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Laparoscopic surgery at Sultan Qaboos University Hospital

* Grant C S, Al-Kindy N, Machado N, Daar A S

جراحة المناظير بمستشفى جامعة السلطان قابوس

ك. جرانت ، ن. الكندي ، ن. مشادو ، ع. داعر

الملخص: إن الشهرة التي اكتسبتها عملية الجراحة بالمنظار في أواخر عام 1980م قد أصبحت حقيقة واقعة بمستشفى جامعة السلطان قابوس في عام 1992م. وذلك بعد الاطلاع على الدراسات والبحوث العلمية التي أعدت في شأن العمليات الجراحية باستخدام المنظار وكذلك الاطلاع على خبرات الذين أعدوا تلك الدراسات. تتضمن ورقة العمل هذه التقنيات المختلفة في مجال الجراحة بالمنظار والمستخدمة حاليا بالمستشفى الجامعي ومن بينها استئصال المرارة، إستئصال الزائدة الدودية، تشخيص بعض الأمراض، وكذلك علاج دوالي الخصيتين. بالإضافة إلى كل ما تقدم تظهر الورقة بيان الدور الذي يقوم به مركز تدريب جراحة المناظير بالمستشفى الجامعي المتمثل في توفير المختبر اللازم للمتدربين في مجال الجراحة والممارسين لها. في الخلاصة تتضمن الورقة أن العمليات الجراحية باستخدام المنظار بالمستشفى الجامعي سوف تستمر في التطور والتقدم وذلك من خلال إجراء العمليات الجراحية الجديدة واستخدام التقنيات المتقدمة.

ABSTRACT: Laparoscopic surgery, which gained prominence in the late 1980s, became an established surgical practice in Sultan Qaboos University Hospital (SQUH) in 1992. Drawing on available literature and the authors' own experiences, this paper gives an overview of various laparoscopic surgical techniques currently available at SQUH, including laparoscopic cholecystectomy, laparoscopic appendicectomy, diagnostic laparoscopy and laparoscopic varicocoelectomy. It also highlights the role of surgical endoscopic training centre at SQUH, which provides a laboratory setting for surgical trainees and practising physicians. Laparoscopic surgery at SQUH would continue to evolve spurred on by surgical innovations and advances in technology.

KEY WORDS: laparoscopic surgery, Oman

The era of laparoscopic general surgery arguably began in 1987 when the first laparoscopic cholecystectomy was performed in Lyon.[1] This landmark surgery remained largely unnoticed until the technique was popularised a couple of years later in North America and in Europe.[1-4] The perceived advantages of the technique caused it to be rapidly adopted into surgical practice worldwide without being evaluated by formal randomised studies, unlike any other innovation in modern surgical history.[4] By early 1990s it had become the operation of choice for symptomatic gallstones.[5] The phenomenal technical success of laparoscopic cholecystectomy, made possible by the rapid advances in videotechnology and operative instrumentation, spurred surgeons to develop and expand the application of laparoscopy to other intra abdominal operations, thus establishing laparoscopic surgery as a dynamic and expanding specialty with a new name: minimally invasive surgery.

At Sultan Qaboos University Hospital (SQUH), we embraced the promises of laparoscopic surgery in 1991 and carefully planned its introduction into surgical practice. Our first laparoscopic cholecystectomy, successfully performed on April 25, 1992, marked the beginning of laparoscopic general surgery at SQUH and indeed, in Oman. We have since then gone through the learning curve like most other institutions in the world. Now laparoscopic surgery is firmly established at SQUH, with a fair number of operations other than cholecystectomy being done using laparoscopic techniques. This paper aims to give an overview of laparoscopic general surgical operations done at SQUH and indicate the technique's benefits, problems and future trends.

LAPAROSCOPIC CHOLECYSTECTOMY

Laparoscopic cholecystectomy is now the single most common general surgical operation being performed at SQUH. It is offered as an elective procedure mainly for patients with symptomatic gallstones proven usually by ultrasonography. A few patients with gallstones are not eligible for the procedure. For example, unfitness for general anaesthesia, uncorrectable coagulopathy and concurrent diseases requiring

Department of Surgery, College of Medicine, Sultan Qaboos University, P.O.Box: 35, Postal Code: 123, Muscat, Sultanate of Oman

*To whom correspondence should be addressed.

FIGURE 1. *Laparoscopic cholecystectomy being performed at SQUH*

FIGURE 2. *Gall bladder being removed through a tiny epigastric incision*

laparotomy are considered absolute contraindications. Acute cholecystitis and dense adhesions from a previous surgery increase the chances of conversion from laparoscopic to open procedure.

The technique of laparoscopic cholecystectomy involves first creating a pneumoperitoneum with carbon dioxide and passing a set of long, thin instruments (the first one being an endoscope) through four tiny separate incisions in the abdominal wall, each of 1 cm or less in length. The gallbladder is then dissected out under endoscopic video-monitored vision, and then removed through one of the incisions. Over 900 laparoscopic cholecystectomies have been performed at SQUH since 1992, with minimal morbidity and no mortality.

The diagnosis and management of common bile duct (CBD) stones is controversial.[5] We generally attempt to diagnose and treat CBD stones before surgery. All patients with gallstones with any one of the following—a history of jaundice or pancreatitis, abnormal liver function tests or raised amylase level, dilatation of the biliary tree on ultrasonography—first undergo endoscopic retrograde cholangio pancreatography (ERCP) and if indicated, papillotomy followed by laparoscopic cholecystectomy two or three days later. We use operative cholangiography selectively, based largely on the pre-surgery investigations and operative findings.

The advantages of laparoscopic cholecystectomy over open cholecystectomy have been well documented: tiny incisions, less post-operative pain, rapid recovery and early return to normal activity.[5,6] The overall savings on healthcare costs have also been well-reported.[7] Most of our patients, barring social problems, are discharged by 48 hours after surgery and resume normal activity by 2 weeks.

However, compared to open surgery, there is a slightly increased risk of damage to the CBD. Injury to the CBD has been reported in 0–2% of laparoscopic cholecystectomies compared with 0–0.6% for open cases.[6-8] The rate of CBD injury for our series of 900 cases was 0.6%, most of which occurred during our early learning phase, reflecting the generally reported trend. With increasing experience and improvements in techniques, these disadvantages can be reduced to the barest minimum,[5,6] and we have achieved this. Thus, our safety level with laparoscopic cholecystectomy is comparable to some of the best units in the world, and is still improving.

LAPAROSCOPIC APPENDICECTOMY

Although laparoscopic appendicectomy was described as early as 1983,[8] general surgeons were not enthusiastic, partly because of the cumbersome and inadequate instrumentation and optics of the time and partly because there was no perceived advantage over open appendicectomy. However, the recent advances in video-laparoscopy and enthusiasm generated by

laparoscopic cholecystectomy have resulted in resurgence in laparoscopic appendicectomy.

We introduced laparoscopic appendicectomy into surgical practice at SQUH at about the same time as laparoscopic cholecystectomy. Unlike the latter, most of the laparoscopic appendicectomies at SQUH were emergencies. Furthermore, due to shortage of supporting staff at night, the procedure has largely been restricted to cases of acute appendicitis presenting during working hours or during daytime at weekends. In spite of this, over 200 laparoscopic appendicectomies have been performed at SQUH since 1992, with minimal morbidity.

Two recent reports of prospective randomised trials comparing laparoscopic appendicectomy with open appendicectomy suggest that the laparoscopic approach results in less pain, a shorter post-operative hospital stay and fewer wound complications.[9,10] Preliminary analysis of our series, however, suggests that these perceived advantages of laparoscopic over open appendicectomy might be less than the advantages of laparoscopic cholecystectomy. At least in our hands, there is usually minimal post-operative pain and disability after open appendicectomy for uncomplicated appendicitis. Laparoscopic appendicectomy is also viewed as not being cost-effective, mainly because of the cost of the disposable instruments used. We have minimised the cost by using re-usable instruments for this procedure.

Nonetheless, we believe the laparoscopic approach offers a great advantage over open appendicectomy in obese patients, as the latter method often requires extensive incisions to achieve a safe appendicectomy. The technique is also particularly useful in female patients in whom the diagnosis of acute appendicitis is more often unclear. Even if the appendix is found normal, the laparoscopic method affords the surgeon a better view of the rest of the viscera. It is also likely that the laparoscopic approach causes fewer adhesions than the open procedure.[11]

DIAGNOSTIC LAPAROSCOPY

This well-established investigative procedure pioneered by gynaecologists is also being widely adopted by general surgeons. The indications for diagnostic laparoscopy in surgical practice are expanding; the main ones currently are evaluation of abdominal pain, staging of abdominal malignancies and evaluation of abdominal trauma. We frequently use the procedure to evaluate patients with undiagnosed acute and chronic abdominal pain, when clinical examination and standard tests have not yielded a diagnosis. The diagnostic accuracy of laparoscopy in the evaluation of acute abdominal pain has been reported to be 80–90%,[12] and this is approximately what we have also observed.

Our experience with laparoscopic staging of abdominal malignant tumours is limited by the numbers and the pattern of referrals. Laparoscopy has proved useful in the diagnosis and staging of abdominal tumours through direct visual assessment and accurate biopsies of lesions. Unlike imaging techniques such as ultrasound, computed tomography or magnetic resonance imaging, laparoscopy can detect peritoneal metastases and lesions smaller than 1 cm in diameter on the surface of the liver.[13]

We have very little experience with diagnostic laparoscopy for abdominal trauma. The results of a recently reported prospective series suggest that the procedure is superior to peritoneal lavage since it can potentially reduce the number of unnecessary open laparotomies and therefore would be increasingly used in the evaluation of abdominal trauma.[14]

LAPAROSCOPIC VARICOCOELECTOMY

By 1995, laparoscopic treatment of varicocoeles was included in the laparoscopic procedures offered at SQUH. The advantages claimed for this approach, as compared with the open technique, include the certainty of vein ligation and the benefits of minimal access. The laparoscopic procedure also appears to offer a particular advantage in patients with bilateral disease or recurrence following open varicocoelectomy. So far about 54 patients with symptomatic varicocoeles have been treated laparoscopically at SQUH with very encouraging results.

LAPAROSCOPIC INGUINAL HERNIORRHAPHY

Open repair of inguinal hernia is one of the most commonly performed operations worldwide. It is often associated with significant post-operative pain and a delayed return to normal activities. The open repair has a recurrence rate of 5 to 10% in non-specialized centres.[15] It was initially believed that laparoscopic repair of inguinal hernia had the potential to duplicate the superior results achieved by laparoscopic cholecystectomy. Several techniques of laparoscopic hernia repair have been developed, but some were quickly recognised to be associated with high rates of recurrence and were abandoned.[16]

In 1993, when we first performed laparoscopic inguinal herniorrhaphy, we used the trans-abdominal pre-peritoneal approach and a stapled patch of prosthetic (polypropylene) mesh over the inguinal floor. Though the early trial results in 17 cases were encouraging, 3 patients developed significant post-operative

thigh pain, which led us to suspend the laparoscopic technique. This complication, very likely due to nerve entrapment by the staples used to hold the mesh, is well recognised now and as a result many centres have abandoned the procedure.[17] We still regard the laparoscopic technique to be experimental and risky compared to the conventional open technique and, so far, as not being cost-effective. Nevertheless, newer techniques are evolving to overcome some of these acknowledged disadvantages. We are keenly awaiting the results of randomised prospective multicentre trials in the US and Europe comparing open hernia repair with laparoscopic minimal access hernia repair.

MISCELLANEOUS PROCEDURES

We have performed various other laparoscopic procedures but rather infrequently, either electively or as emergencies. These include highly selective vagotomy for chronic duodenal ulcer, closure of perforated duodenal ulcers, lysis of intestinal adhesions, deroofing of solitary hepatic cyst, and fashioning of colostomy. Laparoscopic fundoplication (Nissen's procedure) was performed on 3 patients with severe reflux oesophagitis. It is noteworthy that while surgery for gastro-oesophageal reflux disease (GORD) is fairly common in North America and Europe, it is rare in Oman and in the Gulf. One explanation for this is that physicians in the Gulf may have a very high threshold for referring patients with GORD for surgery. It is also possible that significant GORD is less prevalent in the Gulf, but this has to be verified by a survey.

Video-assisted thoracoscopic surgery is also rapidly evolving worldwide in the wake of the success of laparoscopic surgery as it is also perceived to have similar advantages, namely, minimal access, less postoperative pain, rapid recovery and early return to normal activity. Our thoracoscopic surgical practice is at present quite limited but procedures accomplished at SQUH include fashioning a pericardial window, resection of apical bullae in recurrent spontaneous pneumothorax and lung biopsies.

TRAINING AND DEVELOPMENT

Training is vital for endoscopic surgery. We have trained four senior registrars, four registrars and several senior house officers since our programme started. Currently, all registrars in the department competently perform laparoscopic cholecystectomy, appendicectomy and diagnostic procedures.

General surgical residency programmes now require all trainees to be proficient in the basic laparoscopic techniques. To meet these demands, a Surgical Endoscopic Training Centre (SETC) was set-up at SQU in December 1996. When the centre is fully fledged, surgical residents would be able to sharpen their laparoscopic skills by practising on models and animals in laboratory setting. Regular courses are envisaged in basic and advanced laparoscopic techniques, with the assistance of invited experts, for the benefit of practising surgeons in the region. Two courses have been run so far. The SETC, which we set up together with colleagues from the Ministry of Health, would also provide a setting for innovative endoscopic surgeons to test new techniques or do experimental work.

In conclusion, laparoscopic surgery is now well established at SQUH and will continue to evolve, fuelled by surgical innovation and improvements in instrumentation and video-technology. However, the issue of cost will continue to be a limiting factor.

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