

Management of Traffic Accidents in Shanghai City

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China has 2.2% of the number of motor driven in the world, but automobile accidents in China comprise 9% of the automobile accidents in the world. Currently, 86,000 deaths result from traffic accidents annually. Shanghai is one of the largest cities of the world with a population of 13,000,000 inhabitants. The average density of population is >1,000 persons per km², and that in the central part of the city, it is >10,000 persons per km². Currently, more than 2,000,000 people move through Shanghai daily. The total number of passengers using buses during 1995 was over 5,500 million.

Statistics of the past five years indicate that the number of traffic accidents exceeded the past records by 60,000 cases with two persons killed daily (in the whole of China, 1 person is killed by accidents every 6 minutes). Tables 1 and 2 present these traffic accident statistics.

Table 1—Statistics of Traffic Accidents in Shanghai from 1994 to 1998

Year	Number of Accidents	Number of Injured	Number of Deaths
1994	18,475	10,059	1,514
1995	20,074	9,500	1,164
1996	8,736	8,991	947
1997	7,621	4,699	607
1998	7,524	4,450	594
Total	62,430	37,699	4,826

Table 2—Statistics of Traffic Accidents in China from 1994 to 1998

Year	Number of Accidents	Number of Injured	Number of Deaths
1994	298,147	187,399	53,439
1995	276,071	170,598	54,814
1996	258,030	159,002	50,441
1997	250,297	155,072	49,271
1998	264,817	162,019	53,292
Total	1,347,362	834,090	261,257

From the above traffic accidents, the following characteristics can be identified:

1. Of all the persons killed in traffic accidents, 85% are below the average of 40 years of age
2. Prehospital mortality rate from traffic accidents was 66%
3. 60% of traffic accidents are related to bicyclists

Improvement of prehospital first aid and emergency facilities has decreased the rate of mortality and injuries by traffic accidents in recent years. The Shanghai First Aid Central Station (SFACS) possesses 173 ambulances and is staffed by 517 specialists. The facilities of the new resuscitation ambulances, called a "Movable ICU", consists of a cardiopulmonary monitor, ventilator, emergency drugs, and other resuscitative equipment. The ambulance also has an excellent communication device that can connect with any part of the communication network in Shanghai City. Altogether, 110,889 persons requiring first aid were transported by SFACS in 1996. The number of the wounded by traffic accidents and other disasters (e.g., burn accidents,

intoxication, drowning, etc.) was 26,681 with 318 persons found dead before hospitalization.

All severe trauma patients should be transported to the identified hospital in Shanghai. Every central hospital in Shanghai carries out the actions to set up a resuscitative department so as to accept masses of critically wounded casualties in time based on the conditions of the disaster. The functions of a resuscitative department are to sort all of the critically wounded from ordinary ones, resuscitate them, and render all supportive treatments required. Their functions include cardiopulmonary resuscitation, immediate treatment of life threatening respiratory failure, organ injuries, and stopping the loss of blood. Initial management of fractures and injuries from these disasters should be referred to the orthopedic department.

Key words: accidents; ambulances; deaths; hospitals; injuries; resuscitation; staff; traffic; trauma; treatment
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Computer-aided Patient Management on the Field: A New Facet of French School for Disaster Medicine

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In recent years, network technology has made much progress. It has provided us with an easier management of our patients at the disaster scene. This work highlights French rescue organisation and led to the creation of an application program that provides a real management scenario. Above all, it provides effective information in real time for all of the contributors to a rescue plan. The design stage (hardware and software) of the project is completed. Trials are scheduled for May or June 2001 during disasters exercises.

We will present this application program, the product of two years of work. We hope to convince physicians of the great potential of these new network technologies for their practise.

Key words: computer assistance; field; management; networks; patients; technology

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First Aid for Gunshot Wounds in High Altitude Areas

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Introduction: We will discuss special prehospital treatment of the mass numbers of victims of firearms that had not been considered previously. Since 1990, we have attended to the research work of gunshot wounds in such area as Xi Zang, where the plateau is about 4,000 meters (13,123 feet) above sea level (mean atmospheric pressure = 463

mmHg, $pO_2 = 97$ mmHg), We received 574 victims and their wound location, type, and result (died of wound or killed in action) are shown in Table 1.

Table 1—Number and percentage of gunshot wounds by location, type and result

Anatomical Location	Non-Penetrating Wound		Penetrating Wound	
	N	(%)	N	(%)
Head	35	(6.0)	62	10.7
Chest	25	(4.3)	66	11.4
Abdomen	26	(4.5)	43	7.4
Perineum	5	0.9	11	1.9
Upper Extremity	48	(8.3)	70	12.1
Lower Extremity	45	(7.8)	90	15.6
Other	23	(3.9)	488.3	
Total	184	(32.0)	342	(59.1)

Anatomical Location	Died of Wound		Killed in Action		Number of Cases	
	N	(%)	N	(%)	N	(%)
Head	4	(0.7)	58	(10.1)	97	(16.8)
Chest	3	(0.5)	64	(11.1)	91	(15.8)
Abdomen	8	(1.4)	44	(7.6)	69	(12.0)
Perineum	5	(0.9)	16	(2.8)		
Upper Extremity	2	(0.3)	5	(0.9)	118	(20.5)
Lower Extremity	8	(1.4)	18	(3.1)	135	(23.4)
Other						
Total	25	(4.4)	217	(37.6)	574	(100.0)

Effect of Topography and Climate: The high altitude climate of Xi Zang is varied and its topography consists of immense forests, precipitous cliffs, and deep valleys so that travel over the mountains is dangerous. Every year, between spring and summer, mountain floods, falling rocks or rock slides, and avalanches usually occur there. The communications in this area often have been interrupted by these calamities. The field hospital is located far away (about 600 to 800 kilometers) from the calamitous area. Therefore, it is very difficult to have the wounded transported to the field hospital and given first aid treatment. Statistics show that only 18.7% of the wounded can be transported to the field hospital within 24 hours.

Table 2—Effects of altitude

Research area	Altitude (meters)	Altitude (feet)	Barometric Pressure (mmHg)	pO_2 (mmHg)
	3,175	10,417	500.5	104.90
Ton	5,110	16,765	400.5	83.84
Hang	4,366	14,324	439.0	92.0
Don	4,280	14,024	446.0	93.48

Pathophysiology Character and Clinical Signs of Wounds at High Altitude: The adverse circumstances with harsh climates at low atmospheric pressure cause pulmonary artery hypertension, low capacity of lungs, hypoxemia, and overload of the right heart. As a result, pulmonary edema appears. At sea level, the percentage of oxygen in the

atmosphere is 20.95% and the pO_2 at sea level is 159.2 mmHg. At an altitude of 10,000 feet (3,048 meters), where the barometric pressure is 523 mmHg, the percentage of oxygen remains 20.95%, but the pO_2 decreases to 109.6 mmHg ($pO_2 = 20.95\% \times 523$ mmHg = 109.6 mmHg).

The main clinical appearance of victims are due to hypoxemia. It is caused by an inadequate pO_2 in inspired air and a ventilation defect with the result of in an oxygen deficiency in the tissues. The condition of victims is usually serious due to a majority of them presenting with penetrating wounds. Penetrating wounds cause this form of hypoxia with blood loss and anemia. The initial respiratory system response to hypoxia in the wounded, is an increased rate and depth of ventilation. Hyperventilation results in reduction of pCO_2 causing respiratory alkalosis and a shift of the oxyhemoglobin association curve to the left. The result allows an increased binding of oxygen with hemoglobin for transport to the tissue.

At an altitude of 20,000 feet (6,096 meters), the oxygen saturation of the hemoglobin, drops to 70%, and the physical findings include an inability to remain upright, jerking of upper limbs, seizures, unconsciousness, coma, and death. For these reasons, then, the general condition of the wounded is quite serious.

Character of Wound Ballistics: The character of wound ballistics of casualties in the High Altitude area is related to the high percentage of cases with penetration. Thus, the number of patients with penetrating wounds occupy 54.1% of the total number of casualties. While the proportion of penetrating wounds reached 70% of the killed in action (KIA), the entrance of ballistics is small and exits large, the wound will be combined with serious edema and contamination. In bacteriological examination of wound ballistics at an early stage, staphylococcus aureus generally will be found. Low atmospheric pressure and pO_2 make the anaerobic bacteria grow and propagate rapidly. Therefore, the incidence of gas gangrene rate increased to 3.4% (0.44% in Korean War).

Treatment: The natural state of high altitude is perilous. The statistics of our groups are self-explanatory and the self-aid of the wounded is only 9.6% (21.2% in Korean War).

Supplemental Oxygen: The effects to treat hypoxia of the wounded at high altitude is the goal of oxygen therapy, which increases the alveolar concentration of oxygen and decreases myocardial work.

Table 3—The effects of 100% oxygen inhalation at altitude

Altitude (feet)	Altitude (meters)	pO_2 (mmHg)	Post 100% Oxygen inhalation pO_2 (mmHg)
36,000	10,930	39.4	170.9
42,000	12,802	26.8	128.3
46,000	14,021	22.2	105.9

Low Altitude Therapy: For this reason, to utilize high technological communication and helicopters to carry the wounded in the high altitude area is preferable to the original transportation means, is not limited by varied topography, and can conveniently transport the wounded to hospitals at lower altitude. The wounded can be resuscitated in a timely manner and complications from altitude stress and

mountain hypoxemia can be decreased to a great extent.

Key words: altitude; ballistics; gangrene; gunshots; helicopters; hypoxemia; hypoxia; oxygen; penetration; prehospital; saturation; transportation; wounds

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Treatment of Shock Resulting from Abortion Using Misoprostol: A Case Report

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A woman who was five weeks pregnant ingested mifeiston with misoprostol for induction of an abortion. She developed shock 10 minutes after taking three pieces of misoprostol. By way of a series of emergency treatments, the patient improved from her critical condition and an abortion followed. We concluded that the medicine that induced the shock was misoprostol and not the others. In clinical settings where abortions are medicine-induced, it is important to monitor the patient closely after dosing in order to avoid this complication.

Key words: abortion, complications; induction; medicine; mifeiston; misoprostol; shock; treatment

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Development and Analysis of a Peacetime and Wartime Portable Ambulance

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This paper mainly concerns a special portable ambulance used in peacetime or wartime that can be assembled using some new systems. The purpose, necessity, feasibility, and operation instructions are discussed in detail. The stretcher not only can alleviate the suffering of the patients whose bed must be exchanged at the time of medical treatment, but also reduces the labor intensity of medical personnel. Specifically, used as an unsophisticated, operation table or an examination bed in wartime, or, in exceptional cases such as fighting against natural calamities, it may be used in urgent operations and early surgical treatment. In short, it may be useful in many fields.

Key words: ambulance, portable; examination bed; stretcher; surgical bed

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The Management of Mass Casualties of Serious Earthquakes in China

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Since 1950, China has endured 11 serious (Richter magnitude >7) earthquakes. Statistics indicate that more than 280,000 people died, and approximately 1,000,000 m² of

houses were destroyed. Recently, we rendered first aid to those injured in the most serious earthquake in the Tong-Shan area of Northern China, where 242,000 inhabitants were killed and 164,000 were either slightly or seriously wounded. Almost all of the buildings in the city, high and low, were demolished. These buildings certainly included water and electricity supply systems and medical organizations.

At the time, there were 218 emergency medical support groups from all over the country with memberships of 19,772 medical practitioners. They received 145,800 wounded persons. Among them, 63,400 were serious and 29,600 were in critical condition. Both had to receive emergency care. Statistics showed that 92% of wounded were treated with debridement, and others were separated into different categories with different treatments as following: 3.9% were treated with laparotomy; 0.13% with intestinal repair; 0.26% with splenectomy; 1.5% with fracture reduction; 0.2% with amputation; 0.13% with laminectomy; and 1.14% with other operation. From 28 July to August 1996, altogether 15,351 wounded persons were transported to hospitals in other places by air and 72,818 to other places by train.

Key words: deaths; debridement; earthquakes; emergency; injured; Japan; laparotomy; surgery; Tong-Shan

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Effects of Cytokine Gene Therapy on Prolonging Survival Time of Allografted Skin

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Objective: To explore the role of cytokine gene therapy on prolonging the survival time of allografted skin after scalding in a murine model.

Methods: The Interleukin-10 (IL-10) gene was employed as therapeutic objective gene and fibroblast was used as a carrier cell. The gene transcription technique was adopted to establish an experimental murine model in which fibroblast-mediated gene therapy was used to prolong the allografted skin survival time after scalding. IL-10 was transferred into fibroblastocyte (NIH3T3) by reverse transcriptive virus vector. The mice were grafted with alloskin after scalding. In addition, collagen capsulized NIH3T3-IL-10 cells were implanted intraperitoneally into the mice so as to observe its influence on allografted skin survival time and on the changes of their main internal organs.

Results: Cytokine gene therapy prolonged the survival time of allografted skin ($p < 0.01$) without any evident detrimental effect on the internal organs.

Conclusion: These results indicate that skin allograft rejection could be inhibited and the survival time prolonged with the implantation of the fibroblastocyte-transferred IL-10 gene.

Key words: allograft; fibroblastocyte; gene; interleukin-10; scalding; skin; survival time

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