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EDITORIAL

Techniques aren't everything: Why conscientious well-trained surgeons make mistakes?

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The former National Patient Safety Agency in the UK estimated that there are about three million admissions a year to NHS hospitals in England, of these about 300,000 have some sort of harm occurring to them, and a further 30,000 will die as a result of those errors. Studies in the USA and Australia broadly support this figure of about 10 % of all admitted patients coming to harm due to medical error [1]. This is a higher number than the combined annual mortality from breast, prostate and colorectal cancer, so this is a highly significant problem. Half of all these adverse events are related to surgical patients and contribute to 13 % of all hospital deaths. Some 40 % of these events occur in the operating room [2]. Multiple estimates of adverse events in surgical patients have been undertaken and fairly consistently come up with a figure of 20 % [3]. That means that 1 in 5 patients experiences an error in their care that results in harm of some kind and in 4 % the harm is so severe that they die. The conundrum is this: if surgeons are trained to a very high standard (which they are) so that they are equipped with the skills and knowledge to undertake the most difficult surgical procedures (or any aspect of medicine for that matter), why do so many mistakes keep happening? The answer comes from further analysis of these errors. Retrospective reviews looking at the underlying cause of these errors showed that only 6 % were related to a lack of knowledge and technical skill [3]. The surgical community can pat itself on the back and say that through the multiple training programmes and efforts from journals such as this one, surgeons of the future are equipped with the technical skills they need. So what about the other 94 % of adverse events? The overwhelming majority (73 %) are related to human factors (also known as non-technical skills) that the rest of this article will describe, and the remaining 20 % are related to organisational systems that made error extremely likely (i.e. time pressure, locum staff, having patients on non-specialist wards, saline and lignocaine in very similar bottles).

In the simplest terms, human factors are: communication, team working, leadership, decision-making, situational awareness, stress and fatigue. The critical point is they are core to all human behaviour; misreading the road sign and turning the wrong way down the highway is as human an error as removing the wrong kidney, only the severity of the outcome is different. Communication is the core skill of any health care professional, and this has long been recognised by surgeons. When operating room performance is assessed, at least 30 % of communication episodes result in failure visibly effecting system processes, including inefficiency, team tension, resource waste, delay and procedural errors [4].

Nothing in health care is done by individuals alone; work is done in teams, and surgeons are part of a larger team that involves staff from theatre, intensive care, surgical wards, outpatients and other health care professionals who are involved in the care of the whole patient's journey. It therefore follows that how these teams function is critical to the quality and safety of the care provided. The core aspect of the most highly functioning teams is interpersonal relationships. Without a harmonious group climate, teams will never work to their optimal abilities. All members of any team need to know what is going on, and they need to have the same mental model: that is, they all need situational awareness. One way to help communication, team

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working and situational awareness is by conducting both briefings and debriefings [5].

As the medical community gradually realises the impact of human factors on harm and poor care, attempts have begun to address some of these. In a study published in 2009, Atul Gawande and colleagues trialled what has now become the WHO safer surgery checklist [6]. This checklist is now universally accepted and practised all over the world with multiple studies linking its use to a reduction in surgical complications and mortality [7]. However, the checklist by itself is not enough, as suggested by a study that has shown that introduction of the checklist did not improve surgical outcomes [8]. If people purely pay lip service to the checklist and do not change their teamwork and communication behaviours, then the benefits realised in studies will not occur. Just reading out the items on the checklist will not reduce the unintentional harm that we do to our patients in any significant amount. We need to shift the culture so that surgeons in training and at every other level consider human factors as important as technical skills. Current fellowship schemes for senior trainees are focussed almost exclusively on practical skills and knowledge with very little emphasis on communication and teamwork. If we are to offer our patients the best possible care, this needs to change.

Some progress is already underway. Specific training programmes for human factors (e.g. TeamSTEPPS) have been run and evaluated in a variety of studies and consistently show an improvement in teamwork behaviours [9]. This kind of training involves learning about the various aspects of human factors described above and then working together as teams to improve the non-technical aspects of patient care. Recent studies have linked team training to improved surgical outcomes [10].

We can also learn from the experience of other industries. During the 1970s, the aviation industry responded to a series of high-profile crashes caused by human error rather than equipment failure. The industry implemented a programme called Crew Resource Management (CRM) training. This was a comprehensive programme where all airline crews, pilots and cabin crew were trained in human factors. Through a series of lectures, workshops and simulator training, all staff were exposed and assessed on their ability to communicate and work in teams. This then became a mandatory requirement, and staff are annually trained and assessed. Well over half of a pilots' training is focussed on human factors rather than on the technical skills of flying. It is very likely that to address the scale of the problem we described at the start of the article, health care will need a similarly comprehensive approach.

Over the last few decades, health care has learnt how to train surgeons so they are equipped with the knowledge and technical skills that they need to deliver high-quality care. This alone is not enough. We are beginning to realise the importance of the 'softer' skills that are an innate part of being a human and how their failures lead to poor patient outcomes. Briefings and checklists can go some way to addressing this but without the change in emphasis of training so that human factors are taught to all, from student to senior consultant they will achieve little on their own. We need to understand, research and train in these areas as thoroughly as we do for practical skills if we are going to realise the full potential of our highly technically trained surgeons.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent For this type of study formal consent is not required.

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