LEARNING FROM ERRORS IN OBSTETRIC ANAESTHESIA – DESIGNING SYSTEMS TO IMPROVE PATIENT SAFETY

Clin A/Prof Nolan McDonnell

Department of Anaesthesia and Pain Medicine, King Edward Memorial Hospital for Women, Western Australia
School of Women's and Infants' Health, University of Western Australia, Crawley, Western Australia
School of Medicine and Pharmacology, University of Western Australia, Crawley, Western Australia

"To err is human, to forgive is divine." Alexander Pope wrote these now famous lines as part of a poem "An Essay on Criticism" in 1709. An error can be defined as *"the failure of planned actions to achieve their desired outcomes."* Central to the prevention and management of error in medicine and anaesthesia is to realise that we all make errors, not just occasionally, but every day. We are not perfect (as much as we may strive for perfection) and we function in systems that are often far from perfect and may actually increase our chances of making an error. Most of the time these errors are of little consequence but occasionally, what would otherwise be a minor error in another setting, may have devastating consequences for the patient, their family and the medical team. It is only when we appreciate that we are all susceptible to making errors that we can begin to look at ways in which we can prevent or mitigate the consequences of error in our own practice and start designing systems that are more "error proof."

James Reason, one of the pioneers of the "human factors approach" and who originally described the "Swiss Cheese" model of human error debunks a number of myths associated with human error. Appreciating these myths provides an insight into modern error management and what can be done to prevent errors from occurring. The first myth is that *errors are intrinsically bad*. It is not so much the error itself that is bad, but more the context in which the error occurs. For example, we may forget to switch something on at home when we are preparing dinner, an error that most of the time would be of little long-term consequence. This same error in the operating theatre could potentially have extremely serious consequences for the patient, eg if the volatile agent is not switched on after induction of anaesthesia or prophylactic antibiotics are not administered. Errors themselves are crucial to our learning to adapt to new or novel situations and in many ways errors and correct performance go hand in hand as we learn throughout life.

A second myth that is commonly portrayed is that *bad people make bad errors*. This myth is often deeply rooted in the perception that bad things happen to bad people and that the error is attributed to some characteristic of the person who made the error. In fact, the converse is often true. The best people are often performing the most difficult tasks and hence may be more liable to error. But, these same individuals can also adopt certain behaviors that are more likely to provoke errors, such as working when they are significantly fatigued. In "judging" an error, it is not so much the error itself which might be important but whether the behavior of the person involved made them more prone to making errors.

Another common myth related to errors is that *errors decline with practice* and that *they are random and highly variable*. Certainly, when an error is related to a lack of knowledge, then with more practice that error will decrease. This is one of the values of simulation training in medicine. But, much of the time spent in our working life will be spent with the mind functioning in more of an automatic mode, dealing with common situations, a procedure or a series of steps that are very well ingrained in memory. In these situations errors can result from slips or lapses and the chances of these types of errors increase the more we function in automatic mode. This is the price that is paid for freeing the conscious mind from needing to take "moment by moment" control of situations and allowing it to focus on other activities.

It is a commonly held belief that *highly trained people make fewer errors*. This myth has been debunked in a number of medical and aviation studies. What is apparent is that highly trained people are aware of their ability to make errors and they anticipate and practice the skills necessary to mitigate these errors – ie they are more effectively able to recognise an error and take immediate action to mitigate its consequences and recover from the error.

A further myth is that *a single error is normally sufficient to cause a bad outcome*. While on a superficial level this may seem true, in most systems there are a number of defensive layers built into that system to protect against

the error. Often it is the person on the front line, at the "sharp" end of medical care, that completes the error sequence (and is often blamed for the error), but the system itself contains "latent" failures and weak defensive processes such that allow the holes in the "Swiss cheese" model to line up and create the adverse outcome.

The final myth that James Reason describes is that in human error is *that it is easier to change people rather than situations*. Organisations often devote a considerable amount of their resources into targeting the individual behavior as a means to reduce error. This only targets one part of the error cascade. Human error is secondary to the complex interplay between humans and the situations that they are working in and the latent conditions that may exist within the systems. Human error is only avoidable up to a certain point, and it will still occur. That is the nature of being human. But, the situation within which that error occurs can be changed to trap or mitigate the error so that the consequences of the error are negated. This can influence all the people that interact with the system in the future.

So, given what we now know about the myths associated with human error and medicine, what can be done to either prevent error occurring or to limit the impact of such errors? Firstly, it is important to acknowledge that human error is part of being human and it will always occur, even in the most highly regarded and highly functioning individuals. We need to have the confidence to freely report errors. If managers and staff do not know about errors that occur then it becomes very difficult to design systems to limit the impact of such errors. Part of this is changing the attitudes of staff and patients to errors, we need to move away from the view that good doctors and good staff do not make mistakes, and realise that everyone is susceptible to errors and train people to detect errors and detect situations in which errors may occur more commonly. We need to avoid the naming, blaming and shaming reactions to errors when they occur – this inhibits the future reporting of errors and also places too much emphasis on the individual, rather than the systems contribution to the error.

Finally, the systems that the individuals are working in need to be designed in such a way so as to lessen the chance that an error may occur. In the example used in this talk, having two identical infusion pumps for magnesium sulphate and syntocinon made it inevitable that there would be an error in programming one of the pumps at some stage. Using different types of pumps for the different solutions can lessen the chance of this error occurring. In addition, the systems should be designed so that should an error occur, it can be rapidly detected before harm occurs or the effects of the error are minimised. With the magnesium example, by limiting the amount of magnesium that is contained in the infusion solution, even if a programming error occurs then the harm to the patient will be minimal. Lastly, staff should be trained in how to deal with potential errors in the systems they use. Completing the worked magnesium example, staff using this solution need to know what steps to take in the event of acute magnesium toxicity.

Additional Reading

Reason J. Seven myths about human error and its management. (Originally published in Italian as: Come limitare l'errore. KOS: Rivista di Nedicina, Cultura e Scienze Umane. 187:10-17, 2001.)