STAGE OF MEDICAL RESCUE AFTER DISASTER BASED ON CLINICAL FEATURES

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Abstract

In this paper, based on the method of disaster medical rescue of World Health Organization, three phases of disaster medical relief were classified in Pakistan and Indonesia earthquake disasters by the disease profile data after earthquake 3 37days. Five diseases were analyzed including injuries/wounds, acute upper respiratory tract infection, acute bloody diarrhea, acute diarrhea and others disease. Others disease means intern diseases except epidemic or suspected epidemic diseases. Results injuries/wounds disease was primary in 6 days disaster. Incidence of 61.46~79.52% and 61.48~72.35% were in Pakistan and Indonesia, respectively. Others diseases were dominant one week later, 33.93 71.11% and 31.50~52.11% in Pakistan and Indonesia, respectively. The incidence of acute upper respiratory tract infection was higher after one week disaster. Acute bloody diarrhea patients were diagnosed (2/1000) in Indonesia, while acute diarrhea patients in Pakistan (35/1000). Three disaster medical rescue stages are defined as follows: Early or emergency SAR stages (in 6 days after disaster): Injuries/wounds disease and saving lives are chief and key tasks. Intermediate or subacute medical stages (in 7~30 days after disaster): The incidence of kinds of disease was higher and more medical resources were needed, so as to treating acute upper respiratory tract infection, lowering caused disable rate, preventing prevalence of epidemic diseases. Later or recovery stages (in 1~3month after disaster): All kinds of disease was slightly more than the common. Renew and reconstruction in disaster areas should be done and epidemic disease should be focus on. The results above are very important for saving lives and treatment, preventing epidemic disease and assigning medical resources, operation of search and rescue, as well as disaster self-relief for local governments.

Introduction

Mobile Hospital (MH) from China International Search and Rescue Team (CISAR) had accomplished international rescue mission for many times (Zheng, 2005). Classification of three stages of the disaster medical rescue mainly bases on the feature of diseases from the South Asia earthquake in Pakistan and Yogyakarta earthquake in Indonesia.

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Materials and Method

Brief Background

South Asia earthquake occurred on Oct 8th, 2005 with magnitude 7.8 and caused 75,000 deaths and over 100,000 injuries. China International Search and Rescue Team (CISAR) arrived at the Balakot, Pakistan one of the serious destroyed area to take two times relief operation. CISAR took SAR (search and rescue) actions and treated 601 patients during 3 to 10 days after the earthquake at the first stage. At the second stage, 1974 patients were treated within 23 days.

Yogyakarta earthquake occurred on May 27th, 2006 with magnitude 6.3 in Bantul, Indonesia. It brought a large number of casualties; the deaths toll is 5,700 and the injuries are 20,000, even though the magnitude of earthquake is so small. CISAR treated totally 2,779 victims during its relief.

Classification and Statistic of the Diseases

According to the classification of disaster medical rescue of WHO, there were 5 kinds of diseases classified in the paper, that is, the injuries and wounds, acute upper respiratory tract infection, acute bloody diarrhea, acute diarrhea and other diseases (Others disease means intern diseases except epidemic or suspected epidemic diseases.). Only first diagnosed cases are analyzed here (Xu, 2005; Cai, 2003).

Statistic Results

Features of Diseases in Balakot

Table 1 indicates the classification and statistic of the diseases from 3 to 37 days after the earthquake in Pakistan. In time distribution of disease profiles, the injury cases take up the biggest part about 61.46%--79.52% within 6 days after the earthquake, but obviously decreased after 7th day and had only 8.33%--42.19% in the 37th day. However, the other 4 diseases increase at the same time. The other disease has, for example, an incidence of 9.30%--28.13% within 6 days and rise to 33.93%--71.11% after the 7th day of the earthquake.

Tab1.The diseases classification in Balakot disaster area, Pakistan

After earthquake (days)	Injuries/ wounds		Acute upper respiratory tract infection		Acute bloody diarrhea		Acute diarrhea		Others disease		Total
	n	(%)	n	(%)		n	n	(%)	n	(%)	
3	33	76.74	5	11.63			1	2.33	4	9.30	43
4	66	70.97	17	18.28					10	10.75	93
5	57	69.51	11	13.41			1	1.22	13	15.85	82
6	59	61.46	10	10.42					27	28.13	96
7	43	40.95	14	13.33			2	1.90	46	43.81	105
8	27	42.19	15	23.44					22	34.38	64
9	20	35.71	17	30.36					19	33.93	56
10	14	22.58	13	20.97					35	56.45	62
23	9	16.67					11	20.37	34	62.96	54

After earthquake (days)	Injuries/ wounds n	(%)	Acute upper respiratory tract infection n	(%)	Acute bloody diarrhea n	(%)	Acute diarrhea n	(%)	Others disease n	(%)	Total
24	14	15.56	12	13.33					64	71.11	90
25	9	8.33	8	7.41			3	2.78	88	81.48	108
26	45	34.88	17	13.18			6	4.65	61	47.29	129
27	44	37.61	18	15.38			3	2.56	52	44.44	117
28	12	18.75	7	10.94			5	7.81	40	62.50	64
29	55	26.70	20	9.71			9	4.37	122	59.22	206
30	46	30.26	12	7.89			7	4.61	87	57.24	152
31	44	25.29	29	16.67			14	8.05	87	50.00	174
32	51	31.88	31	19.38			4	2.50	74	46.25	160
33	43	28.48	26	17.22			5	3.31	77	50.99	151
34	19	16.10	16	13.56			5	4.24	78	66.10	118
35	50	34.48	24	16.55			2	1.38	69	47.59	145
36	52	34.67	26	17.33			4	2.67	68	45.33	150
37	24	15.38	31	19.87			9	5.77	92	58.97	156
											2575

Features of Diseases in Yogyakarta

The similar situation had observed in Yogyakarta, Indonesia. Table 2 shows the statistics of disease after 4 to 18 days of the earthquake in Yogyakarta, Indonesia. In the time distribution of diseases on table 2 shows that injuries and wounds are majorities within 6 days, about 61.48%--72.35%. Injuries and wounds decrease obviously after 7th days, and became stable after 18th, about 33.91%--45.57%. At the same time, the other 4 diseases, especially the internal medicine disease, increased gradually up to 31.50%--52.11% after 7th days.

Tab2. The diseases classification in Yogyakarta disaster area, Indonesia

After earthquake (days)	Injuries/ wounds		Acute upper respiratory tract infection		Acute bloody diarrhea		Acute diarrhea		Others disease		Total
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	
4	21	63.64	5	15.15			1	3.03	6	18.18	33
5	83	61.48	10	7.41					42	31.11	135
6	123	72.35			1	0.59			46	27.06	170
7	80	40.00	56	28.00	1	0.50			63	31.50	200
8	70	42.42	13	7.88					82	49.70	165
9	91	42.72	11	5.16					111	52.11	213
10	82	45.56	7	3.89	1	0.56			90	50.00	180
11	72	45.57	12	7.59					74	46.84	158
12	78	40.21	45	21.20	1	0.52			70	36.08	194
13	93	43.66	45	21.13					75	35.21	213

14	73	41.71	37	21.14			65	37.14	175
15	63	38.18	32	19.39	1	0.61	69	41.82	165
16	100	41.49	45	18.67	1	0.41	95	39.42	241
17	78	33.91	37	16.09			115	50.00	230
18	110	35.83	47	15.31			150	48.86	307
									2779

Discussions and Conclusions

Division of the Stages of Disaster Medical Rescue

The high incidence of injuries/wounds disease was within 6 days after the earthquake. In the cases of Pakistan, the incidence of injuries/wounds became low from the 7th to 18th days. The same phenomena happened from the 7th to 18th day in Yogyakarta earthquake, Indonesia. The incidence of injuries/wounds ranges about 10% to 40% after the 7th day both in Pakistan and in Indonesia. It is higher after the 7th days than the common but lower than within 6 days. There are no deathful injuries/wounds diseases in this period.

We can roughly deduce three stages of the earthquake medical rescue according to the time distribution of injuries/wounds disease: the early stage, the intermediate stage and the later stage. According to the effects of the earthquake medical rescue, three divided stages are the emergency SAR stage, the subacute medical stage and the recovery stage. Based on the data of two international relief operations mentioned above, we could conclude temporal various rules of diseases profiles. The early or the emergency SAR stages are within the first 6 days after the earthquake. Correspondingly, the intermediate or subacute medical stages are within 7~30 days after the earthquake and the later or the recovery stages are within 1~3months after the earthquake. The time boundary in the early or emergency SAR stages is very definite and saving lives and injuries/wounds diseases are primary and key in this stage. However, the time boundary in the intermediate or subacute medical stages and the later or recovery stages could not be drawn the definite line. Due to a 13 days interval was absence after the earthquake from the 7th to 18th days in Pakistan, and a continuous statistics data of diseases profile has not obtained. A long time of disease classification data has not gained because of only a 15 working days in Indonesia. Inferred from the course of injuries/wounds diseases, the time boundary in the intermediate or subacute medical stages and the later or recovery stages may be in a period of 1~3months after the earthquake (Lin, 2005).

Characteristics of Three Stages in Disaster Medical Rescue

The high incidence of the deadly injuries/wounds diseases, resulting directly by the earthquake, is in the early or the emergency SAR stages. Two kinds of injuries/wounds diseases are included in this stage. One is the survivals under the ruins and has badly wounded. In this case, search and rescue teams should arrive at the disaster area in time. 2-3 days may be the shortest time for them to be in position. The other is serious injuries such as cerebra injury, fracture, opening chest- abdomen injury. These emergency patients are so severe that they cannot survive without a timely salvage. Furthermore, they would remain disabling more likely without proper treatments.

The injuries/wounds diseases, which directly attribute to the earthquake, are decreasing obviously in the intermediate or subacute medial stages. These kinds of injuries or wounds remain the results of inappropriate treatment in the early or emergency SAR stages and indirect factors after the earthquake. They are not fatal but in the high risk of a disability without proper treatments. The incidence of internal diseases is increasing obviously during intermediate or subacute medical stages. In this period, the profile of diseases is mostly acute

upper respiratory tract infection patients and urogenital infection patients account for some scale. The acute diarrhea patients (35/1000) increased and its cause relates to the cold climate, serious disaster and worse local sanitary condition in Pakistan in this period. While acute bloody diarrhea patients were diagnosed (2/1000), some infant cases were also found, in Indonesia. Maybe part of the patients fails to come to the mobile hospital or some cases aren't discovered. The local worse sanitary and high temperature may be the main reasons. Surveillance and monitory to the epidemic and preventing the prevalence of the diseases is the most important (Li, 2005). Long-lasting period in this stage is dues to large numbers of patients and complicated diseases. It is concerned with the local government's self-rescue ability, which is the most important rather than the international rescue teams, and whether medical resources are efficient.

In the later or recovery stages, the profile of diseases is the local common disease, which has some similarities with the intermediate or subacute medical stages, still relates to local government's self-rescue ability and to whether medical resources are efficient. It should be still focused on surveillance and monitory to the epidemic and preventing the prevalence of the diseases.

Influence Factors of Disaster medical Rescue

Disaster medical rescue has characteristics of quick-reacting, advantage of this subject and uncertainty of the prediction. Mobile hospital should arrive at the disaster area as soon as possible without out-aid to exert the function. The earlier rescue team arrives, the more lives can be saved since within 6 days after the earthquake is a key period. Many uncertain factors, such as magnitude of the earthquake, range of the disaster area, amount of the injuries and the death, geography location of the country, climate condition, even economic, agriculture and religion factors can influence the forming of prediction. An objective evaluation is the key and basis to the success of medical rescue. Successful experience to the medical rescue in Pakistan and Indonesia indicate the importance of the perfect disaster evaluation and information transport system. Disaster medical rescue depends on advanced equipments and well-trained crew. The setting of professional field and crew are determined by data from evaluate and information system.

Significance of the Stages for the Disaster Medical Rescue

The main purpose should be search and save lives at early or emergency SAR stages, so the team should be mainly consisted of surgeons armed with regarding professional equipments. The team's scale depends on the magnitude of the disaster, number of the injuries and local medical resources.

It should be objectively considered that when is the best time for SAR teams to depart to the disaster area due to there are no disaster evaluation accurately and quickly after earthquake.

The time that our mobile hospital established in Pakistan and Indonesia is the 2ed day and the 3rd day after earthquake, and functioned one day later after arrival. It has a positive effect on decreasing the rate of disability, paralysis and aberration in the early or emergency SAR stages. In the intermediate or subacute medical stages, the setting of the medical sources should mainly contain with multi-professional crew and equipments. A deficiency of medical sources always shows up at this period. How to optimize the deploying of the sources is the key problem (Zhao, 2004). In the Intermediate or subacute medical stages, according to the characteristic of medical rescue, most of the emergency mission has been accomplished in 20 days. In the later or recovery stages, the team should give priority to the local governments or joins in the rebuild work as a foreign aid for a long period.

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