

Necessity and definition of trauma experts in Japan

A considerable number of trauma cases are due to traffic accidents, industrial accidents, violence, and natural disasters. In Japan, approximately 20 million people are treated at hospitals for trauma yearly, approximately 1.2 million people are admitted to hospitals, and more than 20 thousand people die. Moreover, trauma patients account for 28% (1.42 million people) of the sick and injured who transported to hospitals by ambulance.

Multiple regions of the body are injured in many cases of severe trauma, and treatment may be difficult when these cases are handled by one surgical department alone. Although physicians of several departments cooperate to initiate treatment, if the order and composition of the management are inappropriate, a favorable outcome is not possible. Thus, the presence of a team leader knowledgeable in trauma management who can judge the order of priority for examinations and interdisciplinary treatments within a limited time for urgent and severe cases is essential. In addition, although trauma is limited to a single region, systemic care is necessary in severe cases. 'Trauma experts' were established based on this necessity, and they represent physicians certified in this subspecialty who acquired advanced knowledge and skills.

The definition of a trauma expert by the Japanese Association for Surgery of Trauma is 'a physician who is able to systematically perform

proper initial management and acute phase management including intensive care, and evaluates their performance in order to promote of medical progression regarding severe trauma, to improve the level of total care of trauma, and to ultimately contribute to national welfare’.

The ability to perform immediate trauma care is required for emergency physicians, but difficult resuscitation techniques or complete perioperative intensive care is not required. Thus, although the initial treatment overlaps, the ability to treat trauma that is required for emergency physicians is only a part of the requirements for trauma experts. Physicians of each basic surgical specialty are also required to be able to treat traumas within their specialty, but interdisciplinary knowledge and the ability to judge across basic specialties are not required. Therefore, having a ‘trauma expert’, which is an interdisciplinary subspecialty, to ensure quality of trauma management from resuscitation to rehabilitation can greatly improve the national medical welfare.

At present, 225 trauma experts have been certified by the Japanese Association for Surgery of Trauma. To ensure at least one trauma expert for 24 hours for 365 days, more than 5 specialists are necessary per tertiary emergency care facility. Accordingly, to fulfill all 78 facilities currently certified as expert training centers, 390 specialists are necessary. In another trial calculation, one facility capable of immediately performing emergency surgery for each severe trauma patient is necessary per 2.4 million people. If facilities are established in each prefecture (tertiary medical care area)

based on this calculation, 76 facilities are necessary throughout Japan and at least 380 specialists are necessary. In either trial calculation, the current number of trauma experts is markedly insufficient.

Requirements of trauma experts and training facility

To provide proper medical care to severe trauma patients, it is necessary to establish an organizational trauma treatment system. Accordingly, abilities required for trauma treatment include abilities acquired by trauma experts (personal competency) and functions prepared by training facilities (organizational competency).

1. Competencies required for trauma experts

Trauma experts must acquire and practice the following 4 competencies:

1) Competency for decision making, 2) performance of advanced techniques necessary for resuscitation, 3) Competency for team coordination, and 4) Competency for total management. In addition, acquisition of the latest knowledge and techniques, and maintenance of the 4 competencies are necessary.

1) Competency for decision making

To ensure that lives are saved, understanding of treatment methodologies necessary for resuscitation (treatment strategies) and practice of these are essential. For example, treatment strategies include judgment on operative and non-operative management, selection of definitive or damage control surgery, and decision on the order of propriety of treatments. In addition, not only the rapid execution of proper treatment (surgery and IVR), but also appropriate treatment strategies are essential to

save the lives of trauma patients. To achieve the optimum functional outcome, a strategy to return to society, including rehabilitation from the acute phase, is also important. Knowledge of treatment strategies from lifesaving to returning to society, and acquisition of practical ability for the decision making are required for trauma experts in Japan.

2) Performance of advanced techniques necessary for resuscitation

Regarding advanced techniques necessary for resuscitation, the ability to perform cricothyroidotomy on patients with difficulty in tracheal intubation who need emergency airway management is required. Regarding techniques for abnormal circulation, the ability to rapidly perform pericardiocentesis and pericardiostomy to apply cardiac tamponade, and the ability to perform resuscitation aortic blockage by catheterization with REBOA and thoracotomy are necessary. Furthermore, hemostasis must be rapidly carried out as a part of resuscitation. The hemostasis method selected depends on the status of patients, but a damage control strategy is selected for many unstable cases to prevent the lethal triad of trauma (hypothermia, acidosis, and coagulopathy), and the ability to perform damage control resuscitation including implementation of massive transfusion protocol and abbreviated surgery is required. For life-threatening traumatic brain injury, appropriate management of the intracranial pressure and body temperature is needed. In addition, prevention of hypothermia is important throughout the process.

3) Competency for team coordination

Trauma treatment requires a team approach, and effective teamwork improves the outcome of severe trauma patients. Care provided by a multidisciplinary team is necessary for severe, multiple traumas. The team members have to share the objective and information on the premise of the high specialty of each member, divide the work while cooperating and complementing each other, and provide treatment corresponding to the condition of the patient. For trauma treatment, many decisions must be made under uncertain conditions that cannot be anticipated in advance, in addition to temporary and spatial limitations. For teamwork building under such conditions, 'clarification of the treatment goal and strategy', 'team leadership', and 'clear and effective communication' are important. Trauma experts need to have team coordination abilities to improve teamwork by establishing a chain of command and assigning the members to appropriate positions as a team leader.

4) Competency for total management

To ensure that trauma patients are saved and able to return to society, the chain of trauma care from prehospital care to initial management, definitive treatment, intensive care, and rehabilitation must be seamlessly provided. This chain of trauma care is not achieved by individuals but through hospital performance. The ability of total management via cooperation is also an

important requirement of trauma experts.

2. Functions required for training facility

Training facilities are required to have a sufficient number of severe trauma patients and instructors, and an appropriate trauma management system. An appropriate trauma management requires comprehensive systems comprising a seamless treatment-providing system by multidisciplinary cooperation among different occupations and departments is important. Moreover, continuous monitoring of the treatment outcomes by trauma registry, namely the Japan Trauma Databank, evaluation of treatments in fatal cases and patients who developed severe complications by holding mortality and morbidity conferences, and preparation of a system reflecting these results in trauma care are essential elements. Furthermore, educational activities and research support systems are also important. In addition, it is necessary that resuscitation rooms are functionally laid out and equipped. CT, operating, and angiography theater are always available for emergency use.