Opinion

Medication errors in the operating room: lack of class 1 evidence and necessity for further studies attempting to reduce them

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Ekaterini Christina Tampaki,[1,2] Athanasios Tampakis,[3] Konstantinos Kontzoglou,[1] Efstratios Patsouris,[4] Gregory Kouraklis[1]

[1]Department of Propaedeutic Surgery, Laiko General Hospital, School of Medicine, National and Kapodistrian University of Athens, Greece
[2]National Organization for the Provision of Healthcare Services, Department of Planning and Monitoring of Medicines Dispensing, Medicines Division, Greece
[3]Department of General and Visceral Surgery, University Hospital of Basel, Switzerland
[4]Department of Pathology, Laiko General Hospital, School of Medicine, National and Kapodistrian University of Athens, Greece

Correspondence: Ekaterini Christina Tampaki, Department of Propaedeutic Surgery, Laikon General Hospital, School of Medicine, National and Kapodistrian University of Athens, National Organization for the Provision of Healthcare Services, Department of Planning and Monitoring of Medicines Dispensing, Medicines Division, 17 Agiou Thoma Street, Athens, 11527, Greece, Tel +30 6972074768, Fax +30 2108110544, Email actampaki@yahoo.com

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Opinion

Medication errors have been an unfortunate chapter in the history of anesthesia leading to complications which may be fatal related to procedures performed covering the fields of emergency medicine, chronic and acute pain medicine, anesthetic procedures, perioperative care medicine, and intensive care medicine.[1]

Notably, in a study concerning anesthesiologists, a drug administration error rate of 1 per 133 anesthetics was observed.[2] Patients and healthcare systems globally appeal for safer application of drugs, as wrong drugs, overdose of drugs, and incorrect administration routes remain unsolved problems involving non-anesthetic drugs or anesthetics, accidental high spinal anesthesis, local anesthetic intoxications, ampule or syringe swap, and blood mismatch. Longer procedures lasting more than six hours contrarily to those lasting less than one hour, and procedures with 13 or more medication administrations are correlated with higher adverse event rates and errors. Further research seems mandatory to confirm a possible correlation to fatigue and lapses in vigilance in such cases.[3]

Regarding the timing of the critical incidents occurrence, adverse drug events occur more frequently during the maintenance phase of anesthesia administration (42%), comparatively to either during induction (28%) or at the initiation of the surgical procedure (17%).[4] Notably, deaths recorded in registries were related to issues concerning central venous catheter placement, infusion pump problems, airway management, ventilation management, and complications from regional blockades, which could potentially have been avoided by airway algorithms use, detailed preoperative evaluation, education and use of protocols for diagnosis and treatment, along with development of medication safety checklists specific to the OR settings, aiming at reducing the risk of injury induced by medications.[5]

Other factors increasing the medication error risk in patients undergoing anesthesia, include potent drugs use with serious injury or death risk when given in excessive doses or without efficient patient support aggravated by the operating room complex environment. Therefore, awareness should be raised that drug administration generally takes place under unsatisfactory objective monitoring, whereas bar-coding technology might be useful in preventing drug administration errors, leading to improvement regarding safety in the peri-operative field. However, a clinical use of a multimodal approach to improving drug administration seems the key including records keeping in anesthesia along with technology-based interventions and process-based interventions which can help towards an evidence informing effective system leading to continuous quality improvement.

Guidelines regarding medication safety in the operating room stem so far from the Association of perioperative Registered Nurses (AORN), the Institute for Healthcare Improvement (IHI), the American Society of Healthcare Pharmacists (ASHP), the Center for Disease Control (CDC), the Anesthesia Patient Safety Foundation (APSF), and the Institute for Safe Medication Practices (ISMP Canada).[6] However, to date, only one single randomized controlled trial exists regarding prevention of above mentioned errors along with limited studies concerning direct medication safety strategies and specific techniques applied to reduce the rate of medication errors. The above combined with a lack of a tool assisting in identifying hazards or assessing vulnerability within an institution, highlight the serious lack of evidence, which however can lead to errors prevention.[1]

Articles raising concerns in the fields of anesthesia and critical care, have tried to describe underlying causes of drug error. However, what is required is a framework that permits further analysis, in an attempt to explore the psychology of error so as to reduce their incidence.[2,7] Actions, which are characterized as unsafe acts are subdivided into unintentional or intentional acts, whereas unintentional acts include slips due to attentional failures or lapses, which are skill-based errors because they occur during routine activities and intentional acts which constitute of mistakes and violations. Lack of expertise or knowledge of pharmacology are important contributing factors especially regarding drug interactions, but also lack of knowledge concerning prescribing systems use, according to the GMC study.[8]

Fixation errors arising from focusing on one path and ignoring contrary evidence resulting from cognitively intense work and

time pressure is another factor. According to the vulnerable system syndrome, organizational pathologies makes each system more prone to errors, violations, and adverse events, with a tendency to blame front-line workers, and deny the existence of problematic conditions.[9]

Another issue is speaking up a problem, which happens easier given that anonymity of the person reporting the error is provided. Undoubtedly, greater awareness of error will result in more frequent reporting, as medication errors are identified and interpreted differently impacting further reporting with various conceptions presented such as f it is not my fault, if everybody is aware of it, if a patient faces urgencies more vital than the accurate medication administration, or if inconsistencies are performed to prevent something worse, then it is not an error.[10,11] Another option is to focus on reliability of care, which means delivery of best practice care to the right people at the right time, with professionalism, which is more positive, and provides a clear benchmark for audit: improve reliability, and safety must follow. Moreover, fatigue, burnout, and depression all contribute to error and all need to be addressed, along with lack of communication and team working. Good role models and effective opinion leaders are crucial in developing an organization, which is patient-focused and reliable.[10]

Frequent initiatives appear risky and are not easily adopted by frontline staff, whereas focusing solely on the clinician, instead of exploring failure points throughout the entire system is a disadvantage. Motivation for change will vary between the different groups, however patient and public engagement is a powerful instrument for facilitating change. Identifying hazards and reflective learning from error along with human factors analysis can provide a useful framework for understanding the causes of error and unreliability. Moreover, further studies are essential to gain insight into the cultural issues raised determining any strategy success, as lack of class 1 evidence exists in an attempt to reduce medication errors. After analyzing the latest scientific evidence, examining current practice, and inspecting the local environment, active engagement of both organizational leaders and frontline colleagues is crucial.[10,11]

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Conflicts of interest

Authors declare that there is no conflict of interest.

References

1. Merry AF, Webster CS, Hannam J, et al. Multimodal system designed to reduce errors in recording and administration of drugs in anaesthesia: prospective randomised clinical evaluation. *BMJ*. 2011;343:d5543.
2. Webster CS, Merry AF, Larsson L, et al. The frequency and nature of drug administration error during anaesthesia. *Anaesth Intensive Care*. 2001;29(5):494–500.
3. Irita K, Tsuzaki K, Sawa T, et al. Critical incidents due to drug administration error in the operating room: an analysis of 4,291,925 anesthetics over a 4 year period. *Masui*. 2004;53(5):577–584.
4. Gupta S, Naithani U, Brajesh SK, et al. Critical Incident Reporting in Anaesthesia: A Prospective Internal Audit. *Indian J Anaesth*. 2009;53(4):425–433.
5. Hove LD, Steinmetz J, Christoffersen JK, et al. Analysis of deaths related to anesthesia in the period 1996-2004 from closed claims registered by the Danish Patient Insurance Association. *Anesthesiology*. 2007;106(4):675–680.
6. Wahr JA, Abernathy JH, Lazarra EH, et al. Medication safety in the operating room: literature and expert-based recommendations. *Br J Anaesth*. 2007;118(1):32–43.
7. Llewellyn RL, Gordon PC, Wheatcroft D, et al. Drug administration errors: a prospective study survey from three South African teaching hospitals. *Anaesth Intensive Care*. 2009;37(1):93–98.
8. Dornan T, Ashcroft D, Heathfield H, et al. An in depth investigation into causes of prescribing errors by foundation trainees in relation to their medical education; 2009.
9. Amalberti R, Vincent C, Auroy Y, et al. Violations and migrations in health care: a framework for understanding and management. *Qual Saf Health Care*. 2006;15:i66–i71.
10. Mahajan RP. Medication errors: can we prevent them? *Br J Anaest*. 2011;107(1):3–5.
11. Brady AM, Malone AM, Fleming S. A literature review of the individual and systems factors that contribute to medication errors in nursing practice. *J Nurs Manag*. 2009;17(6):679–697.