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CASE REPORT

Pre-coordinated Deployment of Emergency Medical Team (Emt) Orthopaedic Spine Specialist-Cell: Experience in An Acute-Phase of the 2018 Lombok Earthquake by Yogyakarta Team

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Abstract

Indonesia is located at the meeting point of three major continental plate-the Pacific, the Eurasian, and the Indo-Australian plates-and also on the "Ring of fire", which makes Indonesia vulnerable to earthquakes and volcanic eruption. As population density continues to increase, challenges grow for emergency responders in the aftermath of such disaster [1].Sudden Onset Disaster (SOD) occur with little or no warning and often cause excessive injuries far surpassing the national response capacities. Following SODs a large number of Medical Teams or Emergency Medical Teams often arrive in-country to provide emergency care to patients with traumatic injuries and other life-threatening injuries. Emergency Medical Teams are groups of health professionals (doctors, nurses, paramedics etc.) that treat patients affected by an emergency or disaster. Emergency Medical Teams, according to their capability, classified into 5 types; such as EMT-1 Mobile, EMT-1 fixed EMT-2, EMT-3, and EMT Specialized cell. Providing trauma care or medical care in disaster setting is very challenging. After an earthquake, local medical infrastructure was often damaged or destroyed, thus healthcare responders may not be able to rely on the medical resources of the afflicted region. Therefore, healthcare responders must provide the necessary medical equipment and supplies which requires good planning, efficient resource allocation, and understanding of the injuries that are likely to be encountered. Earthquake-related trauma results in severe injuries and requires rapid response in the acute-phase. Spinal injuries are important issue because the delay in adequate management can cause the patient to fall into a worse state, which can result in death or permanent disability. Orthopaedic spine surgeon on a disaster team could be an important asset during the response. The aim of this report was to evaluate whether the challenges faced in an acute-phase of earthquake can be obstacles to perform adequate orthopaedic spine management.

Introduction

Following the 2018 earthquake in Lombok Island, the Indonesian Orthopaedic Association (IOA) assigned an emergency medical team (EMT) orthopaedic spine specialist-cell from Sardjito General Hospital/Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada to the island. The team from Yogyakarta consists of 2 orthopaedic spine surgeons, 2 general orthopaedic surgeons, 2 anaesthesiologists, 4 general practitioners, 4 nurses, and equipped with logistics to perform surgical treatments. After coordination about local resources, the results of standard operating instruments and operating rooms are adequate with the lack of implants and spine instruments. The EMT orthopaedic spine specialist-cell from Yogyakarta brought their own equipment and implants. The EMT handled 114 musculoskeletal cases with 11 cases of spine injury which required surgical management (Figure 1).

Figure 1: A. Coordination with local team; B. Team's Equipment and Implants; C. Pre-operative patients at Field Hospital

Outcome

During 8 days of deployment, there were 11 spine cases consisting of 6 burst fracture cases; 4 at the thoracal level and the rest at the thoracolumbar and lumbar levels. Three

cases of spondylolisthesis; 1 on cervical and 2 on thoracolumbar level. Two cases of fracture dislocation at the thoracolumbar level (Table 1).

Table 1: Type of Injuries

	n	%
Burst Fracture		
- Thoracal	4	36,6
- Thoracolumbar	1	9
- Lumbar	1	9
Spondylolisthesis		
- Cervical	1	9
- Thoracolumbar	2	18
Fracture dislocation	2	18

The standard EMT requirement based on World Health Organization guideline develop conflicting condition of the needs for full logistics of hospital facilities to perform optimum orthopaedic spine surgery by our team. The damage of local medical infrastructures resulting concrete challenges, in particular, the management of earthquake victims requiring urgent orthopaedic spine surgical care. Despite the above conditions, spine surgeries can be successfully performed by combination of local facilities and our team pre coordination logistics, with good communication to local government to minimize the needs of abundant logistics (Figure 2).

Figure 2: A. Field Operating Theatre; B. Surgery Procedure at Field Operating Theatre; C. Spine Surgery at District Hospital

Discussion

Planning for large numbers of casualties falls outside of the standard trauma system's organized response to injury whereby a locally coordinated approach allows for swift identification and transport of injured people to a trauma center for optimal care [2].In the immediate aftermath of a massive earthquake, it is often unrealistic to pursue definitive internal fixation and damage-control orthopaedics (DCO) may be the approach of choice until definitive fixation is possible. The focus should be on haemorrhage management, wound debridement, infection control, and soft tissue stabilization. External fixation is key to proper management of fractures and soft tissue stabilization, yielding favorable results in earthquake disaster scenarios.

The ratio of external fixation to ORIF depends largely on when the response team arrives at the earthquake location [3]. Compared with internal fixation, external fixation reduces the risk of operative infection, minimizes operative time, and is technically easier to perform when intraoperative imaging is unavailable [4]. Although we found that only 12% of fractures were stabilized by external fixation, the use of external fixation varied by study from less than 2% to more than 30%.

Response teams arriving early to earthquake sites should bring a high proportion of external fixators and be prepared to reduce as many as 25% of fractures by external fixation; several retrospective reviews have proven the technique's value after disaster [5]. By the very nature of the work done daily by practicing orthopaedic surgeons, the use of their skills in triage, injury treatment, and team organization places them in a natural position of leadership with other surgeons for disaster planning and management at the local and regional levels. Education and experience are essential if the surgical community is to achieve an appropriate level of preparedness for a mass casualty event, whether it may result from a natural disaster or a terrorist event [6].

Conclusion

The challenges in achieving the standard requirement for EMT deployment did not become a barrier to carry out optimum orthopaedic spine surgical cares during an acute-phase as long as there was good communication and coordination with the local government.

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