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Understanding medical errors and adverse events in ICU patients

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Introduction

Medical errors are the consequence of multiple actions of a whole chain of organizational and humans interactions in which the individual does not have the intention of doing wrong (Fig. 1). Such errors may or may not lead to an adverse event, which is the actual harm that occurs to the patient. Adverse events may also come from complications not associated with medical errors. These two groups overlap to varying degrees, and this overlap highlights the potential preventable amount of adverse events.

[1] to 58 % [6] of the patients, including one-third from medication errors alone [4], and may contribute to mortality [1]. Understanding medical errors is complex and involves country (or health care system), hospital, group (ICU culture and other ICU factors) and individual levels [7]. These multi-level systems explain the low visibility of the cause-to-effect relationship between the error and its consequences and jeopardize prevention.

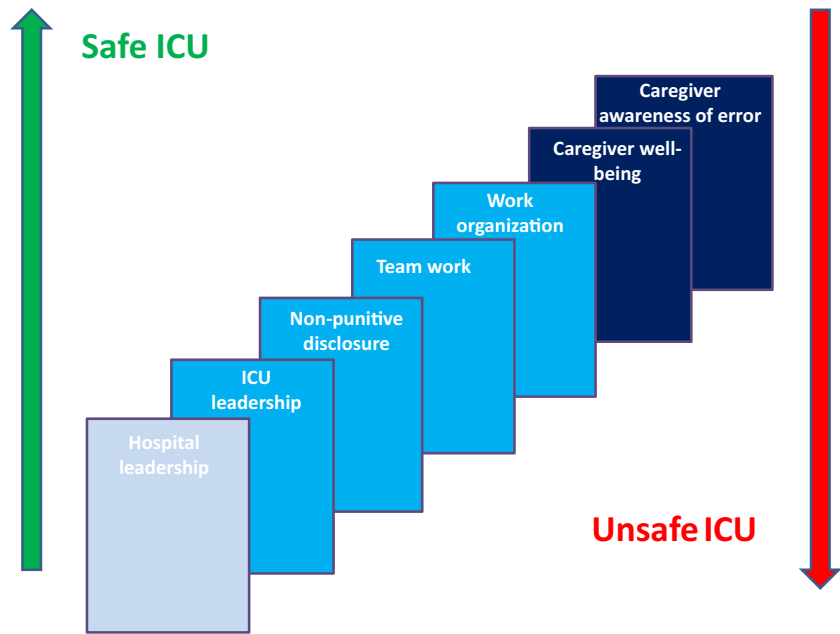
The unit level: relationship between safety culture, safety climate, teamwork, medical error and adverse event

How important is the problem?

Medical errors are common with ICU patients. Studies from Europe report a large variability regarding their incidence, from 2.1/1000 [1] to 804.5/1000 [2] patients days, depending on definitions and methods of reporting [3, 4]. Also, J.T. James claimed that the Institute of Medicine's report in 2000 severely underestimated the prevalence of medical errors and their effects on morbidity and mortality [5]. Medical errors affected from 26.8

The culture or climate behind the system is considered one of the most important factors in improving quality of care. Leadership, trust, respect, open communication, non-punitive actions and coordination of behaviour are essential for a multidisciplinary ICU team to provide safe care. The unit leadership has an important role to create this climate of confidence keeping in mind that safety culture may be perceived differently across caregivers [8]. Recently, no strong association between the reductions of medical errors in ICUs and improved safety culture was

Fig. 1 Factors influencing safety of care



demonstrated in two multicentre studies [2, 9]. However, we must be careful with the interpretation of these results. The studies did not negate the importance of safety culture. A safety culture that encourages the staff to disclose their errors and claim responsibility for them may have an impact of psychological manifestations after an error such as guilt, shame, anxiety states, loss of confidence, and questioning oneself at a professional level [10]. In other studies, the development of safety interventions was associated with decrease of medical errors [11], of mortality [12], and permitted the acquisition of new behaviours with a better disclosure of medical errors [13].

The individual level: relationship between ICU staff well-being and medical errors

Inadequate management at the hospital or ICU levels of care leads to fatigue and exhaustion for the ICU staff. Fatigue and sleepiness are associated with medical errors and danger for the professionals [14]. Work organization has an impact on medical errors. Shorter duty periods are increasingly mandated to improve patient safety and to decrease work fatigue, although usually more for residents than for senior ICU staff, despite the responsibilities being greater. England is a nice example of this practice. Reducing work shift was associated with lower rates of adverse events [15]. In the case of burnout, the relationship between burnout and medical errors is complex to demonstrate. Recently, two studies added new insights. A randomized study from Canada failed to demonstrate a relationship between three types of residents working

schedules (12, 16 and 24 h) and the occurrence of medical errors, burnout or sleepiness [16]. A French multicentre study involving 1500 (physicians and nurses/nursing assistants) caregivers failed to demonstrate an association between the occurrence of selected medical errors and burnout [2]. Depression, rather than burnout, was associated with medical errors [2, 17].

The goal of prevention

Prevention is better than cure, and particularly so with regards to medical errors. Using current knowledge to improve prevention should be possible in any ICU that seriously wishes to reduce medical errors to a minimum. However, we will probably never eradicate medical errors completely. Here are several important areas to consider:

- The backbone of preventing medical errors is an internal reporting system of all adverse events. This reporting system should have a low threshold and operate locally, i.e. the loop should be closed within the unit (reporting, analysis and implementation of change-information back to the staff). A reporting system is there only to learn from the mistakes and errors made and hence prevent their recurrence. Key success of using the reporting system includes active participation of the caregivers from the very start to build a user-friendly system. Including the caregivers in all the steps of the process (discussing modalities of reporting: anonymous or not, modalities of feedback) helps to build a safety culture.

- There must be an openness and transparency regarding medical errors, both between staff and ICU leaders, but also towards patients and family.
- ICU culture should change from a punishment-oriented culture (always looking for “who” instead of looking for a “why”) and focus on systems and not individuals.
- Standardization of procedures and equipment, and use of modern IT systems like electronic checking of prescriptions and delivery of medication, must be utilized to its full potential. It is nonsensical that in 2015 barcode scanners are used almost universally in all supermarkets in Europe but just in a minority of medication dispensers.
- All these objectives alone are not sufficient to reduce errors. Safe care and a safe environment mean that time must be given to caregivers to be aware of their errors so as to learn from them. This is an essential task to build a strong awareness of the positive effect of a medical error.

Compliance with Ethical Standards

Conflicts of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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