Declaration of interest

None declared.

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Medication errors in paediatric anaesthesia—a cultural change is urgently needed!

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Editor

In this issue of the *British Journal of Anaesthesia*, Burton and colleagues[1] present a survey on medication errors amongst paediatric anaesthetists attending a scientific meeting in the UK. Whilst 60% of respondents experienced paediatric drug errors at least once a year, only 15% reported higher error rates of at least once a month. The authors suspect that these results probably underestimate true frequencies. They support this statement mainly with data published by Nanji and colleagues,[2] who detected medication errors in adult anaesthesia as often as once per 20 drug administrations or once in every second anaesthesia patient. One-third of errors resulted in an observable patient harm. Another trial also using direct observation for data collection found an even higher rate of about one error per 10 drug administrations, but errors documenting drug administration in the anaesthesia record were also included.[3] A prospective incident monitoring study, published in this issue of the *BJA*, found an incidence of one error per 38 anaesthetics in a university paediatric hospital.[4] Considering questionable definitions of errors and harm in such studies,[5] the true incidence of errors may still be unclear, and there is a relevant gap between the actual error rate and self-perceived incidences (e.g. one per 133 anaesthesia patients).[6]

An example of the potential extent of this gap is provided by an observational study conducted in a paediatric emergency department, in which a drug dosing error was defined as a 10-fold deviation from the correct dose. During the study period, the self-reported incidence of medication errors was one in 22 500 drug administrations. An audit of the patients' charts, however, revealed that one in 766 medication orders actually contained a 10-fold dosage error.[7] Hence, the rate of documented dosage errors was 30-times higher than the self-reported incidence of medication mistakes. The actual rate of medication errors, however, is likely to be even higher, as the processes of drug preparation and administration have a high potential for additional errors to occur, regardless of correctly written medication orders.

The APRICOT-trial is another example for the questionable validity of study designs relying solely on self-reporting. Although this trial targeted complications in paediatric anaesthesia in general and was not focussing on medication errors, the reported incidence of one drug error per 635 paediatric anaesthesia patients (49 in 31 127 patients) is unlikely,[8] as it is far below error rates described in adult anaesthesia practice.[6,9,10] There is evidence to suggest that drug errors occur more frequently in children than in adults, regardless of the care setting (ward, intensive care unit or emergency department), considering the need for individual dose calculations, the lack of familiarity with dose ranges and the susceptibility for inaccurately prepared drug solutions.[11,12] For example, in one paediatric hospital, the observed rate of potentially dangerous prescribing errors was three times higher[13] than the rate observed in an identically designed study in adults.[14] Summarizing, surveys or trials relying solely on self-reporting for detection of errors are unreliable, as

unrecognized errors cannot be reported systematically, and an uncertain proportion of recognized errors will not be reported as a result of intentional or unintentional omission of the reporter.

While large efforts (e.g. an external observer) would be necessary to detect unrecognized errors, a recognized yet unreported mistake means simply losing a precious opportunity to improve patient safety. An incident or error reporting system is the most frequent demanded measure when articles on medications safety were analysed.[15] Error reporting enhances team vigilance for certain incidents and can help identify typical pitfalls, individual deficiencies of knowledge or organizational weaknesses. Hiding a mistake is destructive for the culture of safety.

An important feature of the survey of Burton and colleagues[1] was the evaluation of the participants' reporting attitudes. It demonstrated that 36% of respondents would only report errors resulting in actual patient harm. Although the reasons for that attitude remain unclear, most participants regarded a 'no blame' drug error reporting and review system as a strategy to reduce errors. An appropriate institutional error culture is essential to improve patient safety, yet it would be wrong and too easy to relieve all individuals from their own responsibility.

Some medical providers are more enthusiastic about safety issues than others, and acceptance of personal susceptibility for errors also differs. Categorical denial of susceptibility to errors, which is common even in senior medical leaders, precludes all measures to prevent them, and is a rejection of fundamental principles to improve patient safety as outlined in the publication '*To err is human*'.[16] Seniority may contribute to overestimation of one's own capabilities and leads to reduced awareness of individual fallibility.[17] The statement '*Where I am, there is quality*' illustrates the perception that experience and hierarchy trumps existing safety structures. This attitude is highlighted in a survey of more than 1000 health care professionals, demonstrating lower acceptance of personal susceptibility for errors in senior staff.[18]

Abundant evidence shows that there is no infallibility amongst experienced clinicians. On the contrary, their personal fallibility (such as the fallibility of any human) endangers patients. For instance, when anaesthetists were asked to calculate the correct amount of a catecholamine needed for a predefined infusion rate, only 15% of participants were able to answer correctly. Errors ranged between 1/50 and 56 times the required dose, and no difference was observed between trainees and consultants.[19] As another example, the senior leader of a paediatric emergency department confused adenosine with amiodarone, causing an avoidable resuscitation of a child. The institution repeated this real case five times as a simulated scenario involving the original team leader with the same error occurring in four of the five simulations. Although several participants recognized the error, they felt unable to protest because of the hierarchical barrier.[20] This illustrates the importance of accepting and internalizing personal susceptibility to errors for each team member, including hierarchical leaders. Mutual acceptance of fallibility is the basic prerequisite for the implementation of patient safety, as reporting of errors becomes easier and will be perceived as a mandatory aspect of responsible patient care. At the 2010 meeting of the American Society for Patient Safety, it was noted that '*anaesthesia professionals may exhibit problems with denial*', and an honest and constructive error culture was included in a '*New Paradigm*' to enhance patient safety.[21] We concur with the last sentence of the report by Burton and colleagues[1]: '*It is time for paediatric anaesthesia to embrace a cultural change that allows honest dialogue and encourages learning from mistakes*.'

Authors' contributions

Writing paper: J.K.
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Evidence of residual neuromuscular block with sugammadex *vs* neostigmine

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Editor—We read with interest the narrative review of Hunter, but we do not agree with the statement 'As yet, there is no evidence that the incidence of postoperative pulmonary complications is lower after use of sugammadex rather than an anticholinesterase'.[1] In recent years, numerous clinical trials analysed in meta-analyses have shown a decreased incidence of respiratory events and residual curarization in patients treated with sugammadex compared with neostigmine.[2–4] Moreover, fewer adverse effects were observed in the sugammadex group.[2–4] Although no statistically significant differences have been demonstrated with critical high-risk respiratory events, minor complications do seem to be reduced.[2–4]

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