Teaching laparoscopic surgery: the need for guidelines

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There is a risk that minimally invasive surgery will fall into disrepute unless adequate steps are taken to reassure the public. Some form of accreditation after a recognised training scheme would go a long way towards allaying these fears. The cost of training surgeons must be addressed. Adequate training will probably pay dividends in reduced litigation. The royal colleges should be responsible for maintaining standards of teaching on recognised courses, setting criteria for accreditation, and supervising a national audit of all laparoscopic procedures.

The explosion of interest in minimally invasive surgery among surgeons and gynaecologists represents the most dramatic change in surgery since the introduction of anaesthesia. Laparoscopic cholecystectomy was introduced into the United Kingdom in 1989 and has rapidly become the treatment of choice for symptomatic gall stones. Studies from the United States, Europe, and the United Kingdom have shown a decreased mortality and shorter inpatient stays with this treatment.¹⁻³ General morbidity from cholecystectomy has also been considerably reduced, but unfortunately the incidence of common bile duct damage has increased.⁴

The introduction of laparoscopic cholecystectomy into the United Kingdom has been haphazard and uncontrolled, with about a third of surgeons being completely self taught.⁵ The Royal College of Surgeons of England made a useful early statement in 1990 as to how training should proceed⁶ but has done nothing since to enforce this; nor has it the facility whereby this training can be achieved. In North America, the Society of American Gastrointestinal Surgeons made a statement suggesting guidelines for "credentialling surgeons" in the performance of laparoscopic procedures,⁷ and Dent has outlined a training programme that is used in Pennsylvania.⁸ In the United Kingdom, lack of equipment as well as lack of training initially hindered the introduction of minimally invasive techniques. There is now no lack of equipment, and general surgeons find themselves plagued by equipment manufacturers. The question of training has not yet been fully addressed.

There is little doubt that laparoscopic surgery will progress to encompass other procedures, and at present there is considerable interest in laparoscopic repair of inguinal hernias and hiatus hernias and colorectal surgery. It is vital that we learn the lessons from laparoscopic cholecystectomy and introduce these new techniques in a much more organised and safe way, as there is an even greater potential for causing damage with these more advanced techniques.

The learning curve

Before 1989 any general surgeon was unlikely to have claimed experience in minimally invasive surgery. All those who now profess such an interest must have

learnt over the past four years. As with any manual skill, during learning the procedures take longer and there may be an increased risk to the patient. An increased incidence of iatrogenic bile duct injuries was reported during the introduction of laparoscopic cholecystectomy.⁴ Training in laparoscopic surgery should be structured to help people along the learning curve quickly and safely. Along with teaching there should clearly be some form of accreditation.

Accreditation

The question of accreditation in minimally invasive surgery needs to be addressed urgently. Accreditation should apply not only to senior house officers and registrars but also to consultants. The Royal Colleges of Surgeons make no attempt to assess manual dexterity at any time in a surgeon's training. At best, senior house officers and registrars will record in their log books their operative experience, which may or may not be considerable by the time the trainee surgeon is ready for a consultant post. The recent case in which Mrs Silverman, the wife of a London lawyer, died in a private hospital from peritonitis after perforation of the bowel during a laparoscopic procedure has resulted in some of the private London hospitals demanding "accreditation" before allowing consultants to perform laparoscopic procedures. There is also anecdotal evidence of trust hospitals preventing surgeons who have had problems with laparoscopic procedures from performing these procedures, or even suspending surgeons from working.

The problem that will be with us for the next 10 years is that all presently appointed consultants are predominantly self taught and have varying degrees of skill and expertise. Thus we are back to the thorny issue of accrediting existing consultants.

There has recently been much media attention to the complications of minimally invasive surgery, and this has raised public concerns over training and accreditation. If accreditation is to be introduced, who should be responsible for it? The logical bodies are the Royal Colleges of Surgeons, as the training of surgeons is their responsibility. It would not seem unreasonable for the royal colleges to set up a panel of surgeons experienced in performing and teaching laparoscopic surgery to undertake this task. This could be done in association with the surgical societies with a specific interest in minimally invasive surgery—the Society of Minimally Invasive General Surgery, the British Surgical Stapling Group, and the Society of Minimally Invasive Therapy.

Criteria for accreditation would have to be laid down, and clearly a mechanism of appeal for those who fail accreditation would also need to be organised. These problems should not be insuperable and action to overcome them would show that the profession is getting its own house in order and help to allay public anxieties.

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Training

We have run 18 courses for laparoscopic cholecystectomy and 24 for laparoscopic hernia repair. We have also performed demonstrations or proctorships at 29 hospitals throughout the United Kingdom. We have been involved in teaching on advanced courses in Dublin and Paris using porcine models. As a result of these experiences we suggest that training may be done in the following ways.

Lectures—This is appropriate for introduction to instruments, basic principles of safety, and the history of the techniques used.

Videos—Training surgeons can watch a video of the procedure repeatedly. This allows time to assimilate techniques at their own pace without the trainer being present.

Demonstrations—Trainee surgeons can watch an experienced surgeon perform a procedure in theatre. This is a useful method of imparting knowledge and is particularly useful for demonstrating difficult cases.

Pelvitainers—Trainee surgeons perform manipulative procedures using standard laparoscopic instruments. This is a useful introduction which helps trainee surgeons to work with a two dimensional image and to become familiar with laparoscopic instruments. However, its value is limited. When virtual reality simulators become available it may be possible to simulate an operation completely and to include various complications; the best estimate at the moment is that this is 10 years away.

Porcine model—It is undoubtedly helpful to practise procedures on a living model where the problems of loss of pneumoperitoneum, bleeding, and mobilising structures are all encountered. Such courses may be basic or advanced. The main purpose of the advanced porcine courses is to teach the techniques and provide practice in intracorporeal suturing, which is vital for the more advanced laparoscopic procedures.

Hands-on courses—Surgery is a very practical subject, and there is no doubt that the only way to learn laparoscopic procedures satisfactorily is to perform the procedure in question under guidance. The hands-on course is an invaluable step before solo performance of procedures. Courses have been run for laparoscopic cholecystectomy, hernia repair, Nissen fundoplication, colectomy, nephrectomy, and other procedures. We have found for the more straightforward procedures such as laparoscopic cholecystectomy and mesh hernia repair that one trainer can teach two to four trainees; however, for the more complicated and advanced

procedures such as laparoscopic Nissen fundoplication and colectomy it is much more satisfactory to have two trainers to one trainee. The potential for serious damage and complications is much greater in these procedures.

Proctorships—In the United States a preceptorship is the situation where a trainee surgeon goes to the trainer surgeon's hospital to observe and be taught: a proctorship is where an experienced surgeon spends the day at a trainee's hospital helping with the first few cases. The question of proctorships is currently difficult: neither the financial implications nor the medicolegal implications have yet been overcome. Some trust hospitals are apprehensive of having outside surgeons operating on and supervising patients in their hospitals. At the moment this tends to be overcome by the trust giving proctors an honorary contract to the hospital for the time they are proctoring. Other hospitals merely ensure that patients being operated on give written consent and understand that they will be operated on by a surgeon who they have never met and probably never will meet. Funding for proctorships is a more difficult issue. At present, trust hospitals are quite prepared to pay for their surgeons to go on courses to other hospitals but are reluctant to pay for proctors to come to their hospital and operate on their patients. Similarly there is little enthusiasm on the part of the hospitals where the proctors are based to let their surgeons go and, in effect, work in another hospital, with no income being generated for the base hospital. These issues must be addressed and we suggest that a central fund is established to enable the proctorship system to be more satisfactorily organised.

The ideal training for a laparoscopic procedure is, firstly, for trainees to watch a video; if they have no laparoscopic experience, they should spend time on a pelvitainer before attending a hands-on course. The trainee should then arrange for an experienced surgeon to act as a proctor at his or her hospital.

These guidelines are similar to those required by many American hospitals before a surgeon is allowed to perform laparoscopic procedures. In addition, it is advisable for a colleague in the same hospital to share the experience as it is probably safer if two surgeons work together in the learning phase. When surgeons have undergone this process they should then be accredited by a recognised body (the Royal College of Surgeons). The accrediting body may grant accreditation on the recommendation of the proctor; suggest further training in the form of a further number of procedures being performed under supervision; or withhold accreditation altogether. (Laparoscopic surgery is not suitable for all surgeons. Cuschieri has estimated that 10% of surgeons will not take up these skills and are thus better confining their activities to open surgery. It is very unlikely that in the immediate future they will find themselves short of trade).

Training junior surgeons

With the introduction of laparoscopic cholecystectomy and laparoscopic hernia repair, traditional training operations have become operations performed by consultants, and until consultants are fully trained in these procedures, there will be a major problem in the training of younger surgeons. With time we will revert to our traditional apprenticeship training methods, but for the next few years this will clearly pose a problem and hands-on courses are going to be necessary for the more junior ranks. As more and more surgery is performed laparoscopically, this will mean that fewer and fewer juniors will be exposed to open procedures. This may well give rise to problems, for instance, when open cholecystectomy has to be resorted to in difficult cases or when complications

Though laparoscopic cholecystectomy has reduced general morbidity, the incidence of damage to the common bile duct has increased—an argument for organising training in laparoscopic surgery before other advanced techniques are introduced

occur. For the time being trainee surgeons will still be exposed to open gastrectomies, pancreatetectomies, and other complex procedures, but as laparoscopic surgery becomes more and more advanced and these more complicated procedures become available to the laparoscopic approach, training in all open procedures will be a problem for the future.

Minimally invasive centres

The government is setting up three centres for minimally invasive surgery: in London, Leeds, and Scotland. It is hard to see exactly what role these centres will play. They will certainly be able to teach with simulators and videos, and trainees will be able to observe surgical procedures being performed. However, they will not be able to use porcine models. The centres may act as a focus for the organisation of hands-on courses and proctorships in the regions but are unlikely to be able to run them by themselves. The hands-on courses that have been run to date have been organised almost exclusively by industry, with obvious beneficial effects for both the surgical profession and the companies involved. It is a sad reflection on surgical teaching, however, that we have to rely on commercial companies to organise the teaching of a new technique for surgeons. This surely is the responsibility of the Royal Colleges of Surgeons and should have been organised by them.

Audit

Should audit be compulsory? There is little enthusiasm from general surgeons for a compulsory national audit, but this will be necessary if we are going to get

any meaningful figures as to the true incidence of mortality and complications in this exciting new field.

Comprehensive audit should be introduced with training and accreditation. The Royal College of Surgeons of England has organised a voluntary confidential audit but it has only audited a fraction of the total number of laparoscopic cholecystectomies that have been performed throughout the country. As a result the true incidence of damage to the common bile duct may never be known. As newer techniques are introduced they must be audited to see if the operation is safe and has advantages over conventional surgery and to assess the long term complications. For instance, there are worrying reports of port site recurrences from colorectal laparoscopic surgery. The true incidence of this complication could be determined by a national audit. The centres for minimally invasive surgery that are being set up may have an important part to play in the development and running of such audits on a regional basis and coordinating results to produce a national picture.

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Commentary on the cholesterol papers

Two months ago the *BMJ* published three papers by Malcolm Law, Nicholas Wald, and colleagues on serum cholesterol concentration, ischaemic heart disease, and death (5 February, p 363-79). This week we publish an invited commentary on these papers by George Davey Smith and Matthias Egger and Law and Wald's response to their commentary. The debate continues on the letters pages (p 1038).

Statistical problems

George Davey Smith, Matthias Egger

Recently, some authorities have called for a change in direction in health policy on blood cholesterol concentrations,¹ while another group considers that current efforts are correct.² The overviews by Law and colleagues can help us make up our minds regarding which, if either, opinion is correct.³⁻⁵

Underestimation of risk of ischaemic heart disease

Following an old but increasingly popular tradition,⁶ Law and colleagues corrected the association between cholesterol concentration and risk of ischaemic heart disease for the attenuation (or regression dilution) due to measurement imprecision. Since cholesterol concentrations vary over time, prospective studies relating future risk of ischaemic heart disease to a single measurement will underestimate the true strength of the association. The adjustment is used because few epidemiological studies have obtained repeat measurements. As Spearman noted in 1904,⁶ however, such adjustments should be used carefully because they are not free of assumptions. They could be misleading if recent levels of a risk factor are

more important determinants of disease than earlier levels; if peaks in the level of the risk factor, rather than the usual value, are the important aetiological factor; or if changes in risk factor levels are important.⁷ Some studies have been able to examine the association of average cholesterol concentration with risk of ischaemic heart disease directly.^{8,9} These have indicated that although the correction factors may overestimate the strength of the association between usual cholesterol concentration and risk of ischaemic heart disease, repeated cholesterol measurements identify people at increased risk of disease better than a single measurement.

Law *et al* have introduced an extension of the correction for attenuation, which they called correction for surrogate measurement bias. Since it is the low density lipoprotein component of total cholesterol which is considered to increase the risk of ischaemic heart disease they argue that the association of total cholesterol with ischaemic heart disease underestimates the underlying association of low density lipoprotein cholesterol with ischaemic heart disease. They determined the degree to which total cholesterol

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