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Review

Safe eye surgery: non-technical aspects.

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Abstract:

The traditional training of surgeons focused exclusively on developing knowledge, clinical expertise and technical (surgical) skills. However, analyses of the reasons for adverse events in surgery have revealed that many underlying causes originate from behavioural or non-technical aspects of performance (e.g., poor communication among members of the surgical team), rather than a lack of surgical (i.e., technical) skills. Therefore, technical skills appear to be necessary but not sufficient to ensure patient safety. Paying attention to non-technical skills such as team working, leadership, situation awareness, decision-making, and communication will increase the likelihood of maintaining high levels of error-free performance. Identification and training of non-technical skills has been developed for high-risk careers such as civil aviation and nuclear power. Only recently training in non-technical skills has been adopted by the surgical world and anaesthetists. Non-technical skills need to be tailored to the environment where they are used, and eye surgery has some substantial differences compared with other surgical areas, e.g., high volume of surgery, use of local anaesthetics, and very sophisticated equipment. This review highlights the need for identification of the non-technical skills relevant to eye surgeons, and promotion of their use in the training of eye surgeons.

Patients in the UK undergo more than 8 million surgical procedures per year, and ophthalmology represents a substantial proportion of the overall surgical volume (e.g., over 300,000 cataract surgeries per year). But surgery is risky and safety practices are inconsistent. The Reporting and Learning System (RLS of the National Patient Safety Agency (NPSA), recorded 44,6184 reports of patient safety incidents from surgical specialties between 1 January 2005 and 30 September 2008.¹ 15,311 of these were in ophthalmology.¹ The real number of incidents is probably greater. The nature of these incidents is hugely varied, from wrong site surgery to misplaced patient notes. Although many of these incidents are not serious some have led to patient harm.

Studies into medical error show that it is frequently 'behavioural' aspects of performance that are causal factors rather than individuals not having the necessary technical expertise.² These aspects of performance can be described as non-technical skills (following from European civil aviation) as they relate to cognitive and social skills necessary for safe and effective practice in a clinical context, that complement technical skills.³ Thus they address a whole range of behaviours that support good performance, such as team working, task management, situation awareness and decision making. Current data is compelling. Breakdowns in team working and communication, lack of situation awareness and poor decision making can lead to poor outcomes for surgical patients.^{4,5} Communication was found to be a causal factor in 43% of errors made in surgery.⁶ In another study, cognitive and diagnostic errors in the operating room contributed to 27% of claims against a health care organisation.⁷ Among surgical specialties ophthalmology occupied the first place in surgical errors due to wrong intraocular lens implantation.⁸ The second most common error in ophthalmic surgery is

administering local anaesthetic to the wrong eye. Errors including operating in the wrong site/ or wrong patient/procedure are rare but unacceptable for the public.⁸

The medical profession increasingly recognises there is more to good surgical practice than having extensive clinical knowledge and good technical and surgical skills. However, as mentioned above, aspects such as decision-making, leadership and team working provide a vital underpinning for effective performance. We propose that behavioural areas of competence should receive explicit attention during ophthalmic surgical training to ensure individuals are aware of what constitutes good practice and have the requisite skills to deliver this. Recognition of the importance of these non-technical skills in anaesthesia has led to the development of aviation-style crew resource management training courses to address them,⁵ e.g. Crisis Avoidance and Resource Management,² and Anaesthesia Crisis Resource Management.⁹ A taxonomy of anaesthetists' non-technical skills (ANTS) and a behavioural scale to rate them is now being used in some anaesthetic training programmes.¹⁰ For surgeons, a non-technical skills for surgeons (NOTSS) taxonomy and rating system was developed.^{11,12} The system was developed using task analysis with subject matter experts and evaluated in trials using standardized video scenarios and real operations. It allows consultant (attending) surgeons to give feedback to colleagues and trainees based on structured observations of non-technical aspects of performance during intraoperative surgery. Training in NOTSS is offered by The Royal College of Surgeons of Edinburgh, and is likely to be introduced as part of performance based assessment for UK surgeons. It is being used in a number of countries and the Royal Australasian College of Surgeons have incorporated NOTSS into their new professional standards.¹³

Although the Royal College of Ophthalmologists has valuable guidelines on promoting patient safety¹⁴ no specific training in non-technical skills is currently offered. Each working environment has its own unique non-technical skill requirements. Although there are a lot of similarities between eye surgery and other surgical specialties, some differences are worth noting.

1. High volume and high turnover that increases the potential for errors. Cataract surgery is the most common operation in the NHS. Other high-volume interventions include retinal laser photocoagulation and intraocular injections of anti-VEGF therapies.
2. Most commonly surgery is performed under local anaesthesia and with the patient awake. Special attention to verbal communication among team members in the operative environment is needed.
3. Current day-case practice lessens the opportunity for patient-doctor interaction. One-stop surgery practised in many units is even more challenging due to time constraints and the potential for overlooking serious medical morbidity in patients that can lead to an intra-operative adverse event.
4. Heavily reliant on highly specialised equipment (e.g., phacoemulsification, laser).
5. Most patients are elderly with concomitant medical conditions and thus vulnerable to dangers of surgery.

The principal non-technical skills categories may be generic and relatively transferable across domains, but the component behaviours that demonstrate proficiency in those skills within a particular environment (e.g., the operating room for ophthalmic surgery) are specific to the needs and characteristics of the domain. The greatest challenge in developing non-technical skills training in eye surgery will be to identify explicitly the competences that are necessary

for good practice and hence need to be trained. It is then essential to be able to describe these skills in sufficient detail to allow them to be included in the syllabus and then assessed reliably during and following the training. Techniques such as cognitive task analysis are very effective for this and as mentioned above have been successfully used in the medical field in identifying the non-technical competencies needed by anaesthetists) and surgeons. (Once a list of non-technical competencies has been produced this can be used as the basis for syllabus development, supporting debriefing and, most importantly, can be used as an assessment tool for evaluating individual trainees' non-technical skills and the overall effectiveness of training. Assessment tools of this type (called behavioural marker systems as they rely on observation of behaviour to indicate level of skill) can be defined as “observable, non-technical behaviours that contribute to superior or substandard performance”.¹⁵ For effective non-technical skills assessment, the behavioural marker systems used must be explicit, transparent and above all validated, and assessors must be trained to ensure the systems are used reliably.

In brief, further research is needed on the non-technical skill proficiencies required for safe ophthalmic surgery, and to describe them in sufficient detail so they can be taught and reliably assessed. Ideally both non-technical and technical aspects of training should be integrated for achieving the safest possible practice.

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