at the airport.

All hospitals in Kobe City were evaluated with respect to geographical locations, the availability of transportation from the Kobe Airport, and emergency medicine capability. The information collected was organized to build a network-flow model that logically connects all the hospitals. To analyze the behavior of the model, computer simulation was conducted according to the grades of disaster.

A priority list of the hospitals in terms of the 3 T's was constructed corresponding to the grade of disaster. It also indicated the time distributions required for triage and transportation, which suggested the insufficient capability of current hospitals to respond to intermediate or larger-scale of disaster.

Computing technology is useful for developing a disaster plan regarding the 3 T's, and has great potential for future improvement combined with geographical information systems.

**Keywords:** computer simulation; disasters; disaster planning
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## Postmortem Computed Tomography after Unsuccessful Resuscitation of Out-of-Hospital Cardiopulmonary Arrest Patients for Defining Cause of Death

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**Background:** It is difficult to definitively diagnose patients with unsuccessfully resuscitated out-of-hospital cardiopulmonary arrest (CPA), because their medical information is extremely limited. It was hypothesized that postmortem computed tomography (CT) scans are helpful in determining their causes of death.

**Methods:** The records of 50 consecutive, sudden, out-of-hospital CPA patients, who were conveyed to this facility over six months, but who were not resuscitated successfully, were reviewed retrospectively. Medical records, chest and abdominal x-ray films, and electrocardiograms were examined if available. CT scans of head, chest, and abdomen were performed after the declaration of death.

**Results:** Six patients were excluded from the study for various reasons. Forty-four patients were examined using CT (age: 70.5 ±11.2 years, 32 males and 12 females). Head CT was performed in 41 patients, chest in 33, and abdomen in 23. Definitive diagnoses were made by CT in nine patients (20.5%) including subarachnoid hemorrhage, aortic dissection, ruptured aortic aneurysm, or severe pneumonia. The suspected diagnosis of acute myocardial infarction for 12 patients (27.3%) was supported by calcifications in their coronary arteries. Three patients (6.8%) demonstrated cardiac tamponade, but its origin was not defined, whether ruptured aortic aneurysm or a ruptured cardiac ventricle by myocardial infarction. Sixteen patients (36.4%) were not diagnosed by CT, but six of them had limited information due to the absence of thoracic and abdominal CT.

**Conclusion:** Postmortem CT scan is informative in defining or suspecting the cause of death in unsuccessfully resuscitated, sudden, out-of-hospital CPA patients.

**Keywords:** cardiac arrest; etiology; computerized tomography; out-of-hospital; post-mortem
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## Military Unit of the Hospital

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Israel presently is preparing itself for the event of chemical warfare. Until 1991, decontamination teams were manned by pre-military youth, ages 16 to 18 years. During the Gulf War, due to the difficulty of the task, it was realized that the role must be filled by adults, and therefore soldiers were designated for these missions. In 1994, special military units were allocated, in order to serve as a contingency unit in each general hospital. The Assaf Harofeh military unit was formed in 1996.

Our hospital is prepared to treat 300 chemical warfare casualties in a mass casualty event. The military unit is made up of around 160 soldiers, as an integral unit of the hospital staff. The unit performs its roles specifically in the contaminated area, side-by-side with the hospital's civilian personnel, under the overall authority of the hospital directors. The roles of this unit are as follows:

1. Evacuation of casualties from the ambulances
2. Undressing and decontamination
3. Ventilating severe casualties
4. Stretcher bearers
5. Transfer of casualties to decontaminated area

The military commander of the unit acts under the direction of the Home Front Command, but receives professional orders and supervision from the hospital administration. Every year, the unit is trained in the hospital, and once every three years participates in an integrative drill simulating a chemical warfare scenario.

**Conclusion:** Without the integration of the military unit, the hospital would not be prepared for chemical warfare and would be unable to fulfill its goal of saving lives.