POINT OF VIEW

Clinical simulations and safety in emergencies: Emergency Crisis Resource Management (E-CRM)

Simulación clínica y seguridad en urgencias y emergencias: Emergency Crisis Resource Management (E-CRM)

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The origins: *Crew Resource Management*

On 27 March 1977, two Boeing 747 aircrafts collided at Los Rodeos airport (Tenerife). 582 people died. This accident and others that occurred in the 70s promoted an in-depth causal analysis. In this analysis it was highlighted that in 80% of accidents the human factor was decisive.

In response to this discovery, NASA (National Aeronautics and Space Administration) developed CRM (Crew/Cockpit Resource Management) training, a management model to make optimal use of all available human, material and procedural resources to promote safety and increase the efficiency of flight operations. In Spain, it began to be used following the JAR-OPS (Joint Aviation Requirement for the operation of commercial air transport) regulations of 2000 and modified in JAR-OPS 3[1].

Crisis Resource Management (CRM)

The sociologist C. Perrow talks in his book ''Normal Accidents'' (1984) that many accidents arise from banal conditions in routine operations. Gaba et al. adapted their perspective to anaesthesiology and developed, similarly to what happened in aviation, the Anesthesia Crisis Resource Management (ACRM) model[2], which was later extended to other areas of medicine and known generically as Crisis Resource Management (CRM)[3,4].

CRM, therefore, is a team development strategy that seeks knowledge and efficient management of the human factor and promotes the development of behavioral (non-technical) skills associated with techniques[5]. CRM training is related to simulation[6] since, according to Gaba, clinical simulation training provides a way of improving safety through scenarios that evaluate teamwork and performance, with feedback sessions[7,8].

Emergency Crisis Resource Management SEMES (E-CRM SEMES)

In the field of emergency medicine, there is a need to develop effective work teams, which deepen the efficient management of the human factor, to promote safety and resilience.

From the example of aviation and anesthesiology, a training model adapted to the special characteristics of our work context is necessary[9]. The concept "crisis" has to do with the relevance and significance of the change taking place. By conceptual definition, and unlike other types of crisis, in emergencies ("dangerous situations requiring immediate action", according to the Royal Spanish Academy of Language) the time factor is the fundamental conditioning factor. On the other hand, our field of work covers both outpatient and inpatient care, which are necessarily connected and coordinated. Finally, in our context, specific and diverse profiles of experience and professional specialization coexist.

In January 2017, the members of the SEMES Clinical Simulation Working Group and a group of national and international experts in clinical simulation and CRM in anaesthesia, emergency, intensive care and paediatrics developed the E-CRM SEMES training model through a consensus based on DELPHI methodology, which included 1) the grouping of CRM principles into 5 axes, to improve understanding and practicality; 2) recommendations for contextualization to the ED setting; and 3) a replicable multidisciplinary training strategy to promote its dissemination.

E-CRM principles and key points of E-CRM SEMES

From its origins in anesthesiology to the present day, several versions of the principles of CRM[10-13] have

Table 1. E-CRM *(Emergency Crisis Resource Management) Axes and Principles*

Axes	CRM Principles
Role Clarity	Identifying a leader Explicitly assigning roles Distribution of work Cross-checking
Communication	Communicate through the leader effectively
Assistance and management	Recognize the seriousness and ask for help early
Use of resources	Knowing the environment Mobilize all available resources Use cognitive aids
Global assessment	Use all available information Anticipating and planning Prevent and correct fixing errors Continuously Revaluate Assign attention wisely Setting priorities dynamically

been developed. The E-CRM model of SEMES considers 15 principles grouped into 5 major areas: role clarity, communication, assistance and management, knowledge and use of resources, and global assessment (Table 1). The order of the axes does not correspond to a standardized time sequence of application. They should be seen as a compendium of strategies and attitudes to improve efficiency and safety, to be applied in a certain order according to the characteristics of each situation.

Axis 1: Role Clarity

– Identify a leader: the leader's task is to coordinate and manage events, promoting a common mental model in the group. It is ideal, if there are enough staff, that the leader coordinates the scene from the "drone vision" (panoramic) without getting involved in manual tasks.
– The leader should assign roles according to the capacities and abilities of the team and communicate them to all members.

Axis 2: Communication

– The leader must channel communication to avoid parallel subgroups of information.
– To avoid giving orders on the air, it is important to address team members by name or, failing that, by function.
– Good tone communication and non-verbal language without aggression should be encouraged.
– It is recommended to use effective communication tools and codes previously established by the whole team: use of double check (cross-checks); closed loop communication (close loop) in which the verbal order made by the transmitter must be reproduced by the receiver and then the transmitter confirms that the message has been well understood.
– For transfers, the SBAR[14] (Situation, context, assessment and recommendation) or the IDEAS[15]

(Identification, detection and diagnosis, patient status, action and alarm signs and symptoms) can be used.

Axis 3: Assistance and management

In a critical situation it is essential to seek support as soon as possible when receiving help may even change the entire course of the crisis. Asking for help is a sign of responsibility and leadership ability, not weakness or incompetence.

Axis 4: Use of resources

– It is necessary to know the material you are working with, the environment and the protocols of each department.
– The use of cognitive aids is recommended: checklist, applications (apps), calculators and protocols.

Axis 5: Global assessment

– To understand the situation and make decisions, all available information should be used by collecting, if necessary, information from witnesses. Not only about the clinical state, but about everything around the patient.
– Anticipate and plan: ask what we expect to happen, what could happen and how we are going to act in the face of changes.
– Prevent and correct fixation errors, in which we become anchored to an idea, losing critical vision ("tunnel vision").
– Continually reassessing: the assessment of the situation, priorities and the plan of action must be reviewed periodically.
– Assign attention wisely, distributing our attention in appropriate proportion to the degree of relevance and urgency of each problem.
– Establish priorities dynamically, being able to adapt the established plan to the changes in the situation.
– Deal with interruptions, which may lead to tasks not being done: written record of actions taken, checklists, etc. A less busy member can perform the interruption filter function.

Dissemination of the E-CRM-SEMES concept

Since the creation of this group, in January 2017, different dissemination actions have been carried out, such as conferences, courses and workshops, in order to disseminate the E-CRM-SEMES model. Up to September 2019, 18 courses have been held at the Universidad Francisco de Vitoria (Madrid), Hospital Universitario Virgen de la Arraixaca (Murcia), at the SEMES Congress venues in Alicante and Toledo, and at the INSPIRE-FEMEBA simulation centre in Argentina, training a total of 212 people (doctors, nurses and health emergency technicians).

Addendum

Members of the E-CRM Clinical Simulation Working Group: Javier Abella Lorenzo, Gracia Adanez Martínez, Chabier Brosed Yuste, Mª del Carmen Casal Angulo, Lukas Drabauer, Salvador Espinosa Ramírez, Víctor Fernández Gallego, Oscar Graña García, Daniella Lehmann, Fernan-do López Mesa, Pilar López- Sastre Nuñez, Luis F. Mifsut Rodríguez, Andrés Pacheco Rodríguez, Gemma Pastor Pons, Jose María Quintillá Martínez, Francisco Javier Rascado Sedes, José Sorribes del Castillo, Ana Vázquez Casares.

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