Surgical professionalism in the 21st century

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During the past 50 years, techniques and results in surgery have advanced enormously. Heart and lung surgery is now routine and is becoming steadily less invasive. Stapling devices have improved the speed and reliability of gastrointestinal surgery, and minimally invasive techniques are routinely used in procedures ranging from adrenalectomy, through gastric bypass for obesity, to difficult hernia repairs. Glimpses of the future have included demonstrations of robotic surgery,[1] telesurgery,[2] and surgery augmented by simultaneous optical and MRI examination of the tissues.[3] Parallel advances in supportive and anaesthetic care are allowing more ambitious procedures to be done in high-risk patients.

Despite these advances, concern and pessimism are prevalent in the surgical community. Many senior surgeons are preoccupied with future threats to the role and professional ethos of the surgeon. Increasingly complex medicine has driven rises in both technical specialisation and the costs of health care, while changes in social and political attitudes have heightened expectations of success among the recipients of surgery and have forced reductions in working hours and training years for surgical trainees. The old system, under which the consultant and his team took on total responsibility for all aspects of management, is clearly incompatible with the changes of recent years. Many surgeons now look at the proposed huge reduction in overall training time and wonder how current levels of surgical expertise can be maintained, let alone increased. They worry that diffusion of responsibility for the overall care of the surgical patient through shift systems will increase the risks of harm inherent in high-intensity, high-tech hospital care. Consultants trained in the old system foresee a loss of professional values leading to a diminished role for the surgeon as a kind of clinical lathe operator, without any continuing responsibility for his patient—deskilled, disempowered, and easily manipulated by financial decision makers in charge of hospitals.

This gloomy vision of the future is understandable, but it is not inevitable. Surgeons are pragmatists, well used to making the best of difficult situations. We can and should use the opportunities afforded by new technology and organisational changes to develop a new set of professional values appropriate for the challenges of the modern clinical environment. Surgery will need to adapt to strengthen the defining features of its professionalism—control over setting standards and responsibility for organising, appraising, and maintaining the quality of work. In at least five areas (training, specialisation, knowledge management, theatre teamwork, and quality improvement), major changes in surgical practice are now likely, but a positive approach could allow us to improve the quality of our care and to retain important elements of control over our working lives. By integrating the changes needed in these areas we can develop a new professional paradigm based on self-examination, quality improvement, and reliability.

Training

The training of surgeons has, for generations, followed the ancient model of the medieval craftsman's guilds, which had many strengths. However, obvious weaknesses included the need for a long training period, the strong emphasis placed on authority rather than logic or evidence, and the role of the master as both trainer and assessor. This model is unsuitable for modern surgical training, but what will replace it is unclear. Educational research on the training of surgeons is in its infancy. Preliminary work has focused on the use of simulation in technical training[4,5] and on the objective assessment of surgical skill.[6,7]

Technical competence during training has not formally and directly been assessed because of the lack of reliable tools with which to do this. Pioneering work in Canada and in London has produced validated techniques for measuring and interpreting the movement of a surgeon's hands[8] and for global assessment of tissue handling skills.[9] However, there are limits to the value of these techniques since successful surgery depends greatly on higher level skills, such as judgment, planning, and effective coordination of a theatre team. Industrial psychologists have much experience of assessing teams at work, and lessons from their work in aviation and high-risk industry are now quoted frequently in medical publications.[10,11] The use of simulator training to measure surgical competence will probably increase in importance,[12,13] becoming more sophisticated, cheaper, and better validated, while opportunities for trainees to carry out real procedures shrink compared with the exposure of their predecessors. Laparoscopic simulation will eventually be feasible on a home personal computer out of official working hours, whereas simulation time in the surgical skill suite will become a sought after resource. Such training may be tedious at times, but can hardly compare with the drudgery of the endless hours on-call, which formed the bedrock of the previous system. Simulation of open surgery will also be developed, but will probably concentrate on team training and on the essential skills of surgery, rather than on specific procedures.

We need to show now that such training, in a modern, well-validated curriculum with competency assessment

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can be effective. Veterans of the previous training culture may be sceptical, but will now have little choice but to give this new style a chance. If it can in some part substitute for that unreliable and tediously acquired old mistress, experience, then perhaps overall technical competence is not doomed to inevitable decline.

Specialisation

Specialisation has changed British surgical practice enormously over the past 10 years leading to the near demise of the concept of the general surgeon. We now assume that specialist units will provide all but the most trivial (or the most urgent) of surgical services, and the practice of most who would, 10 years ago, have described themselves as general surgeons is now very much more circumscribed. This change brings new problems. Remote and rural communities are threatened with the complete loss of local surgical services as equity of provision is deemed to mean that a far away specialist service is preferable to a local generalist. Specialist surgical groups tend to lose a sense of common purpose, which does not strengthen their political voice; even broadly based organisations such as the Royal Colleges cannot function as effective spokesmen for groups who do not feel affinity for each other.

Practising within a narrow field, rather paradoxically, could encourage the return of opinion-based medicine, since within such a limited field of practice it is easier to persuade oneself of one's own expertness. But perhaps our responses to change reveal something important about our own motivations and assumptions. Are the negatives completely unbalanced by any positives? Of course not. The assumptions in favour of specialisation do seem to be borne out by empirical observation in a wide variety of contexts,[14–16] although scientifically valid comparisons of specialist and non-specialist surgery are difficult. Conversely, it is difficult to argue that specialist treatment is always better. However, we need a national framework for surgical services, and it seems clear that this will need to involve more specialist posts with a shrinking number of generalists filling in the gaps. Some senior surgeons bemoan the loss of variety in the job and the loss of skills that accompanies it. But the sense of loss is felt keenly only by those who have experienced an alternative. None of us practising now can remember the days when a single surgical firm dealt with orthopaedics, urology, and gynaecology, or would have any enthusiasm for the idea of a return to this breadth of practice. I remember assisting at lists containing a parotid tumour, a rectal prolapse, and a vascular graft, which I found most exciting as a junior trainee, but modern registrars would recoil at the thought. Most importantly, change has to be for the benefit of the patient, not the satisfaction of the practitioner.

Specialist practice promotes knowledge of expected outcomes and the effects on them—consider, for example, the current audit system for UK cardiac surgeons.[17] A detailed knowledge of ones' own subject will need to be allied to a good understanding of its limitations, and a greater willingness to work in teams where a patient's problems encompass several specialist areas. This is difficult, not impossible, and integration of these efforts by one of the senior specialists is a task that will become an important aspect of the teamwork training discussed above. Difficulties with the specialist model will remain. It seems obvious that the young prospective surgeon must be given some way of experiencing a variety of options before making a decision on a lifelong career, and (in my opinion) we have yet to come up with a satisfactory way of achieving this. Equally, career posts will need to be designed with some humanity, so that future generations of specialist surgeons will take pride in their detailed knowledge and expertise within their own area, and happily regard recognition of its boundaries and cooperation with others as part of their professional paradigm.

Knowledge management

The use of systematic reviews to guide health policy, the improvement in the study design and reporting seen in major journals, and public acknowledgement of evidence-based medicine by experts talking about their opinions can be regarded as successes for the movement. For surgeons, the bold vision of searching and analysis of the scientific record integrated into daily clinical life has not, however, come about. The key obstacle has been the time it takes to find and evaluate the evidence that is needed. This process will inevitably change as the speed and power of computers in presenting and organising information increase.[18–20] The current proliferation of online databases and resources and the popularity of meta-analysis have led to a situation where digests of the available evidence will soon be available for most important clinical decisions and questions. As computing power increases, it will become feasible to request and receive near-instant summaries of the relevant evidence on particular clinical questions.[21] An interesting question will then arise as to whether the conscientious professional will feel obliged to use them. Initial attempts at computerised decision support in general practice have outlined its potential,[22] and in the computerised hospital of the near future it is probable that decision-support aids, warnings, and suggestions based on the best available evidence will become items that appear by default when a clinical decision is recorded online. Hospitals will probably want us to consider the electronically provided evidence to keep to a minimum the risk to the hospital from indefensible decisions made out of ignorance of the evidence. An injunction to do so will probably become a standard part of hospital clinical governance policy. Approached in this way, knowledge management could appear as an alarming threat to clinical autonomy, but if clinicians take the initiative we can use the support of

information-technology evidence to help define and strengthen our professional ethos. By emphasising the professional duty of a doctor to use the best evidence available in making clinical decisions we can make it clear that we embrace the opportunities for better decision making that knowledge management offers, while insisting that a human being should retain the final say in interpreting the evidence and making the decision in conjunction with the patient. It will be important for doctors to retain the right to make decisions contrary to the recommendations when they feel that the clinical context justifies it, but they must be prepared to record and justify their reasoning.

Rigorous scientific assessment of the importance of information-technology evidence will, of course, be needed. If these findings confirm that such tools significantly improve outcomes, then objectors will be left effectively demanding the right to provide inferior treatment. The conscientious surgeon of the future will probably use computerised evidence-based decision support as routinely as we use sterilised instruments. By the same token, making important clinical decisions without at least examining the easily available relevant evidence could come to be thought of as reckless or even unethical. If surgeons seize the initiative when computer systems prove their worth in well conducted studies, and quickly recommend the use of decision support as a professional value, we could have an opportunity to ensure that the way in which it is introduced best fits the needs of the practising surgeon, rather than the professional manager.

Team communication in theatre

In the face of the great changes in surgical techniques and perioperative care during the past 50 years, it is surprising that the operating team itself has hardly changed at all and that the effects of team dynamics, interactions, and behaviour on the quality of the care provided remain largely unconsidered. Surgery involves complex manual tasks, which must be undertaken with a high degree of precision, sometimes under substantial stress and time pressure. Abnormal anatomy can obscure the nature of the task, and the consequences of failure can be fatal for the patient and professionally and psychologically devastating for the surgeon. Theatre environments are often noisy, with distractions from verbal communications and monitors irrelevant to the immediate task. Theatre technology is increasingly sophisticated, complex, heterogeneous, and potentially dangerous. Satisfactory performance cannot be achieved by an individual working alone, but requires teamwork between a surgeon, assistant, scrub nurse, and circulating nurse. There are multiple opportunities for misunderstanding, conflict, and poor coordination of actions.

The substantial morbidity attributable to systems errors in hospital care has been well documented.[23–25]

Studies of operating teams have shown that minor errors are common[26] and that team communication is consistently rated lower than four other measures of team performance.[27] Other professional groups, such as the military, the petrochemical industry, and aviation, have responded to situations needing high reliability team performance by developing standards for team communication and formal training programmes to ensure compliance with these. This training is believed to be very useful in avoiding performance failures when difficult situations occur.[10,11] There is a large element of unexplained variability in surgical outcomes,[28–30] and the lack of a standard for theatre team behaviour could help to explain the differences noted in departmental performance. The intellectual argument for standardising and improving team communication in the operating theatre therefore seems strong, although uncritical adoption of systems designed for other workplaces would probably fail. Research to establish what benefits team training can yield in surgical practice will be important. This should be easier to do in a rigorously controlled fashion in surgery than it has been in aviation where the number of events is so small that trials are not feasible. If team training proves successful it will become a professional duty for the operating surgeon, as one of the leaders of the team, to give briefings, chair debrief sessions, and cross-check formally with others on the team at critical stages of an operation. This kind of departure from the current standard theatre culture is bound to feel awkward initially, but if the evidence supports it, formal team communications will become another professional standard for surgeons.

Continuous quality improvement

In times past, both the magnitude and the causes of variation in surgical outcomes were largely unknown; surgical culture was individualistic and pride in technical expertise was bolstered in many cases by inaccurate knowledge or blissful ignorance of one's outcomes or how they compared with those of others. Poor outcomes from causes other than surgical technique were sufficiently common to obscure the effects of particular surgical practices. Variability was regarded as inevitable by both the profession and the public, and many surgeons argued that fair comparisons between surgical teams were simply impossible. In the past decade, however, improved data collection and analysis techniques have allowed adjustment for case mix factors between departments. Uncomfortably, this leaves a great deal of variation among surgical outcomes unexplained. The need to audit surgical outcomes and to feed data back into changes in practice has been recognised for many years, but remains largely unpractised in the UK. Most surgeons obtain some information informally on their specialist practice, but very few institute a formal means of analysis and

completion of the audit loop. There has been no effective pressure to compel surgeons to undertake this activity, and the lack of resources and time for it have provided convenient reasons for inaction. Self-criticism is always difficult, and critical analysis of the results and practices of consultant colleagues may be even more problematic. Truly independent review is often impractical. Now that expert units are able to produce credible results showing that major surgery can be consistently carried out with a low mortality risk, public and political pressure for uniform high standards has become ever more intense.

Consistency is difficult, and to meet modern expectations the profession will need to radically change its working culture to place greater emphasis on constant evaluation of incidents and results to allow improvement of future practice. The effectiveness of continuous quality improvement systems in ensuring reliable high performance is widely accepted in industrial settings, but some clinicians argue that the unique characteristics of their work make this type of approach inapplicable. This argument is unconvincing, especially when one considers elective surgery in which the same or similar procedures are carried out repeatedly. The development of a safety culture, much discussed in recent years, forms an important part of any quality improvement programme for surgery. Incident reporting systems and a systems approach to the analysis of incidents can help us identify and eliminate the factors which lead to problems in our practice. Uncritical enthusiasm is always dangerous, however, and appropriate modifications must be made to systems adopted from other cultures and professions.

Initial trials of incident reporting systems in surgical wards suggest that nurses are much more likely than doctors to make reports, but that the incidents reported are strongly skewed by professional culture and do not reflect the true picture of the important things that go wrong on wards (unpublished). As well as agreed risk adjustment procedures, the reporting of surgical outcomes urgently needs uniform reporting standards so that the same core data are obtained in each study. The incentives for proper analysis of surgical results are now unfortunately provided by the fear of trial by media, or arbitrary action by managers, which can follow from superficial comparisons of results not adjusted for preoperative risk. Surgeons therefore need to know whether their results match up to those of their peers, and only comprehensive audit on a cooperative basis can yield reliable risk-adjusted data. It is therefore essential for all surgeons to engage in credible, validated cooperative audit with proper use of risk-stratification techniques to allow reasonably fair comparisons between surgeons and departments. This should already be considered a professional obligation by all surgeons, and, for example, is a requirement for recognition as a cancer treatment unit in the UK. Novel statistical tools, such as cumulative sum techniques, will allow the performance of a surgeon or department to be followed continuously over time with the aim of identifying divergences from expected outcomes or practices as early as possible, and these will become more sophisticated with time.[31] The lack of personnel with the time and skills to enter and check the data at hospital level will hopefully cease to hold data recording back, as hospital recording systems become increasingly computerised and integrated, so that data entry will occur automatically as part of the routine documentation of inpatient care.

Conclusion

The profession of surgery is changing rapidly, and this change has posed problems for surgeons who see the principles which they previously used to define their professionalism becoming obsolete or unworkable. The new surgical environment does not, however, eliminate the need for surgical professionalism. Rather, it changes the problems that need to be addressed and, therefore, the professional codes that will be needed. Surgeons in the 21st century will still need to define their own standards of excellence and strive to ensure that their patients receive the highest possible standards of care. Surgical training will become better validated, more structured, and more dependent on simulation as will assessment of surgical technical competence. Clinical decision-making will become more dependent on interaction with computerised decision support based on analysis of the best available evidence. Teamwork in the operating theatre will become better structured and team communication training will become the accepted standard. Concepts of continuous quality improvement will become accepted, with effective incident reporting and analysis systems on wards: sophisticated statistical analysis will allow meaningful interpretation of departmental results and enable completion of the quality cycle. Adherence to these principles will form the framework for the professional attitudes of the next generation of surgeons. The overarching objective of surgical professionalism has always been to ensure that everything that can be done to ensure a good outcome for the patient is done. This will not change.

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