

The Role Tabletop Exercise Using START in Improving Triage Ability in Disaster Medical Assistance Team

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Abstract

Triage ability is a critical skill the members of a disaster medical assistance team (DMAT) should possess. There are few data concerning the triage accuracy in the pre-hospital providers and the members of DMAT. We thus conducted a lecture-based intervention and evaluated the impact of the triage method using a written multiple-casualty incident (MCI) scenario. We enrolled and tested 30 volunteers in a local DMAT training program. The written scenario of a MCI consisted of 40 victims with 5 first priority patients, 17 second priority patients, and 18 third priority patients. The scenario was tested in the volunteers before and immediately after a one-hour lecture of Simple Triage and Rapid Treatment (START) with slide presentation. The mean immediate post-intervention score (87.8% correct) was significantly improved compared with the mean pre-intervention score (55.8% correct) for the 30 volunteers ($P < 0.001$). The over-triage rate was significantly reduced before (28.6%) and immediate after (1%) the intervention ($P < 0.001$). The under-triage rate was also reduced from 15.5% to 11.2% ($P < 0.05$). Tabletop exercises have several advantages over field operation drills. Using tabletop exercise can simulate the disaster or major incidents and evaluate critical knowledge and skills. The training model using START method in a tabletop exercise could significantly improve the triage ability and reduce overtriage and undertriage rate. (*Ann Disaster Med.* 2003;1:78-84)

Key words: Tabletop Exercise; START; Triage; Disaster Medicine

Introduction

When facing multiple victims in a disastrous event, the key to successfully manage many victims with limited responders and resources is

triage. There are several triage systems such as daily triage, incident triage, disaster triage, tactical-military triage, and special condition triage.¹ Each triage system has its special

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consideration and suitable condition. There are several principles for a successful disaster triage: 1) never move a casualty backward, 2) never hold a critical patient for further care, 3) salvage life over limb, 4) triage officers do not stop to treat patients, 5) never move patients before triaged except in cases of risks due to bad weather, impending darkness or darkness has fallen, a continued risk of injury, a triage facility that is immediately available, or the tactical situation that dictates movement.²

When facing multiple victims in a major multiple-casualty incident (MCI) or a large-scaled disaster, the first responders such as emergency medical technicians (EMTs) or members of disaster medical assistance team (DMAT) should be familiar with a good triage system to fulfill such tasks. The so-called titled Simple Triage and Rapid Treatment (START) method has gained popularity in recent years. The system takes into account the critical physiologic parameter such as the respiratory status, the perfusion, and the mental status of the patients and prioritizes patients into first priority (RED), second priority (YELLOW), third priority (GREEN), and expectant (BLACK).³

The training and education for members of disaster medical assistance team should include the topic of triage because these persons are the possible first responders in a disaster medical

response. Tabletop exercises or simulation drills have several advantages over field operation drills in disaster and MCI such as better performance, better chance to evaluate the response without the use of telephones.⁴ Also, limitations of field operation drills such as communications, coordination, assignment of responsibilities, and post-event mitigation priorities were noted, and tabletop drills provided additional benefits for these settings.⁵ We sought to evaluate the effect of START by a tabletop exercise on a local DMAT training program.

Materials and Methods

The participants in this study were the voluntary candidates in a training program of local disaster medical assistance team. The training program was a 12-hours curriculum composed of disaster concepts and several essential disaster medicine associated issues, included triage. The triage system adopted was so-called START method because of its popularity and familiarity in our Emergency Medical Services system.

We designed a simulated tabletop drill composed of 40 victims in a workplace accident. The 40 victims consisted of 5 first priority patients, 17 second priority patients, and 18 third priority patients. The priority was determined by START system. The pre-designed scenario was conducted

to the participants before the triage course, and then the START system was conducted in a one-hour lecture. Immediately after the course, the participants practiced the same scenario. The correct triage rate, incorrect triage rate, over-triage rate, and under-triage rate were calculated. These results were analyzed using the two-tailed Student's *t*-test. Statistical significance was set a priori at $P<0.05$.

Results

The participants in this training program were 30 volunteers consisted of doctors (n=4), nurses (n=18), EMTs (n=4), and administrative officers (n=4) from several local hospitals, fire department, and bureau of health. Six were male. All participants replied this program was the first time for them to know START system. Before the triage intervention, the participants could correctly prioritize 55.8% of victims. The over-triage rate and under-triage rate were 28.6% and 15.5% before the triage course. After the one-hour triage

intervention, correct triage rate, over-triage rate, and under-triage rate were 87.8%, 1%, 11.2%, respectively. The tabletop drill provide a significant improvement in correct triage rate (55.8% *v* 87.8%, $P<0.001$), and reduction in over-triage rate (28.6% *v* 1%, $P<0.001$) and under-triage (15.5% *v* 11.2%, $P<0.05$). (Table 1)

Discussion

The Chi-Chi earthquake in Taiwan in 1999 struck the country and resulted in 2,347 fatalities and 8,722 casualties. The property damage was estimated at more than US\$92 billion. The Liang et al. reported that the peak of medical demand was 12 hours after the earthquake and significantly increased demand for care lasted as long as 3 days.⁶ Different levels of disaster medical assistance teams were built up in Taiwan since 1999. The triage was the essential concept taught in the DMAT training program.

Good triage system should achieve the goal: the greatest good for

Table 1. The impact of START on correct triage, over-triage, and under-triage rate in a tabletop drill.

	Before-START (mean±SD)	After-START (mean±SD)	<i>P</i> value
Correct triage rate	0.558±0.129	0.878±0.081	$P<0.001$
Incorrect triage rate	0.442±0.129	0.122±0.081	$P<0.001$
Over-triage rate	0.286±0.418	0.01±0.025	$P<0.001$
Under-triage rate	0.155±0.079	0.112±0.072	$P<0.05$

*Participants were 6 male and 24 female.

*The START was conducted in a one-hour lecture.

the greatest number. Literatures and experts all suggest the senior experienced staff should be the most appropriate person for the triage task, especially when facing multiple victims. Garner et al. compared several triage algorithms in multiple-casualty incident by a retrospective review of adults patients transported by ambulance and admitted to trauma center. They found that the differences between CareFlight Triage, Simple Triage and Rapid Treatment, and modified Simple Triage and Rapid Treatment were not dramatic. The sensitivity and specificity in predicting critical injury were 82%-85% and 86%-96%, respectively. Both forms of Triage Sieve were significantly poorer predictor of severe injury.⁷ The START method has gained popularity in recent years and the pre-hospital emergency medical education in Taiwan adopted this system to educate the EMT and emergency personnel. The START method results in a substantial over-triage rate. However, the excess over-triage is offset by the ease of application over a wide range of health care providers.¹

Tabletop exercises are a cost-effective and efficient method of testing plans and procedures, which engaging players imaginatively and generate high levels of realism. The Chi et al. reported tabletop exercise could provide better performance in the ability of others to fill in during the

absence of key officials and adequate provisions to link the results of disaster exercises to appropriate changes in terms of training, equipment, supplies, and plans.⁵ The Kilner tested the triage decision-making of pre-hospital emergency health care providers using a multiple casualty scenario paper exercise. He found that there is little difference in the accuracy of triage decision-making between professional groups according to the Triage Sieve method.⁸

We modified the paper exercise presented by Kilner⁸ into a multiple casualty scenario took place in a workplace accident. We designed different severity of injured victims, and provided their physiological parameters such as respiratory status, the perfusion, and the mental status. The accuracy of triage was determined according to the START method. We found that one-hour START method intervention resulted in a significantly improved correct triage score before and immediately after the test. The overtriage and undertriage rate were significantly reduced. Risavi et al. reported similar result using 2-hour START intervention in a MCI paper test. The mean immediate post-test score was significantly improved compared with the mean pre-test score (75% v 55%, $P < 0.001$).⁹

Acceptable undertriage rate have been defined as 5% or less¹⁰, and overtriage rate of up to 50% have been

defined as acceptable.¹¹ Our results showed the pre-intervention and post-intervention scores of overtriage and undertriage were 28.6% to 1% and 15.5% to 11.2%, respectively. The overtriage rate has significantly reduced, but the undertriage rate remains unacceptable despite significantly improved. The undertriage condition may contribute to the scenario design that consisted of 5 critical patients (priority 1, RED), 17 immediate patients (priority 2, YELLOW), and 18 delayed patients (priority 3, GREEN). Since the participants were health care provider (doctors, nurses, EMTs) and administrative officers, they do not perform the triage task in their daily work. The improved triage ability should be regarded as “acceptable”.

Our study has several limitations. The number of participants was small; therefore the training model should be tested in a rigorous study with larger sample size to get more information about its applicability. Also, the experience of tabletop exercise was limited in Taiwan.⁵ Hirshberg et al.¹² and Chi et al.⁵ suggested tabletop exercises are supplementing the traditional mock disaster drill as effective planning and training tool. The training model using tabletop exercise should be established to propagate the essential knowledge and skills involved in disaster medicine training program, such as triage. We

didn't have a control group of field exercise to compare the tabletop exercise. Future application in field operation drill is necessary to evaluate the efficacy of tabletop exercise.

Conclusion

Tabletop exercises have several advantages over field operation drills. Using tabletop exercise can simulate the disaster or major incidents and evaluate critical knowledge and skills. The training model using START method in a tabletop exercise could significantly improve the triage ability and reduce over-triage and under-triage rate.

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藉由桌上練習以 START 增進檢傷能力

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摘要

檢傷能力是一位災難醫療救援隊成員所應具備的重要技能。目前有關到院前照護人員及災難醫療救援隊成員檢傷能力的資料並不多。我們以講演的方式介紹並藉由桌上模擬的方式評估 START 對於檢傷能力的影響。我們以參與地區級災難醫療救援隊的 30 位志願者為對象。桌上模擬演練的角本為一個造成 5 個檢傷一級、17 個檢傷二級、以及 18 個檢傷三級共 40 位病患的大量傷患事故。所有的參加者在接受一個小時的 START 課堂介紹前以及課堂後分別接受這個大量傷患事件角本的測試。這 30 位志願者由 26 位醫護人員(含 4 名緊急急救技術員)和 4 名行政人員所組成。六位為男性。課堂後之平均分數(87.8%正確檢傷)較課堂前之平均分數(55.8%正確檢傷)有顯著之進步($P<0.001$)。此外,過度檢傷率也由課堂前的 28.6%減少到課堂後的 1% ($P<0.001$)。低估檢傷率也由 15.5%減少到 11.2% ($P<0.05$)。結論: 桌上練習相較於實地演習有許多的優點。利用桌上練習的方式可模擬災難或大型意外事故發生時的情境並且可檢視重要的知識及技能。以桌上練習的方式來測試 START 對檢傷能力的影響,我們發現可以顯著地提升檢傷能力並且降低過度檢傷及低估檢傷的機率。(Ann Disaster Med. 2003;1:78-84)

關鍵詞：桌上練習；START；檢傷；災難醫學

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