

sion Liaison Committee. They represent the third revision of the WHO-ISH guidelines and were finalised after presentation and discussion at the 6th WHO/ISH meeting on mild hypertension, Chantilly, France, 28-31 March 1993. The full text of the guidelines is published in the *Journal of Hypertension* 1993;11:905-18. The previous WHO/ISH guidelines were published in *Bull WHO* 1989;67:493-8 and *J Hypertens* 1989;7:689-93.

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Minimally Invasive Surgery

Implications for hospitals, health workers, and patients

H David Banta

Minimally invasive surgery is one of the great innovations of health care in the 20th century. It promises to revolutionise surgery by allowing many more operations to be performed with minimal hospitalisation. Pressure from patients has caused many techniques to spread rapidly before they have been adequately assessed. This must be resisted, and policy makers must pay more attention to minimally invasive surgery to ensure that good assessments are made. The widespread use of minimally invasive techniques has important implications for hospitals and health workers. As more patients are treated on an outpatient basis, fewer hospital beds will be needed, and traditional operating rooms will have to adapt to a greater turnover of patients. Surgeons will have to acquire new operating skills, possibly requiring formal training and accreditation, and, as different specialties fight for control of new technologies, surgery may eventually be merged with internal medicine so that specialists will deal with organ systems. Postoperative care will have to be carried out in the community rather than in hospitals, and policy makers will need to re-organise their health systems to cope with these developments.

Minimally invasive surgery covers techniques from many specialties of medicine and surgery. The key innovation is the treatment endoscope. In addition, vascular catheters have brought alternatives to open surgery on arteries, including coronary arteries, and advanced medical imaging methods such as computed

tomography have brought other possibilities such as draining abscesses through needles without open surgery. As part of a project sponsored by the European Commission, we collected a list of promising procedures in minimally invasive surgery and found that nearly all surgical procedures could be partially or totally replaced by less invasive alternatives.¹

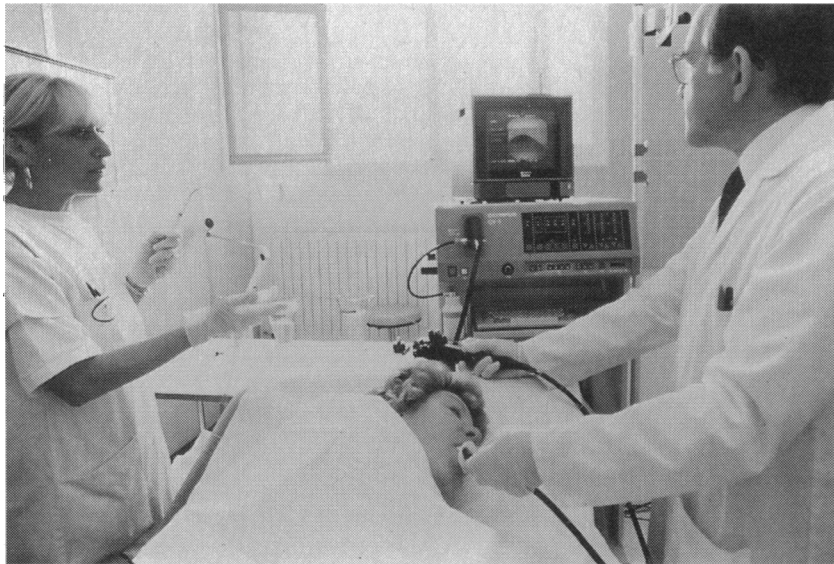
An example of the changes that may be wrought by such techniques is the development of laparoscopic cholecystectomy, which may have spread more rapidly than any other health care technology.² This technique began in France in 1987,³ and by 1988 it was already being done in the United States and other countries.⁴ As people with gall bladder problems learnt about the new procedure they refused to accept the traditional open surgery, for which four to six weeks of recuperation was necessary, associated with considerable pain and other problems.⁵ The laparoscopic procedure requires only a short hospital stay, in the United States it may be done without an overnight stay in hospital,^{6,7} and it allows a return to normal activities within a few days. In the future almost all gall bladder removals will surely be done by this method. It is certainly less traumatic and also appears to be safer, especially in skilled hands.^{6,8}

Problems with the spread of minimally invasive techniques

The problem with laparoscopic cholecystectomy was that it spread into use without careful evaluation. Surgeons adopted it under pressure from patients

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Minimally invasive techniques allow more opportunities for day surgery...

without knowing a great deal about its benefits and risks. Many surgeons have done the procedure without adequate training, and undoubtedly many patients have been harmed. It was only after the procedure was already widely used that groups of surgeons began to report their accumulated experience so that it can now be said that laparoscopic cholecystectomy is the procedure of choice for most gall bladder operations.⁸ The opposite, however, could have been true, and it could have been a dangerous procedure. There are many examples of medical practices that have diffused widely and then turned out to be useless or dangerous.

Many other techniques have developed and spread too rapidly to allow adequate assessments to be made. With procedures such as renal lithotripsy, balloon angioplasty, and arthroscopic surgery patients demanded the new procedures before they were properly evaluated.¹² In some cases such as extracorporeal shockwave lithotripsy and balloon angioplasty patients and professionals joined together to promote political pressure. In the Netherlands, for example, it proved to be impossible to limit the number of lithotripters because of pressures from parliament.⁹

In other cases, however, minimally invasive techniques have not spread as rapidly as perhaps they should have done, partly because of lack of assessment. Innovators have generally not carried out good studies of the benefits, risks, and costs of new procedures. As a result conservative doctors, especially surgeons, have argued that the procedures have not been shown to be

better than the traditional open procedures. For example, the laparoscope has been used in gynaecology for 20 years, and traditional open procedures such as removal of ovarian cysts can be done laparoscopically.^{10,11} This procedure, however, has still not been well evaluated, and open surgery remains the standard in most European countries. Endometriosis can also be treated laparoscopically, but, despite 20 years of experience, the evidence is not convincing that this procedure should replace other methods.¹² Another example is arthroscopy, especially in the repair or removal of a torn meniscus of the knee joint, which has also been in use for almost 20 years. Only one small randomised trial has compared arthroscopic meniscectomy and open meniscectomy, showing superior results for the arthroscopic procedure.¹³

A particular problem concerns cancer surgery, which makes up a substantial proportion of all surgery. Less invasive techniques have been used for treating cancers such as those of the large bowel, the lung, the upper gastrointestinal tract, and the female genital organs. Few procedures, however, have been well evaluated, and surgeons have remained committed to traditional surgery, arguing that newer alternatives may be unethical because they may cause some patients to die who otherwise could have been cured. It will require careful studies with long term follow up to discover if endoscopic treatment of colon cancer, for example, is as effective as traditional surgery.

RESPONSIBILITY FOR LACK OF ASSESSMENTS

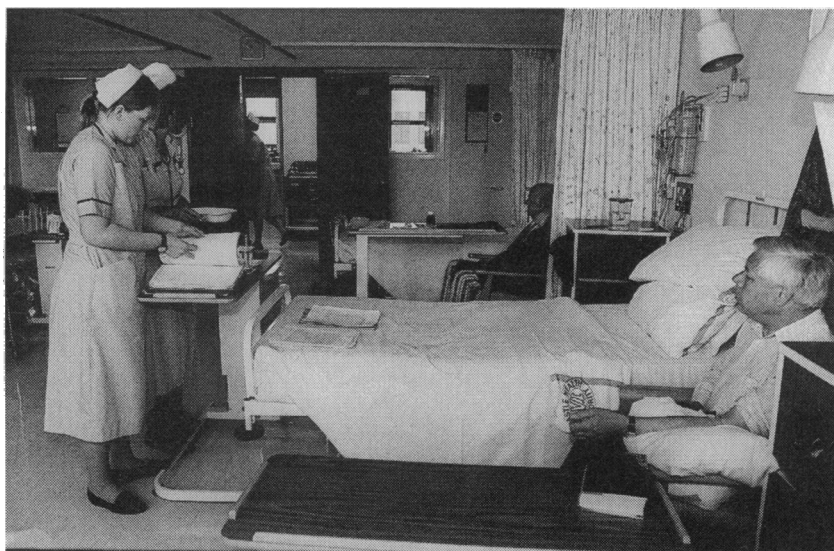
Although the medical profession can certainly be faulted for the lack of studies, the greater responsibility must be borne by governments and policy makers. Assessment studies generally need outside research funds, but only limited funds are available for this purpose and those that are available are not used particularly well. Few countries assess medical procedures for the purposes of deciding whether or not a procedure should be encouraged. In the United Kingdom a new research and development strategy has been set up with the aim of supporting research to assist clinicians and managers,¹⁴ and assessment will be one of the priorities for this program.¹⁵ Other countries need to pay more attention to the need for evaluation in improving quality of medical care, especially when faced with procedures that have great potential benefits. New minimally invasive techniques must not be allowed to spread without adequate assessment. It would be justifiable to restrain new procedures until they are assessed, assuming that someone will take the responsibility for organising and funding the assessments.

Implications of minimally invasive surgery

The widespread introduction of minimally invasive surgery has important implications for hospitals and other health care organisations, doctors (especially surgeons), other health care workers, and patients.

IMPLICATIONS FOR HOSPITALS

Because of its high potential for mortality and morbidity, surgery has been closely associated with hospitalisation for more than 100 years. About half of all hospitalisations in Western countries are for surgery. There has, however, been a trend towards day surgery for about the past 20 years.^{16,17} Many surgeons prefer to do surgery without a hospitalisation because of the reduced risk of complications, particularly postoperative infections (these infections are largely acquired in hospitals, where the organisms thrive). From an economic point of view, many people do not really need to be in hospital after minor surgery. Minimally invasive surgery brings many more possibilities for short stay surgery or day surgery, although



... meaning that fewer hospital beds will be needed



HOBSON/GAMMA/SPONNER

Minimally invasive surgery is more like playing video games than performing traditional surgery

this has not been recognised by doctors or policy makers in Europe. The situation is different in the United States, where more than half of surgical procedures are now done without an overnight stay in hospital.¹⁸ European countries have been slow to adopt this innovation, with typical rates of outpatient surgery of only about 20%, although the rates are rising.

Moving surgery out of hospitals, however, means changing the functioning of hospitals and the working practice of surgeons and other staff. It has great financial consequences for hospitals as they will lose many patients. In most European countries hospitals have every incentive to stay full. If they do not they lose revenue and risk having beds closed by an outside authority. As people are treated on an outpatient basis, however, fewer beds will be needed. How to interest hospitals in such a change is a considerable problem. Certainly, the method of paying hospitals needs to be re-examined.¹ Treatment on an outpatient basis with minimally invasive techniques will also require changes in the organisation of surgical services. Treatment will follow diagnosis much more quickly, often immediately, and traditional operating rooms will have to accommodate a more rapid turnover of patients.

IMPLICATIONS FOR SURGEONS

For surgeons, minimally invasive surgery requires an entirely new set of skills. Traditional surgeons value manual dexterity. They open a body with a hand held knife and sew the body shut by hand. They feel affected organs and judge whether tissue is normal. With minimally invasive surgery, surgeons must be able to judge three dimensions by looking through a scope and must be able to manipulate instruments guided by this judgment. It has been suggested that the skills required in playing video games are more relevant than the traditional skills of the surgeon. There is also a definite learning curve when beginning the new procedures. In one study the incidence of damage to the common bile duct fell from 2.2% in the first operations performed to 0.1% in later operations.⁵ In the United States the Society of American Gastrointestinal Endoscopic Surgeons has suggested that surgeons doing the procedures should be credentialed in hepatobiliary surgery. They should first have thorough training in the procedure in animals and should be initially supervised by surgeons already experienced in doing the operation on people.¹⁹ Apparently, no European body has yet defined clear standards for training and education with the techniques of minimally invasive surgery.

What is to become of surgery as a specialty? I believe

that it will gradually be merged with internal medicine so that specialists will deal with organ systems such as the upper part of the gastrointestinal tract. This will cause problems. Cardiologists have already come into conflict with cardiac surgeons and radiologists over balloon angioplasty, and general surgeons have struggled with gastroenterologists for control of the new technologies.¹ The specialties that already combine both medical and surgical treatment, such as gynaecology and urology, will find the changes easier.

IMPLICATIONS FOR OTHER HEALTH WORKERS

As treatment is given on an outpatient basis, post-operative care will have to be given in the clinic or even at home and it will be necessary to blur the barriers between hospital care and out of hospital care.^{16,17} With traditional surgery a patient is sent home almost fully recovered, but without hospitalisation a patient will need careful follow up, perhaps by a general practitioner or a visiting nurse. Most health systems are presently unable to make such arrangements. Furthermore, new methods of monitoring and quality assurance will be needed. Hospitals monitor the quality of their care, but there has been less experience in the out of hospital setting. Minimally invasive procedures are still potentially dangerous, and when they are done without hospitalisation patient follow up and collection of data on outcome will be necessary.

IMPLICATIONS FOR PATIENTS

By definition, minimally invasive surgery causes less immediate harm to the patient than open surgery. Intuition and common sense say that, overall, it must be a worthwhile innovation. The patient can avoid most of the human cost of surgery: the pain and the risk of injury, death, and postoperative infection. People can return to their normal activities almost immediately after surgery. For example, after arthroscopic knee surgery it is possible to begin walking immediately and to take up more vigorous exercise shortly afterwards.^{20,21}

ECONOMIC IMPLICATIONS

Minimally invasive surgery has developed at a time of rapid organisational and technological change in health care. Cost pressures have caused policy makers to ask if high rates of hospitalisation and long lengths of stay in hospital are really necessary. Such questions are stimulated by the aging of the population and the



GREENHILLS

Postoperative care will have to be given in the community

corresponding increase in the rates of chronic disease. How can elderly people be cared for adequately without greatly increasing the resources available? Minimally invasive surgery is one of the most important technological changes to allow reduction of the rates of hospitalisation. From an economic point of view this is desirable because each procedure becomes cheaper, mainly due to a shorter hospital stay and an earlier return to normal activities.¹ Expenditures in health insurance and social insurance are also reduced. If hospital beds are not closed, however, many of the benefits of shorter lengths of stay will not be realised.

A potentially negative consequence of the new technologies is that they allow operations to be performed in circumstances where previously nothing would have been done. Kidney stones were not previously treated unless they were symptomatic, but, with extracorporeal shockwave lithotripsy replacing open surgery, it is now routine to treat any stone that happens to be found during investigations for other purposes.²² Gall bladders were not removed unless gall stones were associated with infection. Now stones can be easily removed, and why not take the gall bladder at the same time? Women with pelvic pain often have a diagnostic laparoscopy, and gynaecologists have now started to remove normal appendixes during these diagnostic procedures.²³ Such practices threaten to increase overall costs of care with no measurable benefit and some risk to patients.

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Senior house officers: the lost tribes

Luisa Dillner

There are more senior house officers than doctors in any other training grade in Britain but nobody knows what they do in hospitals or has a clear idea what skills they should be learning. Nobody is responsible for them and they suffer from having a poor career structure and inadequate training. Now that there are government initiatives to reduce the hours that junior doctors work and to limit the time it takes to train to become a specialist, the problems that senior house officers face can no longer be ignored. A conference for senior house officers held last week talked about the problems that they face and tried to find some solutions.

The new deal on junior doctors' hours has uncovered the biggest mystery in medical staffing. As soon as regional task forces tried to reduce junior doctors' hours they found that no one knew how many senior house officers there were or what they were doing. No one, it seems, is responsible for their training, career structure, or working conditions. While the General Medical Council keeps an eye on undergraduates and the royal colleges watch over doctors in higher specialist training, senior house officers have no one to speak for them.

Last week the voice of senior house officers was heard at a national conference to discuss the problems they face and the possible solutions. Organised jointly by the BMA, *BMJ*, and Oxford Regional Health Authority, the conference attracted over 300 people, nearly two thirds of whom were senior house officers.

What are the problems?

One of the reasons why senior house officers are neglected is that they are a migrant work force. The title of the conference, "SHOs: The Lost Tribes," accurately describes their predicament, said Elisabeth Paice, associate postgraduate dean at North East Thames regional health authority. "There are more senior house officers than any other training grades but they are constantly on the move. When you are in a post for only six months, even if you think something should be changed it is difficult to get the energy to do something about it," she said. "If you do try to do something about it, the hospital authorities or the consultants think that you will be moving on and they might as well wait for someone less troublesome to replace you. One senior house officer said to me that the only thing she had managed to change were her references."

Elisabeth Paice has visited 16 hospitals in her region and talked to 303 senior house officers about their jobs. She asked about their workload, level of supervision, education, and living conditions. "Many worked jolly hard and liked it that way but 152 whom I spoke to said that their workload was heavy or excessive. Some of them found that they were seriously stressed and talked about having six months off or abandoning medicine altogether," she told the conference. "It wasn't simply the hours of work. In some places I visited the new deal was coming in and the reductions in hours were apparent, but in some areas the same body of work was being done by the same number of