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The ability to perform an operation on a patient hundreds or thousands of miles away from the surgeon was initially conceived as a means of offering emergency surgical care in extreme environments, such as a battlefield or in space. In fact, the first surgical robotic prototypes were funded by DARPA and NASA grants to meet exactly such a vision.

The first robotic-assisted remote telepresence surgery using an early prototype of the da Vinci robot developed by Stanford Research Institute was performed successfully by Drs. Rick Satava and John Bowersox in 1996 (Figure 1).¹² It was, however, Prof. Jacques Maescaux and his team from IRCAD who in September 2001 performed the first clinical robot-assisted remote telepresence surgery (RARTS), a laparoscopic cholecystectomy, using a specially adapted ZEUS robot (Computer Motion, Goleta, CA) on a patient 7000 km away from the primary surgeon (Figure 2).³ Our team at the Centre for Minimal Access Surgery (CMAS) in Hamilton, Canada, has now performed 22 RARTS on patients 350 km away in the northern Ontario town of North Bay (Figure 3). Our ability to successfully perform complex surgical procedures ranging from laparoscopic Nissen fundoplications to laparoscopic anterior resections has demonstrated the viability of remote telesurgery in the dissemination of surgical expertise and delivery of surgical care to remote patients.⁴

In October of 2004, a crew of 3 astronauts from Canada and the USA took part in NEEMO 7 (NASA Extreme Environment Mission Operation) and conducted several telesurgical experiments while living in a saturated environment in a laboratory 50 feet underwater 5 miles off the coast of Key Largo, Florida. The crew was aided by a surgical team from CMAS through Internet telecommunication and were able to successfully perform surgical procedures including cystoscopy and stone basket retrieval of a ureteric stone, repair of arteries, and laparoscopic cholecystectomy on artificial cadavers (Figure 4). The 3 astronauts were not surgeons, and one was not even a physician, yet they were able to successfully complete all the surgical tasks. . . .
surgeons, and one was not even a physician, yet they were able to successfully complete all the surgical tasks at a level expected of a resident in surgery using telementoring and simple telerobotic assistance.

NEEMO 7 proved that the original concept of delivering emergency surgical care in the absence of a surgeon is feasible. However, the current size and weight of the robotic platform prohibited NEEMO 7 from utilizing RARTS as a means of delivering direct emergency surgical care by a remote surgeon. For RARTS to work in an extreme environment, we need a drastic departure from the current surgical robotic platform design. Surgical robots need to become more modular, robust, easily assembled, and significantly smaller and lighter. In addition, surgical robots have to be able to perform tasks in collaboration with humans and become aware of other assistants and objects in their vicinity. Furthermore, the ability to use a variety of different telecommunication technologies available, from simple Internet to fiberoptic lines, to satellite, will make such a platform usable in all environments. A number of centers including ours are engaged in design and development of such robotic platforms, and it will not be long before programming of semi-

Figure 2. (A) Prof. J. Marescaux of Institut de Recherche contre les Cancers de L’Appareil Digestif (IRCAD) performs the first transatlantic robotic assisted remote telepresence laparoscopic cholecystectomy. The surgeon’s console of the Zeus robotic platform for the “Lindbergh operation,” was located in Manhattan New York City. (B) The patient-side view of the Lindberg operation. The patient and the robotic arms were located in Strasbourg France, a distance of approximately 7000 km from Prof. Marescaux. (photographs courtesy of Prof. J. Marescaux)

Figure 3. (A) Dr. Anvari in the CMAS Robot Control Room during a telerobotic surgery. CMAS uses a Zeus TS robotic platform to work with the local surgeon in North Bay, connected via an IP-VPN network. (B) A view of the operating room in North Bay, showing the robotic arms.
intelligent robots will allow for RARTS in environments with long telecommunication latency (>1 second).

Future robotic evolution and development will allow remote telepresence surgery to perform a larger role in everyday surgical practice, help disseminate knowledge, provide expert surgical care at a distance, and save lives in extreme and isolated environments.

Figure 4. NEEMO 7: Astronaut Robert Thirsk performing a laparoscopic cholecystectomy in the Aquarius Underwater Habitat off the coast of Florida with the aid of telementoring and telerobotic assistance from Dr. M. Anvari in Hamilton Ontario. NEEMO 7 was a joint project of CMAS, CSA, NASA, and TATRC, evaluating the use of telerobotic surgery in extreme environments.

Address reprint requests to: Mehran Anvari, MD, Centre for Minimal Access Surgery, 50 Charlton Ave, E Hamilton, Ontario, Canada, L8N 4A6. Tel: 905 522 2951, Fax: 905 521 6113, E-mail: anvari@mcmaster.ca

Mehran Anvari, MD, is a Professor of Surgery and Director of Surgical Research at McMaster University. He is the founding Director of the Centre for Minimal Access Surgery, the first Canadian centre dedicated to the promotion of minimal access techniques in all surgical specialties and was recently appointed to the newly established Chair in Minimally Invasive Surgery and Surgical Innovation. His research interests include the use of surgical robotics and he recently established the world’s first telerobotic surgical service between a tertiary institution and a distant community hospital.

References:

JOURNAL WATCH: JSLS

Esophageal Carcinoma Following Bariatric Procedures • Allen JW et al. 2004;8:372-375. The effect of bariatric procedures on gastroesophageal reflux is not known. Three patients in this study developed esophageal malignancy years after the weight loss operation. It is suggested that patients who develop symptoms after bariatric procedures to induce weight loss should have endoscopic evaluation and that epidemiologic studies should be initiated to analyze the incidence of esophageal cancer following bariatric surgical procedures.

JOURNAL WATCH: Surg Endosc

Development and Transferability of a Cost-Effective Laparoscopic Camera Navigation Simulator • Korndorffer et al. 2005;19:161-167. Although relatively little time is spent on training in the area, camera navigation is an important tool in the performance of laparoscopic surgery. Recognizing this, the authors developed a training simulator and curriculum. The trained group received better scores for verbal cues and percentage of time an optimal surgical view was obtained.

JOURNAL WATCH: Outpatient Surgery Magazine

Safe Minimally Invasive Surgery • Davis MS. January 2005:60-61. Reminds readers of sutures and sharps hazards in MIS and offers tips on injury prevention.
This chapter reviews the ergonomic difficulties experienced by laparoscopic surgeons and presents practical solutions, where they exist, for the practicing surgeon.

**COMPLICATIONS**

**General Ergonomic Problems With Laparoscopic Surgery**

**Static Posture**

Surgeons hold postures that are more static during laparoscopic surgery than during open surgery.\(^1\)\(^2\) This means that surgeons move about less or hold still longer during laparoscopic surgery. The cause has not been studied but is likely to be related to the increased concentration required to perform surgery with indirect vision and less efficient instruments, mentally merging separate visual and mechanical coordinate systems in real time. The problem is that static postures have been demonstrated to be more disabling and harmful than dynamic postures are. This is because the muscles and tendons develop lactic acidosis and build up toxins when held in a static position.\(^1\)\(^1\) The solution is to remember to breathe, relax, and move about to loosen up during laparoscopic surgery, particularly during the more difficult and complex parts of the procedure such as intracorporeal suturing.

**Less Efficient Instruments**

Laparoscopic instruments are constrained to work through small ports 3 to 10 mm in size. This results in more complex internal mechanical linkages that decrease the efficient transmission of force from the surgeon’s hand to the instrument tip. A typical disposable laparoscopic grasper transmits the force of the surgeon’s hand from the handle to the tip with a ratio of only 1:3, in contrast to a 3:1 ratio with a hemostat.\(^1\) The surgeon must therefore work about 6 times as hard to accomplish the same grasping task with the laparoscopic instrument.\(^3\) This increase in force magnifies other problems, such as poor handle design, handles too big for small-handed surgeons, and other problems.

**Limited Instrument Mobility and Exchanges**

Laparoscopic technique requires the use of fixed-position entry ports that limit the surgeon’s ability to adjust instrument position and angle to the task at hand. Improperly placed ports can make an entire operation much more difficult to execute. Additionally, current hand-held laparoscopic instruments offer only 4 degrees-of-freedom of movement (rotation, up/down angulation, left/right angulation, in/out movement) which, coupled with the fixed entry positions, significantly limit the surgeon’s ability to achieve optimal instrument positioning for each part of the laparoscopic operation.\(^4\) Instrument exchanges during laparoscopic surgery are laborious and distracting to the surgeon, thus placing a premium on minimizing exchanges and using multifunction instruments. The latter, when poorly designed, can be even more difficult to use. For all the above reasons, laparoscopic instruments are less able to support the surgeon’s needs than are open surgery instruments.
Dark Room

The operating room lights are often turned off during laparoscopic surgery and thus the rest of the team must work in relative darkness. This increases the risk of choosing the wrong instruments and of collision hazards.

More Clutter

Laparoscopic operations substantially increase the amount of equipment and the number of tubes and cables in the operating room. This creates physical hazards for traffic in the operating room. The multitude of tubes and cables creates a “spaghetti” of connections in the operating field that decreases the efficiency of instrument handling, positioning, and exchanges. Finally, the clutter subtly discourages the incorporation of new technology and instruments that might further aggravate the situation.

Disparate Visual and Mechanical Coordinate Systems

One of the most significant cognitive challenges for the laparoscopic surgeon is the physical separation of the visual and physical aspect of the operation. Because surgeons are no longer operating looking directly at the tissue and the instruments, they must “blend” or bring together the view on the display and the mechanical feedback from the arms and hands in order to dexterously manipulate the tissues. Studies have shown that working in separate coordinate systems decreases performance and increases error rates.

Limited View

The laparoscopic surgeon typically views a 2-dimensional video image of the operating field on a video monitor placed at a distance of 5 to 8 feet. Binocular depth cues are lost and the resolution and quality of the image are less than that with direct viewing. Also important is the loss of peripheral vision that makes efficient navigation of the larger surgical workspace (inside the body and outside) more difficult. Surgeons also do not control the direction of view with their eyes and now must move the laparoscope via a trained assistant or an electromechanical control device. On the positive side, the 15x magnification and wide-angle view of the optical system lens can often provide a very detailed view of normally hard-to-see internal anatomy.

Specific Physical Complications of Laparoscopic Surgery

Neck Pain

Neck pain has been, and continues to be, a constant affliction for surgeons. During laparoscopic surgery, the flexing, rotating, and tilting of the neck typically seen during open surgery has been replaced by neck problems related to awkward viewing angles of the video monitor. Indeed, while the laparoscope and its magnification have brought hard-to-see areas of the body into vivid view for the surgeon, the image is no longer positioned intuitively near the surgeon’s hands; rather, the operation must now be viewed on a display device that typically has to be positioned away from the surgeon and among the various obstacles created by the laparoscopic surgical workspace. Most commonly, the monitor is placed on top of the laparoscopic equipment cart, which itself is positioned wherever possible around the operating room table. This location results in the monitor usually being at or above eye level for the surgeon and in front of the surgeon. Research has demonstrated that the preferred viewing angle for office video terminal displays is 10 to 25 degrees below the horizontal from the users eye level. The preferred locations of the laparoscopic monitor appear to be below eye level, though the exact angle has not been established. Therefore, when the laparoscopic display is positioned at or above the surgeons’ eye level, they must extend their neck to...
maintain the preferred downward viewing angle. This leads to the typical “chin-up” viewing position of laparoscopic surgeons (Figure 2). A video monitor that is not positioned directly in front of the surgeon will result in an additional rotation of the neck. Both of these factors will inevitably lead to neck stiffness and pain in the surgeon’s neck.

**Solutions:**

Place the laparoscopic video image in front of the surgeon and below eye level range (0 to 45 degrees, 25 degrees preferred). This can be accomplished in various ways, for example:

- Place a standard video monitor (CRT or LCD) on a separate low cart that can be positioned easily around the operating room table. Angle the display upward towards the surgeon’s face (Figure 3). This is the most inexpensive solution with current technology.

- Use a ceiling-mounted boom system to achieve the same physical placement as above.

- Use a projection display device with the “screen” in the same relative physical location to the surgeon. With this technology, the screen image can often be placed nearer the surgeon within the sterile field.

- Use a head-mounted display system, designed or adjusted to provide the same relative viewing angle as recommended above.

**References:**


15. Forkey D, Smith W, Berguer R. A comparison of thumb and forearm muscle effort required for

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**Figure 2.** The “chin up” position when the monitor is too high.

**Figure 3.** A separate laparoscopic monitor placed below eye level on a simple cart.


### JOURNAL WATCH: JSLS

**Making the Transition From Standard Gynecologic Laparoscopy to Robotic Laparoscopy** • Ferguson JL et al. 2004;8:326-328. It is suggested that robotically assisted laparoscopic tubal ligation using the Parkland method is a satisfactory procedure to provide transition for gynecologic surgeons and operating room personnel to gynecologic robotic surgery.

### JOURNAL WATCH: JSLS

**Time Management in the Operating Room: An Analysis of the Dedicated Minimally Invasive Surgery Suite** • Hsiao KC et al. 2004;8:300-303. This study suggests that laparoscopic surgery is performed more efficiently in a dedicated minimally invasive surgery suite versus a traditional operating room.

### JOURNAL WATCH: Outpatient Surgery Magazine

**Grow Your Bottom Line Without Doing One More Case** • Ellis S. November 2004:26-35. Highlights 10 coding, billing, and collections strategies. From insurance verification to denied claims, the author instructs readers on how to handle the issues that eat away at their bottom lines.

### JOURNAL WATCH: Fertil Steril

**A Comparative Study of Skills in Virtual Laparoscopy and Endoscopy** • Adamsen S et al. 2005;19:229-234. As it is often assumed that a capable laparoscopist is also an endoscopist and vice versa, the authors used the MIST-VR and GI-Mentor II simulators to look for a correlation between the manual skills used in laparoscopy and those used in endoscopy. They found that the skills they observed in simulated laparoscopy do correlate with those in simulated flexible endoscopy.
Laparoscopy vs. Laparotomy in Pregnancy

James F. Carter, MD, David E. Soper, MD

INTRODUCTION

The incidence of pelvic pain requiring surgery ranges from 1:440 to 1:1300. The incidence of surgery during pregnancies is approximately 0.75%. One in 600 pregnancies are complicated by the presence of adnexal masses. One must consider operative intervention when the mass persists or the patient develops symptoms of acute pelvic pain. The majority of these cases are still approached via laparotomy due to concern about injury during laparoscopic trocar insertion or about the high intraperitoneal pressures associated with pneumoperitoneum. A number of studies have documented the safety of laparoscopic cholecystectomy during pregnancy. Conversely, 2 reports reveal that complications may occur while laparoscopy in pregnancy is being performed. A growing body of evidence indicates that laparoscopy for gynecologic and obstetric indications can be performed safely during pregnancy.

Gurbuz asked about the role of laparoscopy in pregnancy, while Hunter gave us pressure numbers. Reedy defined fetal outcomes and surveyed laparoscopic surgeons. Mazze defined safety in appendectomies in pregnancy, and Carter compared laparoscopy with laparotomy.

DISCUSSION

Reedy’s study, which used the Swedish Health Registry to analyze 5 fetal outcome parameters, showed that no difference existed in birth weight, gestational length, growth restriction, infant survival, or malformations when laparoscopy was compared with laparotomy. In a study that we performed comparing laparoscopy with laparotomy in pregnancy, age, gestational age at surgery, operating time, hospital stay, and complications of surgery were compared; and we found no statistical differences in outcomes except hospital stay: 1 day for our laparoscopic patients and 4.4 days for our laparotomy patients. All the laparoscopic patients delivered live-born infants, while 1 laparotomy patient had a spontaneous abortion 5 days postoperatively. During surgery, our laparotomy patients were placed in the dorsal supine position with a left ward tilt. All laparoscopy patients were placed supine with a leftward tilt and sequential compression devices. Placement of laparoscopic trocars must be modified depending on uterine size and gestational age. Trocar sizes (5 mm to 12 mm) should also be modified for gestational age. Our rule is to use the open technique for initial trocar placement. If the uterus is 18-weeks to 20-weeks size or greater, the initial trocar is placed above the umbilicus by using a 5-mm trocar via the open technique or radial dilatation (VersaStep) instruments. The remaining trocars are placed under direct visualization varying from 5 mm to 12 mm on the affected side. In no cases have we used more than 4 trocar sites, including the laparoscope. If the uterus is <18-week size, the initial trocar placement is in the
umbilicus, not subumbilicus. Our initial trocars varied from 10 mm to 3 mm as our skills, comfort, and technology improved. Intraabdominal pressure was monitored in all patients and care was taken not to exceed 12-mm Hg pressure to ensure adequate venous return and minimize pressure on the inferior vena cava.⁸,¹³,¹⁶,¹⁷ Using multiple graspers and manipulators, the abdominal contents were manipulated based on the location of the pelvic pathology. Uterine manipulation was kept to a minimum. Copious irrigation was used. Postoperatively, the patients were closely observed during labor and delivery for increased uterine activity. We used indomethacin in a one-time dose of 50 mg per rectum in greater than 12-weeks gestation. All laparotomy patients underwent general anesthesia and a midline abdominal incision with minimal manipulation of the uterus. Preoperatively, the fetus was monitored and postoperatively the patients were closely observed on labor and delivery for uterine activity and fetal heart tones.

STATISTICS

Discreet data were compared by using the chi-square test with Fisher’s exact test used where appropriate. The independent samples t test was used to analyze continuous variables.

The preoperative characteristics of pain or adnexal mass were similar in both the laparoscopic and laparotomy groups (Tables 1 and 2).

Comparisons of the 2 groups were similar (Table 3 [p. 15]). The pathologies noted at the time of surgery are listed in Table 4. Pregnancy outcomes are noted in Table 5. One of 7 patients delivered prematurely (34 weeks vaginally) in our laparoscopically managed group compared with 3 of 9 (31 weeks for breech, 33 weeks for failed induction for chorioamnionitis, 35 weeks, 4 days for severe preeclampsia) managed by laparotomy. The difference was not statistically significant. All deliveries were remote from the index surgery, except for one spontaneous abortion following a laparotomy. All infants born preterm did well. The blood loss for laparoscopies was noted to be minimal. The blood loss for the laparotomies ranged from 50 mL to 300 mL.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Symptoms</th>
<th>Weeks Prior</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Right sided pain/Right lower quadrant pain</td>
<td>19</td>
</tr>
<tr>
<td>2</td>
<td>Severe back pain, constant</td>
<td>22</td>
</tr>
<tr>
<td>3</td>
<td>Symptomatic right adnexal mass Right lower quadrant pain</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>Persistent adnexal mass?, Dermoid</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>Right lower quadrant pain</td>
<td>22</td>
</tr>
<tr>
<td>6</td>
<td>Severe pain</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>Right lower quadrant pain</td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
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<tr>
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<th>Symptoms</th>
<th>Weeks Prior</th>
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<tbody>
<tr>
<td>1</td>
<td>Ovarian ascites/Pain</td>
<td>17%</td>
</tr>
<tr>
<td>2</td>
<td>Radnexal mass/Pain</td>
<td>18%</td>
</tr>
<tr>
<td>3</td>
<td>Abdominal pain/Pelvic mass</td>
<td>10%</td>
</tr>
<tr>
<td>4</td>
<td>Abdominal pain/Pelvic pain</td>
<td>10%</td>
</tr>
<tr>
<td>5</td>
<td>Abdominal pressure/Abdominal pain</td>
<td>10%</td>
</tr>
<tr>
<td>6</td>
<td>Right upper quadrant pain</td>
<td>14%</td>
</tr>
<tr>
<td>7</td>
<td>Abdominal pain</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>Abdominal pain</td>
<td>12</td>
</tr>
<tr>
<td>9</td>
<td>Persistent left adnexal mass, pain</td>
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</table>
Our work supports previous reports on the safety and effectiveness of operative laparoscopy in pregnancy. Until recently, laparoscopy was considered contraindicated in pregnancy. We show no increased mortality associated with laparoscopy in pregnancy, which confirms a landmark study by Reedy et al. showing that 413 laparoscopic procedures performed during pregnancy for general surgical and gynecologic indications had no higher fetal or maternal complications compared with complications in a population undergoing laparotomies. Fetal loss has been reported of 10% to 25% and a preterm delivery rate of approximately 20% in laparotomies.

CONCLUSION

In the hands of skilled laparoscopic surgeons, operative laparoscopy in pregnancy can be performed as safely as laparotomy in pregnancy can be with minimal hospital stay. Surgeons must recognize their limitations, know when to refer these patients, and leave their egos at the scrub sink. It is imperative to adhere to several technical aspects when performing laparoscopy in pregnancy. Safe laparoscopic access is paramount, and we feel that the Hasson technique is appropriate. Modification of trocar sites must be individualized ensuring an effective procedure with minimal uterine manipulation. The location of these trocars relative to the enlarged uterus is key to success. Smaller trocars (2 mm to 3 mm) should be used. Minimizing CO₂ insufflation to maximize cardiac output, maternal hepatic flow, and minimize fetal acidosis is paramount, therefore 12-mm Hg pressure or less. Constant communication with the anesthetist combined with sequential compression devices, lateral tilting of the patient and routine

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>LAPAROSCOPY (n=7)</th>
<th>LAPAROTOMY (n=9)</th>
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</thead>
<tbody>
<tr>
<td>Serous cystadenoma</td>
<td>2</td>
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</tr>
<tr>
<td>Benign cyst teratoma</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Simple ovarian cyst</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Peritubular cyst</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Luteoma</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Endometrioma</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Leiomyomata</td>
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<td>2</td>
</tr>
<tr>
<td>Adhesions</td>
<td>1</td>
<td>0</td>
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</tbody>
</table>

<table>
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<tr>
<th>Diagnosis</th>
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<th>LAPAROTOMY (n=9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous abortion</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Preterm delivery</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Term delivery</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

*Differences not statistically significant.
Foley catheters is mandatory. When one adheres to these principles, skilled laparoscopic surgeons may perform these procedures with low morbidity. Though operating times are longer (Table 3), patients benefit with shorter hospital stays and subsequent successful pregnancies.

**References:**


### Table 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>Laparoscopy (n=7)</th>
<th>Laparotomy (n=9)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)*</td>
<td>27.1±3.7</td>
<td>22.9±5.3</td>
<td>0.478</td>
</tr>
<tr>
<td>Nulliparous</td>
<td>1(14%)</td>
<td>5(56%)</td>
<td>0.145</td>
</tr>
<tr>
<td>Gestational age at surgery (weeks)*</td>
<td>15±6</td>
<td>13±4</td>
<td>0.232</td>
</tr>
<tr>
<td>Operating time (minutes)*</td>
<td>116±34</td>
<td>89±35</td>
<td>0.809</td>
</tr>
<tr>
<td>Hospital stay (days)*</td>
<td>1.0±0.0</td>
<td>4.4±1.1</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

*Mean ± SD.
In November of 1999, the Institute of Medicine (IOM) released a report, To Err is Human: Building a Safer Health System, stating that between 44,000 and 98,000 people die annually in US hospitals as a result of medical errors, surpassing deaths attributed to motor vehicle accidents, breast cancer, and AIDS. One of the report's main conclusions is that errors are not resultant of individual carelessness but rather created by faulty systems, processes, and conditions that lead individuals to make mistakes, fail to prevent them, or both. The IOM's report presented a 4-tiered strategy for improvement to achieve a better safety record. Among the 4-tiered approach the IOM suggested “implementing safety systems in health care organizations to ensure safe practices at the delivery level.” Thus, mistakes can be prevented by designing the health care system to make it harder to make mistakes and easier to do things correctly. One of the challenges to health-care personnel is how to handle the tremendous number of components required to accomplish good/adequate health care. This is of great concern as we try to overhaul our current system. Shackled by decreasing revenue and increasing workload, hospitals will be severely challenged to impact change. Even well-meaning countermeasures intended to assist and oversee the system present a burden of layers of paper work required by governing and oversight bodies that may further obscure the main focus of the healthcare professionals, which is to take care of the patient.

Investment must be made in technology to help in meeting our patient safety goals.

The remaining tiers of the IOM's improvement strategy include “establishing a national focus to create leadership, research, tools, and protocols to enhance the knowledge base about safety; identifying and learning from errors by developing a nationwide public mandatory reporting system and by encouraging health care organizations and practitioners to develop and participate in voluntary reporting systems; and raising performance standards and expectations for improvement in safety through the actions of oversight organizations, professional groups, and group purchasers of health care.” Because no designated government agency is responsible for improving and monitoring the healthcare system, the system has fallen behind most high-risk industries in providing and ensuring basic safety for its clients and providers. The development of an agency for patient safety could set national goals and track progress while recommending quality improvements as they arise. Creating and utilizing voluntary reporting systems will enhance the mandatory systems by collecting and analyzing data about nonfatal errors and other system problems that could be easily fixed before leading to fatal injuries. Likewise, developing and adopting performance standards creates expectations of safety and satisfaction for both providers and consumers as well as lays the groundwork for providing financial incentives.
for health-care organizations to continue fostering safe and effective patient care.4

Task management can be greatly improved if we borrow methodology from the aerospace industry. The checklist system has been proven to effectively assist aircrews to manage multi-tasking scenarios with great consistency. This system is used from verification of equipment readiness, to retrieving and acknowledging data important to flight operations. The crossing over of this philosophy could be very important in promoting patient safety. Today, we are operating on an ever-increasing number of elderly patients and patients with multiple medical issues. After the performance of a thorough history and physical, the surgeon may be left with a quagmire of family history concerns, medical diagnoses, and medications. This information may be located in the chart but is not concentrated in one central location. The initial evaluation of the patient has limited value because concerns picked up initially have to be addressed and resolution completed. This situation is probably most evident in the weight loss surgery patient. Up to date, intimate knowledge of the patient’s operative readiness profile is paramount if this high-risk procedure is to be performed with good outcomes.

To address this concern, our institution has introduced a bariatric red flag “Pre-operative Readiness Evaluation Tool (PORET)” for patients undergoing laparoscopic weight loss procedures, specifically to prevent medical condition oversights in this high-risk population. (Figure 1). In the history and physical phase of the preoperative evaluation, pertinent information is identified (flagged) according to the affected system, and these items are marked for follow-up and resolution. Updates are done as resolutions are accomplished. “PORET” is designed to allow anyone reviewing the chart to rapidly know all “medical threats” to the patient and the status of the resolution to that threat. The categories we have developed are specifically related to bariatric gastric bypass and pertain to a special extensive “checklist” of medical clearances that must be obtained before the surgery is scheduled. This is very important in our preoperative patient preparation program, because the chief of surgery reviews all of our patients before surgery can be scheduled. A multidisciplinary review committee also dynamically oversees our process and comprises many of our evaluation team members. Therefore, all threats and their resolution status must be in one place for the process to proceed smoothly. This unique oversight strategy for weight loss surgery is similar to the rigors of selection seen in transplant surgery. The “PORET” helps all involved in the care of the patient from surgeon to anesthesia staff to operating room nurses to be in position to maximally protect the patient at all times. This system was initially applied to weight loss surgery but now will be expanded to include all patients that have to undergo surgical procedures, no matter how minor. Although no single intervention can alleviate the medical error issues our health-care system faces, we believe that the institution of “checklists” like “PORET” can expand the safety net for patients. This along with strong leadership, attention to detail, system-wide coordination of adequate resources, outcome analysis, and dynamic data-driven system checks and balances can aid in deterring preventable medical errors.

GENERAL MEDICAL PREPARATION

The consistent execution of this preoperative evaluation methodology is imperative if we are to make “Pre-Operative Evidence-based Risk Reduction Initiatives (PERRI’s)” one of the core-
The Cardiac Risk Reduction Initiative (C-PERRI), presented by Anthony Antonacci at the Harvard School of Public Health in May of 2004, illustrates an example of this application. He presented the following study as backdrop for his protocol initiation and outcomes measurements. Of the 27 million noncardiac surgeries annually, 8 million are for cardiovascular disease, and 1 million are for perioperative complications costing more than 20 billion dollars annually. Perioperative myocardial ischemia is a potentially reversible risk factor for mortality, morbidity, and cardiovascular complications after noncardiac surgery. In the subgroup of surgical patients requiring noncardiac surgery and who have or are at risk for cardiovascular disease, the single most important risk factors for death are myocardial ischemia and nonfatal myocardial infarction during the first week postoperatively, increasing the risk of serious outcomes by a factor of 2 to 20 in the following 2 years. Postoperative cardiac events appear to be related to the sympathetic response of increased heart rate secondary to surgical intervention. In a previous study published in the New England Journal of Medicine, Mangano et al reported that the utilization of atenolol pre-, peri-, and postoperatively in qualified patients undergoing noncardiac surgeries reduced the risk of cardiac mortality. Patients who were at risk for coronary artery disease or were scheduled for noncardiac surgery requiring general anesthesia were eligible to participate; the presence of coronary artery disease was defined as a previous myocardial infarction, typical angina, or atypical angina with a positive stress test while the at risk population was flagged by having 2 of the following cardiac risk factors: age ≥65 years, hypertension, current smoking, a serum cholesterol 240 mg per deciliter, and diabetes mellitus. Of the 204 patients who agreed to participate in the study, 200 underwent randomization, 99 were assigned to the atenolol group, and 101 were assigned to the placebo group. Thirty of the 200 patients died during the 2-year follow-up period, 21 in the placebo group (12 from cardiac causes), and 9 in the control group (4 from cardiac causes), reducing the risk of total mortality by 55% and cardiac mortality by 65%. Atenolol-treated patients also had a significant decrease in the rate of cardiac events within 6 months after surgery, had significantly lower heart rates, and increased the 2-year survival rate for diabetics by 75%.

References:
2. Leape LL. Institute of Medicine medical error figures are not exaggerated. JAMA. 2000;284:5-97.
Validation is best viewed as an ongoing, iterative process that uses scientific evidence to continually improve the educational efficacy of simulators. Kirkpatrick’s 4-level evaluation model is applicable to validation of simulator-based (SB) training and requires consideration of trainee reactions, learning, behavior, and results (Table 1). Validation of SB performance assessment requires consideration of the psychometric reliability and validity of assessment instruments.

VALIDATION OF SIMULATOR-BASED TRAINING

Reactions can be assessed by using surveys, ratings, logs, journals, or interviews. Though subjective, they are very important because negative reactions may severely limit simulator use despite scientific evidence of efficacy. Learning can be assessed by simulators measuring performance improvements in speed, accuracy, errors, efficiency, or decreased variability, or all of these, in trainees’ performance of simulated tasks. Learning can be assessed by comparing trainees randomly assigned to either a control or experimental group on simulator-based test scores administered after the training period. A pre-post test design may also be used to measure learning. Measurement of variables that may influence individual learning, such as prior experience and visual spatial perceptual skills can shed light on the optimal utilization of simulation for individuals with different aptitudes, learning styles, backgrounds, or all of these.

Evaluation of behavior involves generalizability and transfer. Generalizability is concerned with (1) the benefits of SB training of component skills used in the performance of an actual complex task or (2) the benefits of simulator-based training of a complex task on performance of other complex tasks. For example, Seymour and colleagues used the Minimally Invasive Surgical Trainer-Virtual Reality (MIST-VR) to train surgical residents in a component skill (ie, manipulative diathermy) related to laparoscopic cholecystectomy and demonstrated that trainees were superior to controls in later performance of an actual laparoscopic cholecystectomy.

Analysis of transfer assesses the extent to which an increase in performance of a simulator-based procedure improves performance of the corresponding actual procedure. Transfer can be assessed either by looking for an increase in performance of an actual procedure resulting from training on a simulator or by comparing performance by trainees and controls of an actual procedure after the training period. Analysis of outcomes (results in Kirkpatrick’s terminology) considers whether training has an impact on clinical or cost-effectiveness endpoints, or both, such as surgery.
time, operating room costs, complications, pain, recovery time, and other long-term outcomes or medical errors. Large samples and multivariate analyses are needed to isolate the specific effects of training on outcomes that are often determined by a multitude of individual and systemic factors. It is also very difficult to precisely measure individual performance in a manner that will generalize across patients, operating teams, evaluators, and other relevant factors and to attribute changes in outcomes to variations in training and performance parameters.

**VALIDATION OF SIMULATOR-BASED PERFORMANCE ASSESSMENT**

One of the greatest potential benefits of simulation is the opportunity to objectively measure numerous aspects of performance and manipulate numerous parameters that can affect learning and performance. The reliability of any application of an assessment instrument must be estimated before consideration of validity. Reliability refers to the degree to which assessment is free from errors of measurement. The

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<th>Application to Simulator Based Training</th>
<th>Examples</th>
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<td>Reactions</td>
<td>Reactions</td>
<td>After training on a virtual reality laparoscopic cholecystectomy simulator, ask trainees to complete rating scales assessing their perceived confidence to perform the procedure on patients.</td>
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<tr>
<td>Learning</td>
<td>Learning</td>
<td>Compare postraining performance of a simulator based task (eg, suturing in virtual reality) to pretraining performance.</td>
</tr>
<tr>
<td>Behavior</td>
<td>Generalizability</td>
<td>After virtual reality based training of a complex manipulation skill (eg, laparoscopic suturing), compare trainees to a control group on overall technical performance of a real operation.</td>
</tr>
<tr>
<td>Transfer</td>
<td></td>
<td>After training on a virtual reality laparoscopic cholecystectomy simulator, compare trainees to a control group on overall technical performance of actual laparoscopic cholecystectomies.</td>
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<tr>
<td>Results</td>
<td>Outcomes</td>
<td>After training on a virtual reality laparoscopic cholecystectomy simulator, compare trainees to a control group on patient outcome variables (eg, risk-adjusted length-of-stay and pain).</td>
</tr>
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<th>Methods for Estimating the Reliability of an Assessment Instrument</th>
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<td><strong>Approach to Reliability</strong></td>
<td><strong>Description</strong></td>
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<tr>
<td>Split-half</td>
<td>Assesses the level of reliability based on the correlation between scores on 2 randomly selected sets of test items. Randomly divide test into 2 halves and measure the correlation between scores for the 2 halves across subjects.</td>
</tr>
<tr>
<td>Internal consistency</td>
<td>Assesses the level of reliability based on the correlations among test items. Compute Coefficient Alpha based on performance of a cohort of examinees.</td>
</tr>
<tr>
<td>Test-retest method</td>
<td>Assesses the extent to which a similar pattern of results would be obtained from one test administration to the next. Administer test to subjects on at least 2 occasions separated by brief time intervals (eg, within a few weeks) and correlate scores on items from the 2 administrations.</td>
</tr>
<tr>
<td>Accuracy/concordance model</td>
<td>Absolute agreement in the results obtained from an assessment tool across occasions, raters, alternate forms, and other relevant factors. Kappa statistics or Kendall’s coefficient of concordance, or both, are typically used for this purpose.</td>
</tr>
</tbody>
</table>
actual score an individual obtains on a test can be conceptualized as representing the individual's true score (ie, his or her “true” level of proficiency) and a certain amount of systematic or random error, or both, that can have an effect on test scores. Systematic error is due to specific extraneous factors that influence performance. For example, if performance improved as the brightness of the lighting in the room where testing was conducted increased, lighting would constitute a systematic source of error that would have to be standardized and controlled. Random error is caused by extraneous or idiosyncratic factors (eg, luck, individuals not feeling well on a particular day, and other such things), or both, that can cause scores to increase or decrease in unpredictable ways.

One approach to estimate reliability is to examine the homogeneity of the test content or internal consistency. This is commonly assessed by computation of Coefficient Alpha. The Test-Retest method examines similarities in the pattern of test performance across administrations of a test over short time periods to the same cohort of individuals. The concordance/accuracy method is concerned with absolute agreement between test items and provides a more stringent test of reliability (Table 2).

Numerous studies have specifically examined the reliability of VR simulation for skill assessment. As a general guideline, reliability coefficients should be ≥0.70 for an assessment to be considered sufficiently reliable for research purposes, ≥0.80 for low or medium-stakes testing, and approximately 0.90 for high-stakes testing.

Having demonstrated that a measurement instrument is sufficiently reliable, it is appropriate to investigate its validity. The question shifts from whether or not the test consistently measures individual performance to whether it actually measures what it purports to measure. Five types of validity criteria are generally applied to applications of an assessment instrument: face validity, content validity, construct validity, discriminate/convergent validity, and predictive validity (Table 3).

### Validation Criteria for an Assessment Instrument

<table>
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<tr>
<th>Type of Validity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face validity</td>
<td>Subjective assessment by a panel of experts as to whether or not the test seems appropriate and will measure what it is designed to measure.</td>
</tr>
<tr>
<td>Content validity</td>
<td>Experts look at appropriateness and cohesiveness among items, and presentation of test materials to decide whether the content is accurate and representative of the content domain.</td>
</tr>
<tr>
<td>Construct validity</td>
<td>Broadly speaking, the degree to which an assessment tool measures the abilities or traits it was designed to measure.</td>
</tr>
<tr>
<td></td>
<td>Based on a convergence of results from methodologically sound empirical studies. The strongest evidence is derived from experimental studies that demonstrate systematic changes in test performance resulting from systematic manipulation of variables that should theoretically affect performance on the assessment instrument.</td>
</tr>
<tr>
<td></td>
<td>Logistic and ethical complexities associated with experimental studies lead many investigators to estimate construct validity of an assessment instrument by comparing groups that are expected to differ (eg, residents at different levels of training that as a result have varying skill levels).</td>
</tr>
<tr>
<td>Discriminant/convergent validity</td>
<td>When performance assessments correlate, agree with, or correlate and agree with, those derived from other tests that measure the same constructs (convergent validity) and have little or no correlation with performance assessments derived from other instruments that measure different constructs (discriminant validity).</td>
</tr>
<tr>
<td></td>
<td>Investigator must administer the instrument in question to a group of trainees, and then administer other measures of the same ability and unrelated abilities, within the same relatively brief period of time.</td>
</tr>
<tr>
<td>Predictive validity</td>
<td>Extent to which performance on an assessment instrument correlates with a criterion variable measured at a later date.</td>
</tr>
</tbody>
</table>
To date, the majority of the studies looking at validity have been concerned with construct validation, demonstrating the ability of VR-based assessments to differentiate among individuals with pre-existing differences in relevant experience.3,4,11-14

Summary

The description of validation criteria presented in this paper is intended to provide readers with a general understanding of the characteristics of SB training and assessment systems that must be apparent to the intended users of these systems for them to be accepted, adopted, utilized effectively and efficiently, and improved over time. These criteria should be considered and studied routinely by developers of SB technology beginning in the early stages of system design.

References:
1. Designed to provide the minimally invasive surgeon with 3D stereoscopic vision, Viking Systems' EndoSite 3Di Digital Vision System promises to provide clarity of vision, performance with comfort, and information on demand. The system has a 23” flat-panel monitor and lightweight, ergonomic head-mounted displays with 3-panel LCD technology that give the surgical team immersive 3D vision. Infomatix, the system's digital information platform, allows voice-activated, picture-in-picture presentation of existing diagnostic images and live secondary video. Contact Viking Systems, www.VikingSystems.com

2. The System by ConMed is an integrated electrosurgical system created to address individual surgical needs. With 5 modes including Laparoscopic Mode, The System can be used for multiple specialties. Energy Synchronous Processing Technology delivers continuous synchronization of current and voltage, and Advance Digital Signal architecture enables The System to sample current and voltage over 450,000 times per second and adjust output accordingly. Contact ConMed Corporation, www.ConMed.com

3. The sterilizable FISSO Instrument Holder System from Baitella AG is distinguished among other things through its unrestricted mobility, excellent stability, and simple and rational operation. One single action can stretch and loosen all 5 joint functions for easy, quick positioning. Use of high-quality materials guarantees a safe adjustment of retractors and other instruments, and the wide range of bases guarantees a secure fastening onto different operation tables. Contact Baitella AG, info@baitella.com, www.Baitella.com

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9:00 am – 4:30 pm CONCURRENT MASTER’S CLASSES
12:00 pm – 6:00 pm CONGRESS REGISTRATION OPEN
5:00 pm – 6:30 pm OPENING CEREMONIES
  - PRESIDENTIAL ADDRESS • HONORARY CHAIR PRESENTATIONS
6:30 pm – 8:30 pm Welcome Reception / Exhibits Open / Recognition of SLS Benefactors, Corporate Members and Innovations of the Year

THURSDAY, SEPTEMBER 15, 2005 • Day 1 International Congress and Endo Expo 2005
6:45 am – 7:00 am Moderator Briefing
7:00 am – 5:00 pm Congress Registration
7:00 am – 7:30 am Complimentary Coffee and Bakery Items
7:30 am – 8:30 am GENERAL SESSION: Best of Laparoscopy Updates
8:30 am – 10:00 am MULTIDISCIPLINARY PLenary SESSION: [Gynecology, General Surgery, Urology] Laparoscopy Surgery for Cancer
9:30 am – 4:00 pm Exhibits open
10:00 am – 10:30 pm Refreshment Break / Visit Exhibits
11:30 am – 12:30 pm MULTIDISCIPLINARY PLenary SESSION: [Gynecology, General Surgery, Urology] Endoluminal Surgery
12:30 pm – 1:45 pm Complimentary Light Snacks and Refreshments Available in Exhibit Hall
1:00 pm – 1:30 pm POSTER PRESENTATIONS
1:45 pm – 5:00 pm CONCURRENT SCIENTIFIC SESSIONS: Laparoscopy Updates, Scientific Papers, Open Forum Presentations and Videos
2:00 pm – 4:00 pm Refreshment Break / Visit Exhibits
6:30 pm Fiesta Celebration with Faculty (Tickets Required)
5:00 pm Adjourn for the day

FRIDAY, SEPTEMBER 16, 2005 • Day 2 International Congress and Endo Expo 2005
7:00 am – 5:00 pm Congress Registration
7:00 am – 7:30 am Complimentary Coffee and Bakery Items
7:30 am – 8:30 am AWARD WINNING SCIENTIFIC PAPERS AND VIDEO PRESENTATIONS
8:30 am – 11:30 am LIVE TELESURGERIES [Refreshments Available in Exhibit Hall from 10:30 am]
9:30 am – 4:30 pm Exhibits open
11:30 am – 12:30 pm Complimentary Light Snacks and Refreshments Available in Exhibit Halls
12:00 pm – 12:30 pm New Product Presentation by Exhibitors in Exhibit Hall
12:30 pm – 12:45 pm BEST POSTER AND RESIDENT AWARD-WINNING PAPER PRESENTATIONS
12:45 pm – 1:45 pm EXCEL AWARD LECTURE AND PRESENTATION
1:45 pm – 5:00 pm CONCURRENT SCIENTIFIC SESSIONS: Laparoscopy Updates, Scientific Papers, Open Forum Presentations and Videos
2:00 pm – 4:00 pm Refreshment Break / Visit Exhibits
6:30 pm Adjourn for the day

SATURDAY, SEPTEMBER 17, 2005 • Day 3 International Congress and Endo Expo 2005
7:00 am – 11:15 am Congress Registration
7:30 am – 9:00 am BREAKFAST WITH KEYNOTE SPEAKER (Ticket Required)
9:00 am – 10:30 am FUTURE TECHNOLOGY SESSION: Special Effects for Surgery: From Hollywood to New York City
10:30 am – 10:45 am CLOSING CEREMONY – Passing of The Presidential Gavel
10:45 am 14th International Congress is Adjourned
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11:15 am – 1:00 pm SLS Committee Meetings

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1:00 pm – 4:30 pm
2. Master’s Class in Laparoscopic Treatment of Adhesions for the General Surgeon, Gynecologist, and Urologist Including Abdominal and Pelvic Pain

9:00 am – 4:30 pm
3. Master’s Class in Laparoscopy in Pediatrics and Pregnancy

9:00 am – 4:30 pm
4. Master’s Class in Robotic Laparoscopic Surgery (MIRA)

9:00 am – 4:30 pm
5. Master’s Class in Gynecologic Endoscopic Surgery

9:00 am – 4:30 pm
6. Master’s Class in Laparoscopic General Surgery

9:00 am – 4:30 pm
7. Master’s Class in Minimally Invasive Bariatric Surgery...State of the Art

9:00 am – 4:30 pm
8. Master’s Class: Role of Simulation in Residency Training and Continuing Medical Education

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- Comprehend the developing technologies that will be available in the future to enhance the standard of patient care; and
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Markus Wolfreiner

A Randomized, Prospective, Patient-Blinded Study Comparing Endoscopic Inguinal Hernia Repairs With and Without Tacks,
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A Series of 190 Day Case Laparoscopic Subtotal Hysterectomies in the UK: the New Approach to Hysterectomy,
John Erian MD

Anesthetic and Elmiron Rescue Therapy in Treatment of Chronic Pelvic Pain,
Maurice K Chung MD

Antegrade Dissection in Laparoscopic Cholecystectomy,
Vincenza Neri MD

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Manjula M Rohatgi MD

Changes in Bacteremia and Cytokines After Different Pressure Laparoscopic Procedures in an Experimental Model of Peritonitis in Pigs,
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Lukas Sokyrka MD

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LS-51 Laparoscopic Anterior Interbody Fusion,
Tallal M Zeni MD

Laparoscopic Adrenal Sparing Surgery for Adenomas With Preservation of the Adrenal Vein,
Nikolaos Roukounakis MD

Laparoscopic Aortorenal Bypass in an Acute Porcine Model Under Warm Ischemia: Feasibility Study and Resident Training Module,
Romney Aboaz MD

Laparoscopic Appendicectomy in Children: a Trainee’s Perspective, Sai Prasad TR MD

Laparoscopic Assisted Transumbilical Medial’s Diverticulectomy in Children,
Sai Prasad TR MD

Laparoscopic Cholecystectomy in 2000 Consecutive Patients Without a Common Bile Duct Injury,
Titus D Duncan MD

Laparoscopic Cholecystectomy in Children With Beta-Thalassemia and Asymptomatic Cholelithiasis,
Giuseppe Currio MD

Laparoscopic Colectomy. Results of Three European Centers,
Nas Kafetzis MD

Laparoscopic Findings in Chronic Pelvic Pain in a Large Community Hospital,
Sandhya Nayar MD

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Laparoscopic Radical Nephrectomy: Comparison of Renal Tumors Less and Greater Than Seven Centimeters,
Stephen R Tolhurst

Laparoscopic Resection due to the Band After Open Banded Gastric Bypass,
Atul K Madan MD

Laparoscopic Roux-en-Y Gastric Bypass Utilizing the Triple Stepping Technique,
Talal M Zeni MD

Laparoscopic Splenectomy With Radiofrequency,
Roberta Gelmini MD

Laparoscopic Treatment of Incisional Hernias,
Camillo Cavicchioni MD

Laparoscopic Treatment of Urachalcarcinoma,
Behrooz Salehi MD

Laparoscopic Versus Open Partial Nephrectomy: Short Term Experience at the University of Chicago,
Benjamin R Stockton MD

Lavage and Its Effect on Peritoneal Cell Count,
Douglas E Ott MD MBA

Management of Ectopic Pregnancy in a District General Hospital,
Noor Less

Lessons Learned After More Than 300 Video-Assisted Thyroidectomies,
Ilya A Volfson MD

Laparoscopic Treatment of Incisional Hernias,
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Exhibit Hall Events

SLS CYBER CAFÉ
Stop by and check your e-mail or log onto the web and WiFi Station. Educational programs will be scheduled throughout the day.

SLS INNOVATIONS OF THE YEAR
The SLS Innovations of the Year will be recognized at the 14th International Congress and Endo Expo 2005. It is not necessary for a company to exhibit or advertise to be eligible for this recognition. SLS encourages all commercial entities to enter their most innovative product for consideration.

NEW PRODUCT PRESENTATIONS BY EXHIBITORS
SLS invites all exhibitors to share information about new products, technology, and developments during the New Product Presentation Session. Exhibitors who submit new product information will be allowed a one-minute presentation during a break, Friday, September 16, 2005. Note: Each exhibitor will be allowed to present only one product that must have been developed within the past year.

BENEFACTORS AND CORPORATE MEMBERS
SLS gratefully acknowledges support from the following corporations.

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MultiSpecialty Plenary Session
REMOTE TELESURGERY...NEAR AND FAR Thursday, Sept. 15, 10:30 am – 11:30 am
Telesurgery has been one of the promises of robotic surgery; however, there appears to be very little practiced today. Four pioneers in the field (from General Surgery, Obstetrics and Gynecology, and Urology) present their data with using telesurgery systems for telesurgery, telemonitoring, and remote surgery. In addition to validating the clinical practice of telesurgery, the substantial barriers to routine use of remote surgery will be addressed.

With Richard M. Satava, MD, as Director and Michael S. Kavic, MD, as Co-Director, this session features:

Mehran Anvari, MD, presenting “Use of TeleSurgery in the Rural Setting—The Canadian Experience”
Mika N. Sinanan, MD, PhD, presenting “Surgical TeleConsultation to the Operating Room Supporting the Referring Community Surgeon”
Tommaso Falcone, MD, presenting “TeleSurgery for the Practicing Gynecologist—Perspectives on Implementation”
Thomas W. Jarrett, MD, presenting TeleSurgery for Urologists – Pros and Cons for an Emerging Technology

MultiSpecialty Plenary Session
ENDOLUMINAL SURGERY Thursday, Sept. 15, 11:30 am – 12:15 pm
Preceding the remarkable rise of laparoscopic surgery with the “scope,” there was the use of flexible and rigid endoscopes. As is common, a previous technology gets new life when more capable technology and devices are discovered. This session focuses upon the emergence of an entirely new application for flexible and rigid endoscopy—endoluminal surgery. Exciting new developments in gastrointestinal, urologic, and hysterologic endoluminal procedures will rejuvenate the flexible scope revolution. These issues must be addressed now, or abrogate their use to other practicing specialties, such as gastrointestinal endoscopy and radiology.

With Michael S. Kavic, MD as Director and Richard M. Satava, MD as Co-Director, this session features:

William Richards, MD, presenting “Endoluminal Surgery—The Emergence of Flexible Endoscopy as Therapy”
Ceana Nezhat, MD, presenting “Endoluminal Hysteroscopic Surgery—An Evolving Technique and New Pages for Gynecology”
Ralph V. Clayman, MD, presenting “Endoluminal Endoscopic Surgery of the Upper Urinary Tract: Stones, Strictures, and Transitional Cell Cancer”

Breakfast and Future Technology Session
SPECIAL EFFECTS FOR SURGERY: FROM HOLLYWOOD TO NEW YORK CITY Saturday, Sept. 17, 7:30 am – 10:30 am
7:30 am – Breakfast
8:00 am – Keynote Lecture
9:00 am – Future Technology Session

Hollywood and New York City meet surgery. Many of the technologies used in surgery, such as image guided surgery, simulation, preoperative planning, and medical illustration, benefit from the special effects used for non-medical imaging. This Future Technologies session will explore the next generation of special effects that may soon be used for physician education and patient care. From the movie Star Trek to the operating room to the video game parlor, technologies that were once in the minds of science fiction graphic artists, video game designers, and scientific visualization computerists will be displayed with extraordinary visual effects.

The Future Technology Session, directed by Richard M. Satava, MD, features:

Scott Anderson, Keynote Speaker
Alexander Tsarias, MD, presenting “Architecture and Design of Man and Woman”
James C. “Butch” Rosser, Jr., MD, presenting “Video Gaming for Surgeons”

Tickets required for accompanying guests.

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The hotel’s location along the boardwalk places visitors next door to picturesque Seaport Village, two blocks from the clubs and restaurants of Gaslight Quarter, and minutes from other famous San Diego attractions such as Balboa Park. In addition to its fabulous location, the Hyatt boasts its own tennis courts, a health club, extensive spa facilities, a 25,000 sq ft pool deck, a marina, and four on-site restaurants offering a cosmopolitan combination of culinary styles.

Hotel Rates
Single or Double Room: $249.00 / night
This rate is subject to appropriate state, local, and occupancy taxes and does not include meals. The SLS room block will be released after August 13, 2005. After this date, rooms will be on a space available basis only. Rates are applicable 3 days before and after the conference based on availability.

In order to qualify for the special rate, you must make reservations by August 13, 2005, and mention that you are attending the “SLS Congress.” Please make reservations early!

Travel Information
For negotiated airline discount rates contact Steve at The Store For Travel, toll free at 800 284 2538. Outside the United States call 1 305 251 6331. Please be sure to mention you are attending the SLS Congress in San Diego. For those attending the conference who require special assistance (accessibility, dietary, etc.), please contact SLS no later than August 13, 2005 with special requests.

Accreditation
The Society of Laparoendoscopic Surgeons (SLS) is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

Designation
The SLS designates this educational activity for a maximum of 26 category 1 credits toward the AMA Physician’s Recognition Award. Each physician should claim only those credits that he/she actually spent in the activity.

Half-Day Master’s Classes: 3 credits
Full-Day Master’s Classes: 6 credits
14th International Congress: 20 credits

Congress Fees
Registration deadline: August 30, 2005.
SLS physician members register online by July 14, 2005 and save $100.

Conference $595
(Includes admission to exhibit hall, welcome reception, 1 ticket to breakfast with keynote speaker, and future technology session)

Master’s Classes
1 Half-Day Master’s Class $195
2 Half-Day Master’s Classes $295
1 Full Day Master’s Class $295

Programs, Scholarships, and Grants for Residents, Fellows-in-Training, Nurses, and Affiliated Medical Personnel

1. OUTSTANDING LAPAROENDOSCOPIC RESIDENT AWARD
Residency training program department heads are asked to nominate one Resident surgeon from their program to receive the SLS Outstanding Laparoendoscopic Resident Award [includes SLS membership].

2. SCHOLARSHIPS TO ANNUAL MEETING
Residents/Fellows-In-Training/Nurse/Affiliated Medical Personnel are eligible for a $300 scholarship towards the full Congress Registration fee. Application deadline: May 14, 2005

3. GRANTS
For Residents participating with their Program Director in the new masters class, “The Role of Simulation in Residency Training and Continuing Medical Education” at the SLS Congress and Endo Expo. Application deadline: May 14, 2005

4. $1000 CASH AWARD FOR BEST RESIDENT PAPER AT ANNUAL MEETING
For the Best Resident Paper submitted for the SLS Congress and Endo Expo.

5. SPECIAL MEMBERSHIP RATES
For details, visit www.sls.org

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**MAY 2005**
19-20 Annual Meeting of the American Society for Gastrointestinal Endoscopy. Chicago, Illinois, USA
21-26 AUA ’05—American Urological Association Annual Meeting. AUA. San Antonio, Texas, USA
20-21 Advanced Course in Laparoscopy in Pediatric Urology. IRCAD-EITS and ESPU. Strasbourg, France
22-27 Laparoscopic Bariatric Surgery Mini-Fellowship Program. Univ of Texas Southwestern Med Ctr. Dallas, Texas, USA
23-27 Intensive Course in Laparoscopic General Surgery. European Institute of Telesurgery. Strasbourg, France

**JUNE 2005**
1-4 IPEG's 14th Annual Congress for Endosurgery in Children. International Pediatric Endosurgery Group, European Association of Endoscopic Surgeons. Venice, Italy
8-12 13th EAES Congress. European Association of Endoscopic Surgeons. Venice, Italy
13-17 Intensive Course in Laparoscopic Urological Surgery. European Institute of Telesurgery. Strasbourg, France

**AUGUST 2005**
17-19 7th Asia Pacific Congress of Endoscopic Surgery—ELSA 2005. Endoscopic and Laparoscopic Surgeons of Asia, Hong Kong Society of Minimal Access Surgery, The Chinese University of Hong Kong, Hong Kong
21-26 Laparoscopic Bariatric Surgery Mini-Fellowship Program. Univ of Texas Southwestern Med Ctr. Dallas, Texas, USA

**SEPTEMBER 2005**
7-9 The Sixth Royan International Congress on Reproductive Biomedicine. Royan Institute. Tehran, Iran
7-10 16th World Congress of the International Society for Laser Surgery and Medicine. Tokyo, Japan
14-17 14th International Congress and Endo Expo 2005, SLS Annual Meeting. Society of Laparoendoscopic Surgeons. San Diego, California, USA
15-16 Minimally Invasive Surgery Series 2005—Laparoscopic Gastric Bypass. Mayo Clinic. Scottsdale, Arizona, USA

**OCTOBER 2005**
14-17 13th Annual Congress of the European Society for Gynaecological Endoscopy, Evolution of Surgical Techniques to Improve Women's Health and Reproductive Function. European Society for Gynaecological Endoscopy. Cagliari, Sardinia, Italy
16-21 ACS Clinical Congress. American College of Surgeons. San Francisco, California, USA
17-21 Advanced Gynaecological Endoscopic Surgery Training Workshop. Sydney, Australia
26-29 18th Annual Techniques in Advanced Laparoscopic & Gynecology Surgery. Mayo Clinic. Maui, Hawaii, USA

**NOVEMBER 2005**
11-13 Advanced Laparoscopy Course. University of Iowa Hospitals and Clinics. Iowa City, Iowa, USA

**DECEMBER 2005**
10-12 7th International Workshop on Therapeutic Endoscopy. Theodor Bilharz Research Institute. European Society of Gastrointestinal Endoscopy and American Society for Gastrointestinal Endoscopy. Cairo, Egypt
12-16 Intensive Course in Urological Surgery. European Institute of Telesurgery. Strasbourg, France

**JANUARY 2006**
6-7 Pacific Rim Robotics: An International Perspective. UCI Medical Center. Anaheim, California, USA
14-17 American Society for Reconstructive Microsurgery (ASRM) Annual Scientific Meeting. Tucson, Arizona, USA

**FEBRUARY 2006**
8-11 2nd AsianAmerican MultiSpecialty Congress of Laparoscopy and Minimally Invasive Surgery. Society of Laparoendoscopic Surgeons. Honolulu, Hawaii, USA

For more information about these and other upcoming events, visit www.laparoscopy.org.
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