

The Strategy of Medical Rescue for Mass Casualty Incidents

Heng Wang

Jiaozuo Vocational College of Industry and Trade, Jiaozuo 454550, Henan, China.

Abstract: Mass casualty incidents refer to the medical resources required in the rescue of casualties, which obviously exceed existing local medical resources in a relatively short period. In recent years, mass casualty incidents caused by various reasons happen frequently in China, which results in the serious situation of emergency medical rescue. Troops have always been an important force in the rescue of mass casualty accidents. This paper introduces the latest development of the method of triage and its principles of implementation in the on-site rescue of mass casualty incidents in foreign armies. According to *National Emergency Plan for Medical and Health Rescue in Public Emergencies*, the paper puts forward strategies and skills that should be adopted in the on-site rescue of mass casualty accidents, and analyzes the significance of mass casualty drills at the same time.

Keywords: Mass Casualty Incidents; Medical Rescue; On-Site Rescue

Introduction

China has planned to improve its capability of emergency medical rescue on the spot effectively during the 13th Five-Year Plan, including effectively improving the speed of emergency response of local rescue teams at all levels, reaching the spot fast, and handling effectively. Around the world, troops have always been an important force in the rescue of mass casualty accidents, and most countries have formed the medical rescue system of mass casualty incidents based on civil-military association. This paper introduces the experience and practice of North Atlantic Treaty Organization and other countries in the medical rescue of mass casualty accidents, and put forward measures and suggestions to improve China's capability in the rescue of those accidents on the spot, in order to provide reference for on-site first aid.

1. The On-site First Aid of Foreign Mass Casualty Accidents

Given the characteristics of mass casualty accidents, US army and North Atlantic Treaty Organization attach great importance to the management, communication and evacuation of construction site, providing that the site must be assessed continuously and repeatedly. The main content includes understanding the overall situation of the site, and clarifying what resources are needed, what assistance should be provided, recent and current risks, casualties, where to get a number of rescue and return relief, the assistance of other companies in transport, medical and non-medical evacuation resources, and possible landing point destroyed or not polluted by the environment. They pay attention to the site above all else organizationally, and highly value on-site provision of diagnostic and non-rescue resources and designated medical institution.

The most outstanding feature of many on-site rescues of mass casualty accidents is triage, and casualties are rescued based on priority. There are 2 types: one is the patients that cannot be brought back through rescue, and the other is the patients that need more time and complex process to rescue and have narrow chance for survival. However, the exhausted resources can be used to rescue other patients with light injuries. As to the two types, they mainly adopt supportive and palliative therapies until the mass casualty accident is controlled. As to the emergency degree of four types of casualties and

patients, the standard of US army is that the emergency rescue team needs to save life, amputation, or visual impairment in 2 hours, or salvage in 4 hours. The delayed treatment team can cure survivable casualties and patients in 24 hours. The lowest treatment team disposes the wounds of casualties, and cannot affect the casualties that continue to fight ^[4].

2. The Measures and Technologies for the On-site First Aid of Mass

Casualty Accidents

According to the requirements of China's current National Emergency Plan for Medical and Health Rescue in Public Emergencies, the medical rescue team should transfer casualties to a safety zone as soon as possible after arriving the spot, adheres to the standard of "saving people first and then saving and curing casualties with light injuries", and mainly controls external hemorrhage and triage analysis: (1) as to serious patients with active internal haemorrhage, patients with side haemorrhage should be treated firstly in a relative safe spot, putting a tourniquet on the abnormal pelvic girdle. If you suspect a patient with nephridium bleeding, make zone planning and recover. (2) According to the national uniform standard, the condition of injuries can be divided into light, serious, grave, and death, in order to help distinguish for treatment and adopt effective measures later.

Mass casualty caused by on-site rescue measures of mass casualty accidents influences not only casualties but also a number of institutions. If the required response ability exceeds local diagnostic and service security resources, causality caused in a short time can be announced as a mass casualty accident.

Medical rescue solutions of mass casualty incidents changes based on the standard from that meets the demands of every patient to that meets the maximum requirements. In the process of conventional diagnosis and treatment, the chosen team is usually trained to a highly cooperative emergency rescue team ^[1].

After rescuing and treating casualties, technological medical professionals should take the following measures to rescue them: (1) set up diagnostic rescue area such as the spot of triage for casualties and timely arrival area of rescue, designate specific staff to undertake and conduct triage, and provide enough supply of labor and relief. (2) Evaluate the level of pollution to the environment, the change of requirements in diagnostic emergency resources, and medical resources that have got and need to be added and medical evacuation plan. In the situation that the natural environment is unsafe, we should ensure the rescue cannot cause too great damage to other survivors or rescuers. We should care about the balance between the number and condition of survivors and applicable rescue resources. If the condition of a survivor cannot be verified, we should adopt emergency diagnostic treatment; if the condition has been grasped, we should describe the injury of the survivor in detail in order to decide medical demands such as stretcher, oxygen, blood, revival liquid, and so on. (3) The method of triage analysis. When coming across several casualties, making the priority of rescue clear is the premise to perform rescue. (4) On-site rescue. (5) Plan and distribute the reports of situation about sending survivors to temporary or last safe place. On the spot of mass casualty accidents, rescuers often encounter many injuries, while the contradiction between the requirements of rescue and emergency materials is obvious at this moment, so we need to avoid unhelpful and ineffective interventions of rescue, which not only occupy precious rescue resources and cause that other casualties cannot be rescued, but also form risks to rescuers (such as infectious disease, nuclear biochemical environmental pollution, etc.). In normal environment, those interventions that are understood to be less than 1% in survival rate can also cause futile efforts against professional ethics. In this time, we should adopt the measures of "not open CPR and "stop CPR". During this period, medical rescuers need to observe and record features. For example, in the condition of arteria carotis communis or cardiovascular apex without pulse in 60s, we can use monitor, because although it has opened, the bronchus don't conduct respiratory movement in 60s (which can be determined by auscultation); if no response to painful stimuli such as kneading scapula, and no tendon reflection; no pupil reflector (that is, the pupil does not respond to light, and keep fixed and spread), and no corneal reflection; lack of more drugs is direct evidence of non-response. If a casualty is not apparently dead, we can conduct cardiopulmonary resuscitation until he has vital signs or until the doctor confirms his death.

The purpose of technologies for the on-site first aid of mass casualty accidents is to make casualties keep in a stable state and sent to hospital safely. As to any casualty with functional impairment in life, limbs, sight, and organs, and timely conducted triage, recovery, stability, preliminary disposal and treatment after evacuation: (1) Triage. In most cases, it can be divided into 4 types, similar to NATO. The sign for the expectation of medical treatment in China is black, while that of NATO is milk white. With effective first aid in time, casualties with serious injuries assigned to the first aid team can turn to secondary group. If the massive haemorrhage of limbs can be controlled by tourniquets, casualties with injuries later can be turned from the first aid team to the delayed treatment team. (2) We should start to handle the work of survivors as soon as possible, in order to make serious casualties safe. We should pay attention to the management of trachea, the control of bleeding, the alleviation of stress caused by pneumothorax, recovery through intravenous drip, and heat preservation. General principles should be followed are: the first thing is the management of respiratory tract and the maintenance of cervical spondylosis, including thyrocricocentesis and the application of oropharynx breather; secondly, maintain normal respiration, including CPR with hands, intrathoracic puncture to relieve stress or closed drainage, and chest wound dressing; thirdly, maintain the function of circulatory system function, including the control of external hemorrhage, recovery through intravenous drip, and pelvifixation. In addition, it also includes the assessment of neurological condition, pain relief, and the application of antibiotics.

The capability of medical rescue for mass casualty incidents mainly demonstrates on the treatment outside hospital, including extrahospital first aid and medical evacuation; the second is treatment in the hospital, including the capability of hospital outpatient clinics to organize and implement treatment. In mass casualty incidents, rescue in and outside hospital is the basis of its outpatient clinics. The on-site working competence is from the emergency plan and drills, and all participators have to understand the emergency plan, triage, and on-site emergency technology, and participate in drills of mass casualty incidents; This activity includes: (1) evaluate the working capability of the safety management of level 1 diagnosis and treatment and the medical evacuation by air in a war zone; (2) find out mutual enforceable problems influencing different areas (or China); (3) balance low-value and consumable medical supplies, such as blood and gases for diagnosis and treatment; (4) clarify whether emergency medical resources are enough; (5) test the situation of communication^[5].

Conclusion

Expect the above first aid strategies and technologies for mass casualty accidents, disposal plans and repeated drills can reduce casualties and losses caused by those accidents. In addition, according to the spot and type of a specific mass security accident, to complete adjustment and effective solution through level and area divisions can reduce chaos caused by the accident, which can provide orientation and time for its effective disposal.

References

- [1] NATO STANDARD, AMedP-1.10. Medical aspects in the management of a major incident/mass casualty situation. 2015.
- [2] National Health and Family Planning Commission. National Health and Family Planning Commission's Notice on the Print and Issue of "13th Five-Year (2016-2020) Plan" Emergency of Medical Rescue [J]. Communique of National Health and Family Planning Commission of the People's Republic of China, 2016, (8) : 73-78.
- [3] AMedP-1.10. Medical aspects in the management of a major incident/mass casualty situation [S]. 2015.
- [4] Yao Yongming, Liu Liangming, Liang Huaping. General War Wound Medicine [M].: Zhengzhou University Press, 2016.10.
- [5] Xinhua News Agency. National Emergency Plan for Medical and Health Rescue in Public Emergencies [EB/OL]. (2016-02-16) [2020-03-10].