

Laparoscopic Surgery: The Scientific and Professional Challenge

R.C.G. RUSSELL MS FRCS
The Middlesex Hospital, London, UK

The objective in surgical advance is to treat patients more effectively. Minimal access or minimally invasive surgery has addressed some aspects of this goal, namely patient comfort and quality of recovery. Further, the concept of minimally invasive therapy addresses, in these times of public interest in therapy, two key areas, namely absence of pain from the wound and a good cosmetic result; indeed, when the concept of this mode of therapy was first discussed in our group at the Middlesex Hospital London in 1982, the therapy was called “no scar surgery”. Patients do not like scars and are body image conscious; further, pain is no longer considered a necessary evil in the management of disease^[1]. Thus, the concepts of minimally invasive therapy immediately attracted strong public interest as part of the ethos of modern medicine. Almost by coincidence, this surgery enabled the patient to make a surprisingly rapid recovery with consequent early discharge from hospital and short convalescence. Governments, under pressure from increasing health care costs, through their local funding, supported the developments as a means of cost containment. Industry, usually a small player in surgical practice, was faced with an opportunity for enormous growth for not only did minimally invasive therapy rely on expensive equipment such as the video camera, monitors and insufflators, there was the potential for an enormous sale of complex disposable instruments – a manufacturers dream. What of the surgeon – the entrepreneur saw the opportunity of spreading his wings, and achieving the technicians dream, for once again he could talk about operations which is above all what fires the enthusiasm of most surgeons.

The scene was set for an explosive growth in this new form of surgery as the patient liked it, health care costs would fall so the health authorities liked it, the health industry saw tremendous commercial opportunity so they liked it, and the surgeon could

again talk respectably about technique so he liked it. What is more, after the success of lithotripsy for renal stones the first laparoscopic procedure which took the fancy of the general surgeon, laparoscopic cholecystectomy, rapidly became a success fulfilling all the wishes of agencies involved in its establishment. If laparoscopic cholecystectomy is such a success, why not other surgical procedures? Extravagant claims that the whole of surgery will soon be performed through a 'keyhole' are being made, and rational thought is cast aside.

Laparoscopic cholecystectomy was developed along classical lines by Dubois^[2] and others with careful laboratory work, and then careful patient trial on the basis of a vast experience with mini-cholecystectomy. The latter operation had been pioneered by Dubois^[3]; he considered that the laparoscopic method was superior, and thus did not feel it necessary to undertake clinical trials. His experience with laparoscopic cholecystectomy and that of other experts have shown that the technique is remarkably safe and free of complication^[4]. Troidl and his colleagues in Cologne^[5] considered that a clinical trial was necessary, to determine whether the laparoscopic technique was superior to the open operation. They correctly considered that the learning curve associated with any new technique should be passed before commencing the trial, but by the time their learning curve was completed, they felt it was inappropriate to undertake a trial because of patient preference. Clinical trials so far performed, however, show that the differences between the procedures are not great, and probably the cost of the laparoscopic technique is greater than the conventional technique^[6,7]. A further problem is that many groups are comparing traditional open cholecystectomy with the laparoscopic procedure, thus the comparison is unfair as a mini-cholecystectomy with a 5 cm muscle splitting incision,^[8] a no touch technique and preemptive analgesia followed by postoperative wound blocks^[1] can compare very favourably with the laparoscopic procedure. There is no doubt that laparoscopic cholecystectomy in the hands of an expert surgeon undertaking more than 100 such procedures per annum personally will produce results that are better than mini-cholecystectomy. Nevertheless, the acute gallbladder will still present problems, and the extended operative times will lead to a cost disadvantage^[6]. What of the occasional cholecystectomists? This is the root of the problem. There will always be the rare and talented surgeon who can do the occasional procedure adeptly, but the average surgeon needs practice with the specialist techniques associated with laparoscopic surgery. For the surgeon who has not learnt operative laparoscopy from the beginning of his training, I believe that practice is necessary, and that in order to achieve a good level of skill at least one operative laparoscopic procedure should be performed per week. Consistent use of such skills will enable the surgeon to compete with the best to prevent the major complications such as bile duct injury at cholecystectomy. It is this one major injury that is causing doubt amongst regulatory authorities in the United States, and hopefully around the world^[9]. A rate of 0.4% is acceptable, but above the level is a cause for great concern^[10-14]. What has been of more concern is the fact that many surgeons will try and repair these bile duct injuries, having little or no previous experience. Bile duct repair is without debate for the specialist, and repair by the non-specialist is negligent.

Further, many of the problems associated with laparoscopic cholecystectomy can be managed non-operatively in the specialist hepato-biliary unit after careful outlining of the problem by the appropriate imaging. Laparotomy at this stage is not only difficult but detrimental to the long-term outcome of the patient.

Acknowledgement of expertise is the great lesson of laparoscopic surgery, and the judgement to convert to the open procedure for the sake of patient safety is the challenge which faces every surgeon undertaking these procedures.

For the general surgeon, the next operative procedure to approach laparoscopically was appendicectomy. Karl Semm had shown the way^[15], and the preciseness and accurate visualisation of the lower abdomen with the ability to exclude other pathology together with neat removal of the appendix appealed to the logical mind. Unfortunately, the technical problems associated with the retrocaecal appendix, the perforated appendix with a peritonitis, and a bulky appendix which cannot be delivered through a 11 mm port dissuade many from enthusiastically advocating the technique. Further, most appendicectomies are performed as an emergency when the appropriate staff are unavailable. The scientific challenge of whether the technique is better has recently been answered by one group from Dublin^[16] who have shown that there are advantages in performing appendicectomy laparoscopically, but the professional challenge must be to define criteria for the type of appendix which can be done laparoscopically, by open appendicectomy or by a laparoscopic assisted procedure.

Perhaps the greatest challenge is the commonest of all procedures – the hernia. With a Shouldace repair performed under local anaesthetic as a day case, all the criteria for minimal access surgery are met^[17]. Further, the complication rate is very low, with a recurrence rate approaching 1%. Is there a need for improvement? For those who have experienced hernia repair, pain is a problem, and limited mobility during the first few days is common. It is suggested that the rapidity of recovery is greater in those who have the procedure laparoscopically, and return to work is possible within 2 or 3 days^[18]. Is such a goal worth the risk of laparoscopy, the unknown risk of recurrence and the expense of the procedure. At the present time, a hernia repair relies heavily on the use of expensive disposables; this is good for health care manufacturing businesses but a major problem for the health care provider. The dilemma for the surgeon, even if there proves to be a slight advantage for the laparoscopic technique, is whether the increased procedure cost is justified.

So often a procedure is laparoscopic or open, yet the logic may well lie in the laparoscopic assisted procedures. With more major surgery, particularly oncological operations, there is a danger that the surgeon will forget the principles of surgery and oncology for the sake of technical prowess. Excellence of technique is but a means of attaining the ideal outcome for our patients. Nowhere is this more true than in colonic surgery. Laparoscopy before any cancer surgery is of value with its view of the dome of the diaphragm and the pelvic peritoneum where those seedling deposits accurately define the true extent of the disease^[19]. Mobilisation of the large intestine

can easily be performed, and if properly undertaken will allow the colon to be delivered to the skin surface. A small incision, but not too small such that the tumour has to be squeezed through the abdominal wall, is undertaken, and the procedure with the anastomosis is performed under direct vision on the surface of the abdomen^[20]. The tour de force of a high-tie with an expensive vascular stapler is rarely necessary, and a good lymph node clearance can be achieved on the surface of the abdomen after appropriate mobilisation. The profligate use of multiple vascular cartridges to divide the mesentery cannot be condoned when there are effective simpler alternatives. The anastomosis can be undertaken on the surface or by the use of stapling sutures using the circular stapler, but again as the number of disposables mounts so the cost disadvantage outweighs the clinical gain. The role of the manufacturer must bear down heavily on surgical decision making.

Thus, the surgeon finds himself with a burden of responsibilities – first and foremost is the patient with his desire for any easy and successful operation from which he will make a scar-free recovery. Second, must be the intelligent use of all the new technology available including the use of improved preoperative, peroperative and postoperative anaesthesia and analgesia together with improved surgical technique – careful and bloodless anatomical surgical dissection is not the prerogative of the laparoscopist. Third, is the pressure of the health care industry providing better yet more expensive and perhaps unnecessary equipment, yet taunting the surgeon that to be modern and at the forefront of the surgical revolution he must undertake the exciting procedure. Fourth, but not least important, is the pressure from the health providing executive demanding cost control.

The professional challenge is to answer each of these dilemmas by careful study of the available alternatives. Sloth in undertaking this evaluation will mean that the surgeon is but a poodle at the call of whichever master calls loudest and perhaps most sharply.

References

- [1] **Bush, D.J.** Pre-emptive analgesia. *Br Med J* 1993; **306**: 285-286.
- [2] **Dubois F, Icard P, Berthelot G, Levard H.** Coelioscopic cholecystectomy. A preliminary report of 36 cases. *Ann Surg* 1990; **211**: 60-62.
- [3] **Dubois F, Berthelot B.** Cholecystectomie par mini-laparotomie. *Nouv Presse Med* 1982; **11**: 1139-1141.
- [4] **Deziel DJ, Millikan KW, Economou SG, Doolas A, Ko S-T, Airan MC.** Complications of laparoscopic cholecystectomy: A national survey of 4,292 hospitals and an analysis of 77,604 cases. *Am J Surg* 1993; **165**: 9-14.
- [5] **Neugebauer E, Troidl H, Spangenberg W, et al.** Conventional vs laparoscopic cholecystectomy and the controlled trial. *Br J Surg* 1991; **78**: 150-154.
- [6] **Stoker ME, Vose J, O'Mara P, Maini BS.** Laparoscopic cholecystectomy. A clinical and financial analysis of 280 operations. *Arch Surg* 1992; **127**: 589-595.
- [7] **McMahon AJ, Baxter JN, Russell IT, et al.** Laparoscopic and mini-laparotomy cholecystectomy: a randomised trial comparing postoperative pain and pulmonary function (*In Press*).
- [8] **Cheslyn-Curtis S, Russell RCG.** Laparoscopic cholecystectomy [letter] *Br Med J* 1991; **302**: 594.

- [9] **Editorial.** NY State issues privileging guidelines for laparoscopy. *General Surgery and Laparoscopic News* 1992; **13(8)**: 5-8.
- [10] **Davidoff AM, Pappas TN, Murray EA, et al.** Mechanism of major biliary injury during laparoscopic cholecystectomy. *Ann Surg* 1992; **215**: 196-202.
- [11] **Kern KA.** Risk management goals involving injury to the common bile duct during laparoscopic cholecystectomy. *Am J Surg* 1992, **163**: 551-2.
- [12] **Moossa AR, Easter DW, vanSonnenBerg E, Casola G, D'Agostino H.** Laparoscopic injuries to the bile duct. A cause for concern. *Ann Surg* 1992; **215**: 203-208.
- [13] **Rossi RL, Schirmer WJ, Braasch JW, Sanders LB, Munson JL.** Laparoscopic bile duct injuries. Risk factors, recognition and repair. *Arch Surg* 1992; **127**: 596-602.
- [14] **Wooton FT, Hoffman BJ, Marsh WH, Cunningham JT.** Biliary complications following laparoscopic cholecystectomy. *Gastrointest Endosc* 1992; **38**: 183-185.
- [15] **Semm K.** Endoscopic appendectomy. *Endoscopy* 1983; **15**: 59-64.
- [16] **McAnena OJ, Austin O, O'Connell PR, Hederman WP, Gorey TF, Fitzpatrick T.** Laparoscopic versus open appendectomy: a prospective evaluation. *Br J Surg* 1992; **79**: 818-820.
- [17] **Glassow F.** Inguinal hernia repair using local anaesthesia. *Ann R Coll Surg Engl* 1984; **66**: 382-387.
- [18] **Macintyre IM.** Laparoscopic herniorrhaphy [Editorial]. *Br J Surg* 1992; **79**: 1123-1124.
- [19] **Fernandez del Castillo C, Warshaw AL.** Diagnostic and preoperative evaluation of pancreatic carcinoma with implications for management. *Gastroentrol Clin N Am* 1990; **19**: 915-933.
- [20] **Darzi A, Hill ADK, Henry MM, Guillo PJ, Monson JRT.** Laparoscopic assisted surgery of the colon. Operative technique. *End Surg* 1993; **1**: 13-15.

جراحة المناظير التحدي المهني والعلمي

آر. سي. جي. رسل

مستشفى ميدل سكس ، لندن ، المملكة المتحدة

المستخلص . تقدمت جراحة المناظير وأعطت المرضى والأطباء هدفاً يسعون له وهو الجراحة بألم أقل بدون جروح . ونتيجة لهذا التقدم تدخلت الأوساط الطبية الصناعية لدعم هذا التقدم ، وكان الكاسب الأكبر هو الشركات الصناعية التي وجدت في تصنيع معدات هذه العمليات الفرصة السانحة لكاسب خيالية ، وبدأت تضغط على الجراحين لإجراء تجارب أكثر وإدخال مزيد من الجراحات تحت هذه المظلة .

فاستتصال الحويصلة المرارية رغم تكلفتها بالنجاح لانتخو من مضاعفات إذا لم يكن الجراح متمرنًا بما فيه الكفاية ، ثم تبعها عملية استئصال الزائدة الدودية ، وتصليح الفتق ، وعمليات استئصال سرطان القولون ، وغيرها .

ويجد الجراح نفسه تحت ضغط من المريض لإجراء جراحة أبسط واحتياجاته للخبرة الواسعة في استعمال المعدات الجراحية ، وتحت ضغط الصناعيين لإجراء هذه الجراحات وإغرائه بحجة التقدم . وأخيراً ، فإن الدوائر الصحية تضغط لتقديم هذه الجراحات لتقليل التكلفة .

ولذا ، وجب على الجراح دراسة جميع البدائل المتاحة قبل الإقدام على أحدها وألا يكون أداة في يد الآخرين .