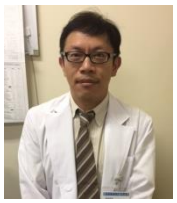
Chapter

Simulation and RRS



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Introduction

Rapid Response System is a tool implemented in hospitals designed to identify and respond to patients with early signs of clinical deterioration in non-intensive care units. RRS can encourage and empower the ward staff to recognize potential dangerous status and request for help for their patients. It is a logical solution to provide patients safety and to prevent medical deterioration from progressing and degenerating into irreversible cardiopulmonary arrest in hospital. Additionally, RRS could also reduce hospital mortality and unanticipated ICU admission, then keep ICU open for other patients and improve turnover of patients flow. Therefore, early recognition and timely treatment for patients with high risks of deterioration can significantly improve patient outcomes.

However, the activation relies on medical, nursing, and other staff working in general wards. With large and increasing proportions of hospitalized patients more elderly and co-morbidities, it is more important to reinforce the abilities including regular monitoring and interpretation of vital sign, timely administration of treatments, requesting for additional professional help, and activation of RRS. Besides, team function is also important in general wards. Different from medical and nursing assessment and treatment, team training focuses on organizational skills. General principles for team training include using life-like situations, emphasizing objectives on team function, and debriefing with focus on organization. Therefore, scenarios are needed to be designed with clear objectives for team management and non-technical skills.

Learning Objectives

These objectives can be based one of the three components of affective limbs that we mentioned above or combined more than one component. It can be slightly different in every institution based on different

activation criteria, materials, and resources deficiency.

I. Activation of RRS

Before setting up the learning objectives, the first thing is to realize when and how RRS is activated. The activation can be divided into three components: (1) the selection/diagnostic/triggering criteria; (2) human and/or technologic monitoring; and (3) a mechanism for triggering response. Each component's response will determine the fluency of RRS startup, the cascade of response, and then influencing the patient safety. Specifically, the activation is named as afferent limb. Respectively, the efferent limb is believed to be responders, such as Medical Emergency Teams (METs) or Rapid Response Teams (RRTs) according to different hospitals' organization or system. Each component of the afferent limb and the efferent limb could be a challenge to each hospital's system based on different hospital culture, materials, and personal resources.

On the aspect of the afferent limb, RRS is responsible for monitoring the patient, detecting any change or deterioration and then triggering a response, such as the efferent limb of an RRS. Failure or delay of activation may induce irreversible clinical outcome, such as cardiopulmonary arrest, unanticipated intensive care unit (ICU) admission and morbidity. Usually the afferent limb can be happened in general wards or chronic care unit in hospital, rehabilitation department or any health care institutions. The learning objectives for those who are from such units could focus on the criteria, patients' monitoring, first-line treatment (The first 5 minutes), and triggering.

The first 5 minutes (Table) is a protocol meaning "the first 5 minutes to be done before medical emergent team (MET) arrives at the site". It is briefly shown what to do in 5 minutes from grasping the abnormal situation of the patient and actually starting up the RRS until the team arrives. This is also written in acronym ABCDE to make it easier to remember. The above actions in the first 5 minutes are needed to be trained frequently by simulation and instructors also provide feedback and debrief according to the first 5 minutes concept or guideline of institutions.

Table: The guideline of the first 5 minutes in RRS

Airway	Airway maintenance
Assistance	Contact ward nurses
Activate code team	Call and trigger the code team
Annunciate	Inform where, who, what is the code activation
acquire data	Information of the case
Attend patient	First-line treatment before RRS arrive
Access	IV line preparedness
Assist	Follow the team leadership

Breathing	Provide oxygen devices
Bed	Prepare the resuscitation environment
Backboard	Backboard for CPR
Blood glucose	Check blood sugar for conscious disturbance patients

Circulation	Check pulse
CPR	Start CPR for pulseless patient
Crash cart	Prepare resuscitation cart
Connect	Prepare IV fluid and medication
Clear the room	Prepare ward environment
Communicate	Inform code team of current condition

Defibrillate	Defibrillation for Vf and pulseless VT
Document	Record resuscitation process

Explain (S-BAR)	
Situation	The cause of reason of RRS activation
Background	Past history
Assessment	The assessment of current condition
Recommendation	The request of current treatment

On the aspect of the efferent limb, the learning objectives are to bring the response team to the bedsides or to the scene efficiently. In

many hospitals, the response team has existing specific activation criteria clearly for specific situation, such as sepsis team, stroke team, and so on. However, there are still some crisis events that did not fit perfectly into certain activation criteria for each team. For the teams that deal with specific situation or teams that handle all situation, the learning objectives is to response to activation promptly, establish leadership, clear communication and collect all resources as soon as possible. Regular review of the frequency of activating indication can allow efferent limb to optimize the care response for.

II. Teamwork using non-technical skills

The situation of RRS usually involves the both afferent and efferent limbs and relies on medical, nursing, and other staff working in general wards. An inter-professional and collaborative strategy is necessary to observed and debriefed during scenario. Through involving members of different healthcare professions in the design process, potential issues around the inter-professional objectives can be easily be performed and predicted only using scenario training. Besides, to simulate relation with different professions provide both realism of the scenario and the some sort of communication between team members maximizing non-technical skills.

Design Scenarios

Simulation with high fidelity simulator is a good tool for staff to frequently practice the assessment of potential critical patients, the decision of activation of RRS, and function as an effective teamwork. The first step in development of the scenario is to create the defined objectives of every scenario clearly. A scenario may have 2-4 primary objectives that are essential to teach. With too much objectives, the scenarios become over-inclusive and make the educational plan unachievable. Based on objectives, several components are needed to be built for completing scenarios.

I. Framework

Framework of simulation is the most important structure needed to be defined clearly before education. The three themes identified as preparedness, activation, and reflection.

The theme “preparedness” refers to the activities that are undertaken to ensure that the simulation session has the potential to run effectively and thoroughly. Among RRS, medical, nursing, and other staff collaborative work as a team and the objectives are needed to be clearly defined for maximizing learning experiences. The setting objectives are better to be broader, not too narrow. Based on the objectives, learners can be confident to and willingness to participate in the next theme “activation”. The theme “activation” is the scenario, the essential part in the education program. The learners are expected to be themselves to deal with the situation represented in the scenario. Among the RRS scenario, learners are trained to be able to activate RRS earlier. So, the scenario is better not too complicated for beginners. In the theme “reflection”, instructors can debrief according to the learners’ activities in scenario based on the objectives.

II. Equipment and Environment

After deciding the scenario framework, the physical fidelity (real situation setting), which includes manikin, environment, and clinical equipment, is based on the degree of fidelity in the scenario. The choice of the manikin depends on the learning objectives. High fidelity manikin may represent the complicated situation of patients’ condition in RRS activation. High fidelity manikin could also provide too much information of patient medical condition to distract participants from learning objectives.

For the environment, a simulation center is convenient and efficient but may not be as realistic as performing a scenario in the participants’ natural working space that we named in situ simulation.

The equipment used in the scenario is better to be same or similar as what participants used in their regular clinical practice. Different equipment will make participants confused and take time to adapt in the simulation process, and may also cause frustration and learning difficulties. For example, real-life defibrillation and intravenous pumps are usually used in general wards which are high valued as realism by

participants. Ensuring a complete list of all equipment and supplies needs for the scenario is essential.

III. Moulage

The scenario of RRS activation is mostly in the general wards. The standard dressing of patients and intravenous line setting can provide the realism. The use of photographs and video can also be effective as more complicated scenarios.

IV. Confederate

Confederates are important in scenario for RRS. In real situation, the activation of RRS involves members of different healthcare professions. Confederate are useful in divulging important information as well as physical characteristics that are difficult to simulate. Therefore, with confederate, simulation can enhance the scenario's realism and learning objectives. It also can be confusing and fluctuating participants if the confederate distract from the scenarios. It is better to provide confederate specific scripts.

V. Adjuncts

Laboratory results, diagnostic imaging, ECGs, patient charges, and nursing flow sheets can be powerful adjuncts for helping participants to involve in the scenario. The more complex scenario needs more detailed adjuncts for realism of the scenario. We may collect such adjuncts from real patients. Be sure to remove any patient identification from the adjunct we collect. When using real-life scenarios, privacy must be ensured. The name given to the manikin in the scenario should not reflect the actual patient's name.

Debriefing

Debriefing after scenario should focus on the criteria, patients' monitoring, the concept of "First 5 minutes", and triggering. In addition, we need to consider the background of different students in the

curriculum design. According to different units characteristics, possible complications or potential deterioration should require more attention and repetitive training. For example, in such unit with elderly patients with difficult swallowing function, and respiratory complication (i.e.; such accidental food aspiration or increased sputum impaction) could happen anytime. These situations require close monitoring, first-line treatment and activation of RRS if necessary. Besides, regular review of the frequency of activating criteria can also provide us learning objectives in different units, respectively. Even though, the following principles of debriefing will necessarily be covered: the team's goals, role assignment, leadership, and communication. We should focus on not only the timely decision of RRS activation, the initiation of first treatment, but also the team function.

Summary

The education of ward staff and those involving in RRS is necessary. With all kinds of education methods, the capabilities of RRS can be strengthened, including technical skills and non-technical skills. Simulation education with scenarios designed with clear objectives is an important method for team management and non-technical skills. Based on the clear objectives, trainers can focus on non-technical skill performance in scenarios and debriefing setting.