Special Issue on Laparoscopy  Part I
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- Stayed up late reviewing clinical practice guidelines
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- Flown in from the Neighbor Islands to participate in quality management meetings
- Helped us provide evidence of improved outcomes for members
- Achieved consistently high levels of patient satisfaction
- Increased immunization rates for Hawaii’s keiki
- Documented according to NCQA requirements
- Gone beyond the call to demonstrate truly excellent standards of care

Mahalo! We couldn’t have done it without you!
Contents

Editorial
Norman Goldstein MD ................................................................. 685

Medical School Hotline
Sheila Schiel, Executive Director, Hawaii Residency Programs, Inc. .......... 687

Harry L. Arnold Jr. MD, Case of the Month
Tetanus: Still “Inexcusable”
Angela G. Myśliwiec MD and Lisa L. Zacher MD ............................ 689

A Laparoscopic Update
Bradley D. Wong MD, Guest Editor .............................................. 692

Laparoscopic Ultrasound: A Valuable Adjunct to Laparoscopic Surgery
Junji Machi MD, PhD ................................................................. 696

Laparoscopic Inguinal Herniorrhaphy:
The New Gold Standard of Hernia Repair?
Andrew J. Oishi MD, Barry N. Gardiner MD, Nancy Furumoto MD,
Junji Machi MD and Robert H. Oishi MD ................................. 700

Laparoscopic Staging of Malignant Disease
John H. Payne, Jr., MD, F.A.C.S .................................................. 705

Advanced Laparoscopy: “The Next Generation”
The Adrenal, Kidney, Spleen, Pancreas, and Liver
John H. Payne, Jr., MD, Wilfred Toshima MD, Brandt Lapschies MD,
Robert Washecka MD, Anandon Hariharan MD and Quan-Yang Duh MD .......... 710

News and Notes
Henry N. Yokoyama MD ............................................................... 716

Classified Notices ..................................................................... 717

Weathervane
Russell T. Stodd MD .................................................................. 718

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Leho He’e

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You are invited to attend...

- Tumor Board Conference – Luncheon
  
  **New Development In Treatment of Metastatic Breast Cancer**
  Reuben Guerrero, MD
  November 2, 1998, 12:30 – 1:30 p.m.
  Doctors Dining Room

  **Learning Objectives**
  At the conclusion, participants should be able to:
  - Understand the rationale in the development of oral chemotherapy in treating metastatic breast cancer.
  - Recognize it's value when considering quality of life issues (i.e., home based therapy, oral administration vs IV infusion etc.)
  - Evaluate the difference, using current IV 5FU in comparison to oral 5FU.

  We would like to acknowledge the generous Educational Grant from Roche Pharmaceuticals

- Friday Noon Conference –
  
  **Environment of Care Trends for the 90’s: an Abbreviated Study of Issues Which Impact the Environment of Care for Patients and Employees**
  Kevin Matsukado, Rose Arpon, Clayton Takara, & Michelle Fisher
  November 6, 1998, 12:30 – 1:30 p.m.
  Doctors Dining Room

  **Learning Objectives**
  At the conclusion, participants should be able to:
  - Describe specific environment of care issues that may impact daily practices.
  - Understand and Identify Infection Control, Tuberculosis and Bloodborne Pathogens.

- Ophthalmology Conference –
  
  **Glaucoma – Differential Diagnosis and Management**
  Stefan Karas, MD
  November 19, 1998, 4:30 – 5:30 p.m.
  Straub Eye Department

  **Learning Objectives**
  At the conclusion, participants should be able to:
  - Recognize unusual glaucoma cases.
  - Evaluate and manage difficult glaucoma cases.
  - Understand surgical considerations in difficult glaucoma cases.

Please call Fran Smith at 522-4471 for more information.
Editorial

Norman Goldstein MD
Editor, Hawaii Medical Journal

Laparoscopy I

When Bradley D. Wong MD was asked by Henry Yokoyama MD to serve as Guest Editor for a Special Issue on Laparoscopy, he said, “Yes, but...” the “but” I understand, implied he was too busy, as were his associates. He was, however, able to assemble a phenomenal amount of talented “laparoscopists” as you will see in this Part I of Laparoscopy Special Issue and in Part II to appear early in 1999.

I do not believe there is a Laparoscopy Society yet. A few years ago, the concept of a Laser Society was inconceivable too. Well, we do have an American Society for Laser Medicine and Surgery. Our meetings, like the manuscripts in this Special Issue on Laparoscopy, cut across all specialties in medicine and surgery.

Even the non-surgeons and non-surgical readers will find Bradley Wong’s Update and the manuscripts he collected truly fascinating, must reading for all physicians. Bradley Wong is an Assistant Professor of Surgery in our Medical School. He was honored as Teacher of the Year by the UH Surgical Residency program in 1995; the Queen’s Medical Center named him Outstanding Physician in 1996; and he received Excellence in Teaching Awards in our Medical School in 1985, 1990 and 1995. He extends his teaching skills to our readers in this Special Issue.

Mahalo nui loa, Brad Wong.

The Index to the Journal - Dec 1998

Every year, the staff of the Hawaii Medical Library prepares the Index to the Journal. This is a time-consuming task, but Marlene M. Ah Heong and Carolyn S.H. Ching are doing it once again with smiles of a job well done.

As Journal manuscripts become more diverse in subject matter with many authors sharing in the research and the preparation of the articles, an accurate and complete index is mandatory.

Even with computers in the office and computers at home, without the Reference Section and CHIS (Community Health Information Service) at the Library, good medicine would be more difficult to practice for Hawaii physicians.

Thanks to John Breinich, Director of the Library, to Sharon Berglund, Judith Kearney, Tina Okamoto, and Christine Sato at the Reference Section.

Tetanus: Still “Inexcusable”

Harry Arnold, Jr. MD would be proud to see this Case of the Month by Doctors Mysliwiec and Zacher of the Tripler Army Medical Center. As Consultant Emeritus at Tripler, I too am extremely proud of the work our military physicians are performing at Tripler—not just for the active duty military and their dependents, but for many non-military patients in the Pacific. In July 1995, Tripler celebrated its 75th year of service in Hawaii.

Tetanus is still with us! Be sure to read the Case of the Month on page 689.

References

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Hawaii Benefits from Graduate Medical Education

Sheila Schiel, Executive Director
Hawaii Residency Programs, Inc.

The future of Graduate Medical Education (GME) in Hawaii is uncertain. Not only is there heated debate over whether there is a need for more physicians in the current health care system, but the very funding used to train physicians is rapidly declining. With all the increased attention and controversy focused on the role and value of GME today, one has to ask, “Does Hawaii need GME?” The resounding answer is, Yes!

Currently, about 250 residents are receiving their postgraduate training in one of fourteen ACGME accredited training programs sponsored by the University of Hawaii John A Burns School of Medicine. Unlike the traditional mainland model in which residents train at a university-owned medical center, Hawaii relies on its community hospitals to provide the training venue for young physicians.

Through a collaborative effort between the School of Medicine and the community hospitals, Hawaii has succeeded in developing a viable, cost efficient system for training physicians. This system was created over twenty years ago because Hawaii did not want to be dependent upon mainland resources, including the recruitment of physicians, to sustain our health care system. Without the continued support and endorsement of local physicians and the medical community at large, there is the risk of losing this important educational resource.

Some critics contend that with the growing predominance of managed care and the perception of an oversupply of physicians, the training of more doctors in Hawaii should cease. Others argue that GME is too expensive and the services of residents can be purchased more cost efficiently from other health care providers. These arguments are both inaccurate and short-sighted. The value of GME goes far beyond simply training new physicians. In fact, the very presence of quality GME programs infuses academic rigor into the underlying health care system and improves the standard of health care delivery throughout that system. It also guarantees a continuing supply of new physicians without reliance on mainland resources. GME not only improves Hawaii’s health care system, but the lives of Hawaii’s citizens and economy. Here’s why:

- The presence of GME expands the collective pool of medical knowledge within the community by drawing young physicians from other academic centers, both mainland and abroad, to Hawaii.
- Hawaii’s postgraduate residency training programs provide local students the opportunity to train, and possibly establish their practice after graduation in the State.
- Residents provide much of the teaching for medical students.
- Residents provide quality medical care to Hawaii’s indigent and to others in underserved areas of the State.
Residents provide medical care to Pacific Rim countries which also helps develop referral networks back to our community hospitals.

Because of Hawaii's diverse population and unique epidemiology, the Programs offer the world's brightest and most promising young physicians an unsurpassed training experience, including exposure to alternative forms of medicine practiced in the Pacific region.

GME accreditation requires programs to conduct research and scholarly activity. Teaching facilities become active participants and beneficiaries of these research activities.

GME enhances Hawaii's economic base by capturing millions of dollars in Medicare reimbursement each year.

GME provides teaching opportunities for attending physicians in an academic environment and plays an important role in attracting and retaining top physicians for our State.

GME provides an educational infrastructure which perpetuates continuing education and lifelong learning for community physicians. Through the use of visiting professors, the training programs sponsor world renowned medical experts who lecture residents and community physicians on the latest developments in medicine.

Hawaii's health care industry is a valuable and growing economic commodity in the Pacific. Medical education is an integral part of that industry. If Hawaii hopes to become the Pacific Rim's premier health care provider and "the Health State", Hawaii's thriving academic environment must be preserved and a viable medical school, which includes graduate medical education, must be supported. Without such support, Hawaii will become entirely dependent upon mainland resources to sustain its health care system. It has taken Hawaii over two decades to develop the quality graduate medical education system we now enjoy. If that system is allowed to be dismantled, it is unlikely that there will ever be the critical mass or assets necessary to create it again.

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Tetanus: Still “Inexcusable”

Angela G. Mysliwiec MD and Lisa L. Zacher MD
Department of Internal Medicine and Pulmonary/Critical Care Service
Tripler Army Medical Center

Introduction

Deemed “the inexcusable disease” by Edsall in 1876, tetanus remains a potentially fatal disease that is easily preventable. Although vaccination is stressed, and its benefits are well-known, many cases are reported each year in the United States, especially in those shown to be at increased risk. Tetanus must be recognized in its early stages, and it should be considered in patients with uncertain immunization status. Herein, we describe the case of a patient from the Marshall Islands who received treatment in our medical facility.

Case Report

A 22-year-old Marshallese male presented with complaint of fever and lower back pain. He was admitted to the hospital in Majuro where he was found to have a temperature of 102 degrees Fahrenheit and significant muscular rigidity. He was treated with diazepam five milligrams intravenously and ibuprofen 800 milligrams orally as needed for symptoms. He was given penicillin G, ceftriaxone, and tetanus toxoid.

There was no known past medical history, and immunizations were reportedly up-to-date. The patient had undergone no surgeries. His only medication prior to admission included an occasional acetaminophen; he had no known drug allergies. He smoked approximately three cigarettes per day, indulged in marijuana on the weekends, and consumed alcohol infrequently. He was unemployed, but his daily activities included carrying heavy sacks. He lived with his father and three others; he had no siblings.

The patient was transferred to our medical facility five days after his initial presentation. There had been no significant change in the patient’s condition over this time period. On arrival history was obtained with the assistance of an interpreter; there was no history of trauma, bite, or penetrating wound. He denied headache, photophobia, or other symptoms. The medical attendant reported that most adults in Majuro receive only the initial tetanus immunization as children and rarely receive booster shots.

On physical examination, the patient was afebrile (temperature, 98.4 degrees Fahrenheit) and tachycardic (pulse, 117 beats per minute); his blood pressure was 130/59 and respirations were 27 breaths per minute. In general, he was alert and oriented; there was noticeable discomfort with movement. Pupils were equal and reactive, extraocular movements were intact. There was decreased jaw mobility with a two-centimeter opening. Nuchal rigidity was also evident. Lungs were clear to auscultation. Heart sounds were regular. The abdomen was intermittently rigid with audible bowel sounds. Superficial cutaneous abrasions were noted on the right elbow and bilateral pretilial regions; otherwise, no obvious puncture wounds or entry sites were identified. Neurologic examination was notable for restricted conjugate gaze, risus sardonicus with mild stimulation, and increased spastic tone throughout; there was no clonus. Laboratory data including complete blood count, electrolytes, and urinalysis which were within normal limits; hepatic panel was notable for an aspartate aminotransferase of 202 U/L. Creatine kinase was 5520 U/L.

The patient was admitted to the intensive care unit where observation was required due to the need for sedation and subsequent risk of respiratory compromise and cardiac arrest. He was given human tetanus immune globulin (HTIG) 500 unit dose to neutralize the tetanus toxin. His antibiotic regimen was altered to include metronidazole 500 mg intravenously every six hours given its decreased GABA agonist activity compared to penicillin G. Supportive measures were initiated including diazepam 10 milligrams intravenously every six hours for sedation, seizure prophylaxis, and control of muscle spasms. Propanolol 20 milligrams orally every six hours was given to decrease sympathetic tone. An intravenous fentanyl drip at 100 micrograms per hour was initiated to control pain. Sedation was later achieved with a lorazepam drip at one milligram per hour. Decubitus and aspiration precautions were observed; deep venous thrombosis prophylaxis was with heparin 5,000 units subcutaneously twice daily. Unnecessary stimuli were avoided.

Treatment was largely supportive throughout the remainder of our patient’s one month hospitalization. Attention was focused on preventive measures to include control of spasms, autonomic hyperactivity, pain, stimuli, and malnutrition. Opisthotonic posturing was noted with verbal and tactile stimuli and occasionally while the patient slept. Nutrition remained marginal for the first two weeks of the hospitalization despite efforts to provide supplementation, and a percutaneous endoscopic gastrostomy tube was placed by gastroenterology on hospital day number nineteen. The patient’s rigidity gradually subsided and sedation was tapered. He recovered completely and was without neurological sequelae. There were no respiratory complications. The patient was discharged on hospital day number thirty with a plan for rehabilitation of deconditioning.

This manuscript has been seen and approved by all authors. The opinions or assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the U.S. Department of the Army or the Department of Defense.

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Discussion

The incidence of tetanus in the United States has declined significantly since 560 cases were reported in the year 1947. The reported average of 41 cases annually for the years 1995-1997 was the lowest to date with 0.15 cases per million population. Immunization remains the key to prevention; few patients with tetanus (13%) have received a primary series of tetanus vaccination and only 33% receive proper wound prophylaxis. Several factors have been associated with decreased immunity, and despite emphasis on the need for immunization, the risk remains highest in minorities, the elderly (especially women), the poverty-stricken, the uneducated, and those born outside the United States. This trend has gone unchanged for decades and accounts for higher mortality rates our elderly population. In underdeveloped countries the figures remain staggering with 50,000 deaths due to tetanus each year.

Trismus is reported in almost all patients with tetanus. The initial presentation is often accompanied by dysphagia, headache, restlessness, and nuchal rigidity. In the generalized form of tetanus, the condition progresses to spasms with a "sudden burst of tonic contractions of muscle groups causing opisthotonus, flexion, and adduction of the arms with clenching of the fists on the thorax". Extension of the legs completes this picture of what has been described as the "tetanic seizure". Spasms occur with minimal stimuli and can be quite painful. All muscle groups can be affected leading to respiratory paralysis, a well-known complication of the disease. Autonomic dysfunction has emerged as the leading cause of death in these patients and is characterized by tachycardia, arrhythmias, excess sweating, and labile hypertension.

The diagnosis of tetanus remains one of clinical suspicion. Laboratory data is often either unreliable or unavailable. Muscular rigidity coupled with sympathetic overactivity distinguishes tetanus from other ailments which it may mimic such as tetany, meningitis, stiff-man syndrome, rabies, hysteria, strychnine poisoning, and dystonic reactions. Patients with a history of injury followed by symptoms and those without clear portal of entry should be considered at risk for tetanus and treated.

Treatment focuses on efforts to neutralize the toxin, debride the wound, and provide supportive care. HTIG neutralizes the toxin and shortens the course of the disease. Surgical debridement and removal of foreign matter may be required in some cases. Administration of metronidazole has been shown to improve survival, and special attention should be given to airway protection, inhibition of seizures, and treatment of autonomic dysfunction. Benzodiazepines are recommended to control spasms, provide sedation, and prevent tetanic seizures; neuromuscular blockade may be considered in severe cases. Control of autonomic dysfunction can be achieved with beta blockers or morphine; however, beta blockers have been associated with an increased risk of cardiac arrest and should be administered in a monitored setting.

Prevention has gone unchanged for decades and consists of vaccination and wound care. Primary immunization in patients younger than 7 years of age includes injection with diphtheria, tetanus, and pertussis (DTP) vaccine at ages 2, 4, 6, and 15 months with boosters at 4 to 6 years and at 11 to 12 years of age. Three injections with tetanus and diphteria (Td) four weeks apart followed by booster at one year is reserved for those requiring primary immunization at an age greater than seven. All patients should receive Td booster every ten years. Wound prophylaxis is based on the patient’s immunization status and classification of the wound as tetanus-prone (greater than six hours old, contaminated, deep and infected) or non tetanus-prone (less than six hours old, clean, superficial, and noninfected). Tetanus-prone wounds in patients with uncertain immunization status require primary immunization and HTIG. If immunization can be proven or the wound is clean, no HTIG is required. If it has been more than ten years since the last booster in a non tetanus-prone wound or more than five years in a tetanus-prone wound, a booster shot should be given, even in those with up-to-date immunization.

This case illustrates the classic presentation of tetanus. No portal of entry is identified in many patients, and uncertain immunization status cannot be relied upon. Our patient responded well to supportive therapy and had an uncomplicated course. The importance of vaccination cannot be overemphasized. Unfortunately, our knowledge of the fatal nature of tetanus and the methods by which it can be prevented has not aided us in eliminating the disease. Primary care providers must routinely screen their patients for vaccination status, as the prevalence remains high in our elderly and others at increased risk. Indeed, there is no excuse.

References:
1. Edsall G. The Inexusable disease. JAMA. 1876; 235:82-83.
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A Laparoscopic Update

Bradley D. Wong MD*, Guest Editor

Henry Yokoyama asked me in late 1997 to write an article on laparoscopy. Hoping that our medical colleagues might be curious about what goes on in the inner sanctum of the operating rooms, I agreed. The articles that you’ll be reading are a result of my pleas to my surgical colleagues and are included in this issue. Robb Ohtani was ambitious enough to gather the gynecologists together for their contributions which will be published in early 1999. I selected the group of general surgeons because of their expertise or special interest in their subject. I thank them all.

In the following articles, we’ll be taking a look at some of the procedures that have been adapted to laparoscopy. I’m sure there will be some surprises for everyone. Even the general surgeon accustomed to performing laparoscopic colectomies may be unaware of the advances occurring in gynecology. For the non-surgeon, I hope that these articles will improve awareness of what conditions the laparoscopists can now treat.

First, we need a perspective. A study of laparoscopy’s roots might be of interest to you. It is a fascinating story, replete with ingenuity, innovation, inspiration, and luck. Let us begin.

The events of the past 10 years have been a great surprise to me. No one could have anticipated how far laparoscopy would come. I am not embarrassed to admit that I was a disbeliever of its potential. In 1989, I recall reading the article by Drs. Eddie Reddick and Olsen in Surgical Endoscopy reporting their first cases of cholecystectomy done with the laparoscope. I was amused. Why would any sane surgeon struggle with a cumbersome, albeit new, method when the old way was so simple, safe, and reliable? At the Hawaiian Surgical Association meeting on the Big Island, I had to personally speak with Dr. Reddick and view his videotape of this new procedure before I was convinced. How ironic that now ninety-five percent or more of cholecystectomies are done laparoscopically. I had learned an important historical lesson.

In August of 1991, the first laparoscopic cholecystectomies were done in Honolulu. Seven of us (Virginia Pressler, Steve Nishida, Peter Halford, Werner Grebe, Kristine Gebrowsky, Mihaq Yu, and myself) began at the Queen’s Medical Center. Gene Robinson started at Pali Momi. I think I can speak for all in saying that those first cases were some of most challenging, satisfying, and stressful cases of our careers.

Many have called the advancements in laparoscopy in the early 1990’s a revolutionary period in general surgery. Studying the history of laparoscopy, however, makes it clear and fascinating that most pioneers are merely the most recent on a timeline of innovators and each is interdependent on many others for his individual successes. Each advance was the endpoint of an accumulation of human invention and is really evolutionary. While one person may be credited with having been the first to have accomplished an act, more often than not, many had thought about doing it before him but lacked only another concept or instrument, ever so slight or simple.

Having never inserted a Veress needle into an abdomen, many of us implored our gynecology friends to show us how to do it. This needle allowed the abdomen to be inflated with carbon dioxide, creating a cathedral-like work space. Janos Veress, by the way, was a Hungarian physician who, in 1938, reported his invention of a spring loaded obturator that slipped beyond the sharp point of the needle, lessening the chance of perforating a viscous. He never anticipated that his needle would be used to our benefit in 1991; he devised it to drain ascites and pleural effusions and never suggested that it be used to insufflate air.

Kelling, a German, about 1900, was the first to use a (sharp) needle to instill room air into the abdomen, which he viewed with a cystoscope. No one thought much of this idea at the time. Perhaps this was because his subjects were dogs. Hans Christian Jacobaeus of Stockholm, Sweden was the first to report in 1910 on the use of laparoscopy and thoracoscopy in humans. He instilled air through the trocar. He felt that thoracoscopy held greater potential and pursued this in the treatment of tuberculosis, leaving further developments in laparoscopy to others. Eventually, endotracheal intubation would enable formal thoracotomy to overshadow thoracoscopy, until, of course, today, when thoracoscopy has regained some respect. That story is for another editor to tell.

Air, though abundant, was not easy to work with. It enabled combustion and tended to leak out of the trocars. Richard Zollikofer of Switzerland suggested carbon dioxide as the ideal gas. It was nonflammable and was quickly absorbed by the peritoneum. Not everyone listened to Richard. In 1933, C. Fervers in Germany used oxygen to insufflate the abdomen, which resulted in a flash explosion when cautery was used to lyse adhesions. The patient survived, but the use of oxygen as a method of pneumoperitoneum did not. Z.E. Stone of Kansas in 1924 described the use of a rubber gasket placed at the end of the trocar to reduce the air leak.

In 1991, we were using the Veress needle, carbon dioxide, and Dr. Stone’s rubber gasket to insufflate our patients’ abdominal cavities. Once the abdomen was filled with carbon dioxide, a sharp pyramid tipped obturator within a (hollow) trocar was blindly plunged through the linea alba. This daring act consistently confirmed my belief in the benevolence of the universe. B. H. Orndoff of Chicago in 1920, invented that horrendous instrument, whose sharpness simplified the insertion of the trocar but likewise increased the chance that bowel or aorta might be punctured. Orndoff used fluoroscopy as an aid to insertion. In later months, many of us would learn the open technique of trocar placement developed by H. M. Hasson whereby a blunt trocar was inserted under direct vision. Hasson thought of this method 20 years before, in 1970, and greatly reduced the degree of faith and the intensity of prayer required to begin the operation.

Through the 10 mm trocar, we inserted the tubular rod-lens scope, a marvel of optical engineering, which gave us a bright light and a
clear image. Life was not so simple before this.

The Ancients did not have the benefit of modern glass and metals technology. Writings from 400 BC to 1000 AD in Greece, Pompeii, Rome, Babylonia, and Baghdad described various primitive tubes and speculums used to examine the various orifices of the human body. Getting a tube into those orifices was an accomplishment in and of itself, but seeing through that tube required that another set of engineering dilemmas be solved.

One needed light to see. Many instruments were devised using both natural and artificial light, directed through holes, flasks, lenses, and mirrors. Philipp Bozzini working in Frankfurt in the early 1800’s, developed the first practical endoscope using a candle, mirrors, and different specula to view the urethra, bladder, rectum, and vagina. Medical conservatism, politics, and professional jealousy hindered its acceptance by his colleagues.

Up through the 1850’s, subsequent scopes using similar principles were constructed by Segalas (in Paris), Fisher (in America), and Desormeaux (in Paris). All suffered from poor external lighting and a view limited by the narrowness of the tube-speculum.

The urologist Maximillian Nitze is often credited with inventing the first “modern” cystoscope. Nitze collaborated with both an optician and an instrument maker (Josef Leiter), producing a scope in 1880 whose lens system gave a wider field of vision and a magnified, non-inverted image.

His initial light source was a heated platinum wire, placed at the tip of the scope and cooled by water (easily done in the bladder). Putting the light source within the bladder was a great inspiration, but he apparently borrowed that idea from a dentist, Julius Brock, who 13 years before had used the platinum wire light to view the inside of the mouth.

About the same time, Thomas Edison, aided by Perspiration, had invented the incandescent bulb (in 1879). Leiter meanwhile feuded with Nitze, and they parted ways. In 1883, Newman in Scotland passed a miniaturized bulb into the bladder through a cystoscope. By 1887, both Nitze, a German, and Leiter, an Austrian, independently had connected the American’s invention to the tip of a cystoscope. The scope that Nitze (and Leiter) created remained conceptually unchanged until the 1960’s.

Though the Nitze scope was revolutionary, it still suffered from relatively poorly light transmission characteristics: the view was dim. Pressured by a urologist, James Gow, Professor Harold Hopkins, an Englishman, invented the rod-lens scope, a system mass produced in the 1960’s by a German instrument maker named Karl Storz. For those uninformed internal medicine types, this man Storz is to surgical instruments what Levi Strauss was to pants.

In Nitze’s scope, a series of lenses was placed within an air-filled tube. At each air/glass interface, light was reflected. Light absorbed by the interior of the metal tube was also lost. Both effects reduced the amount of light reaching the eyepiece. In a brilliant conceptual maneuver, Hopkins reversed the materials within the tube. In place of air spaces, he inserted solid glass rods, curved at their ends, and separated by narrow air pockets, creating in effect, air lenses. This arrangement exploited the phenomenon of internal reflection of light within a glass tube and, combined with the new technology of antireflective lens coatings, increased the light transmitted by a factor of 80. Our current scopes bear the name of “Hopkins.”

We are still left with the major problem of getting enough light with which to see into the abdomen. The heat generated by an incandescent bulb placed at the tip of a scope would be obviously damaging to tissues. Once again, enter Professor Hopkins.

In the 1940’s, the decade before he developed the rod-lens system, Hopkins was stimulated by the gastroenterologists’ need for a flexible scope to replace the rigid scopes of that era. He and a graduate student constructed a primitive short flexible tube which consisted of fine glass fibers, bundled and oriented to carry an optical image. They named it the “fiberscope.” Hopkins moved on, directing his energies to the rod-lens scope, but from this primitive instrument came the next piece of the technical puzzle.

Basil Hirschowitz, a fellow in gastroenterology at the University of Michigan read of Hopkins’ work, and collaborated with two physicists (Peters and Curtiss). They coated fine glass fibers with a glass of lower refractive index to exploit the phenomenon of internal reflection, and in 1957 built the first practical flexible gastroscope. The light source of these early scopes was still an incandescent bulb placed at the tip of the scope, but by 1963, a fiber optic cable, based upon the glass fiber concept of the flexible gastroscope, was carrying light from an external source. This was a “cold” light which eliminated the risk of heat injury to internal organs.

Over the next 15 years, Dr. Kurt Semm, a German gynecologist took the advances in scopes and light sources and performed a variety of gynecologic procedures endoscopically (adenosiolysis, ovarian biopsy, fimbrilysis, tubal sterilization, salpingectomy, oophorectomy, myomectomy). He was the first to perform an appendectomy, incidentally, of course, and to suture the bowel. To accomplish this he developed a number of instruments and concepts which we still use today: high frequency monopolar and bipolar coagulation, the automatic pressureregulating insufflator, the hook scissors, a uterine vacuum grasper, a tissue morcellator, the endoloop, the suction-irrigating tubing, endosuturing, and the “pelvitrainer,” an apparatus to aid surgeons in developing the hand-eye coordination necessary for laparoscopic operations. He was prolific inventor.

In 1991, to complete our cholecystectomies, we were using the still relatively primitive tools developed by Semm and the gynecologists.

American surgeons, meanwhile were doing little to advance laparoscopy in the 1960’s. “Culdoscopy” was devised by two Americans Decker and Cherry, and was the most popular technique up to the 1960’s. This arcane and undignified procedure had the woman positioned on her hands and knees. The few laparoscopists who 13 years before had used the platinum wire light to view the ovaries, mainly tubal ligations. Even with Semm and the Europeans pushing the laparoscopic envelope, the clumsiness of the laparoscopic instrumentation dissuaded most American surgeons from embracing the technique.

The accomplishments of Semm and his contemporaries are remarkable when one considers that they viewed the abdomen through the single eyepiece of a rigid scope. When the scope was moved to another angle, so had to move the surgeon’s head. Any observer had also to look through an eyepiece physically connected to the surgeon’s scope. A cumbersome articulated optical tube system was still being used by gynecologists as recently as 1991. For the surgeon to use two hands, the assistant had to hold the operating scope/eyepiece for him, while holding his own eyepiece merely to observe the procedure. He could not provide any operative assistance. This obviously limited the complexity of the procedures which could be performed.
Our generation of pioneers were waiting for the marvelous CCD. You are undoubtedly familiar with the silicon charge-coupled device (CCD). Your home video camera uses it to capture a light image, converting it into electrical impulses, which are then recorded onto magnetic tape. The CCD was developed at Bell Laboratories in 1969, but it took grants from NASA to nurture its development into the compact and light weight camera we use today. The chip itself is smaller than a postage stamp. The first practical camera was marketed by Circon in 1985. Its resolution is not as great as the cameras now on board the Galileo space probe (to Jupiter) or the Hubble telescope or the Cassini probe (to Saturn), but it uses the same technology. The arthroscopists were quick to exploit its potential and were the first to use the technology here in Hawaii.

The CCD camera sits atop the eyepiece of the laparoscope. It is about 7-10 cm long and connects by a cord to a video processor which transmits the image to a familiar black box, the TV monitor (now that is a fascinating story and an important part of the puzzle as well). We now had a large, clear, bright, color image which could be viewed by many observers. This video-imaging system freed the surgeon to use 2 hands to operate and enabled assistants to participate actively in the operation.

By 1987, the first cholecystectomies in humans were performed using the CCD-TV systems, first in France and then in the United States. In early 1991, Eddie Reddick in Nashville was teaching his technique to a small group of Hawaii surgeons. He normally charged $3,000 dollars to take his course. He offered it to us for free. Dr. Reddick had been a surgical resident at Tripler and most of us had been his instructors. The student had now surpassed the teachers.

Our first laparoscopic cholecystectomy adventures were made possible by the cumulative daring and ingenuity of the many inventors before us. Soon we became familiar with the instrumentation. Laparoscopic cholecystectomy became routine. A few gynecologists confided to me that the general surgeons’ success stimulated them to perform more complex procedures. It was inevitable that appendectomy and inguinal herniorrhaphy would be adapted to the laparoscope.

It has been an intoxicating ride. As I look back upon our first entry into laparoscopic surgery in August of 1991, I find it hard to recall how difficult it seemed then. As you will see in the forthcoming articles, technical advances have made more difficult operations feasible (cholecystectomy, spleenectomy, adrenalectomy, fundoplication, nephrectomy, and others) and have simultaneously raised issues of cost, safety, and efficacy. What lies ahead? If I’ve learned anything from the past seven years, it is that the unimaginable will become possible. History teaches us that the horizon is never fixed.

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Laparoscopic Ultrasound: A Valuable Adjunct to Laparoscopic Surgery

Junji Machi MD, PhD

Laparoscopic ultrasound represents a recent merger in the laparoscopic technology and intraoperative ultrasound and shows a diagnostic accuracy higher than preoperative studies. Laparoscopic ultrasound can be used during laparoscopic cholecystectomy to screen the bile duct. It is particularly useful for diagnosing and staging malignancies, including hepatobiliary, pancreatic and gastroesophageal cancers. By demonstrating the interior of organs and deep structures, it can compensate for the limitation of laparoscopic examination. Laparoscopic ultrasound will become a valuable adjunct to laparoscopic surgery.

Intraoperative ultrasound, the use of ultrasound during open surgery, has proven invaluable during various abdominal operations. The main advantage of intraoperative ultrasound is the high diagnostic accuracy due to high-frequency, high-resolution instruments employed. For example, the accuracy of intraoperative ultrasound is equal to or superior to intraoperative cholangiography in screening bile duct calculi during open cholecystectomy. It is the most accurate method for detecting liver metastases or localizing islet cell tumors, exceeding the sensitivity of intraoperative inspection and palpation by surgeons. The stage and resectability of hepatobiliary, pancreatic or other abdominal cancers can be determined more precisely than by preoperative tests. Thus, intraoperative ultrasound helps surgical decision-making, and occasionally alters planned surgical procedures. In addition, with its guidance capability, intraoperative ultrasound enables procedures such as needle biopsy of nonpalpable tumors or facilitates hepatic resection or ablative treatment of tumors.

Laparoscopic ultrasound (LUS) is one form of intraoperative ultrasound that represents a merger in the laparoscopic and intraoperative ultrasound technologies. LUS utilizes the same high-frequency instruments that provide high-resolution images. This ultrasound technique allows surgeons to visualize the interior of organs and deep structures, thereby compensating for the limitation of laparoscopic examination. With increasing number of laparoscopic procedures being performed, the application of LUS to laparoscopic surgery is a logical extension of intraoperative ultrasound.

History

LUS using A-mode (one-dimensional) ultrasound was first attempted by Japanese investigators in the 1960s, for the diagnosis of gallstones or liver tumors. In the early to mid-1980s, several prototype LUS probes using B-mode (two-dimensional) ultrasound were developed in Japan and Europe. In spite of excellent images obtained by these prototype probes, LUS was not widely accepted in the 1980s, mainly because of declined interest in diagnostic laparoscopy among surgeons. However, shortly after the explosion of laparoscopic surgery with a video laparoscope, interest in LUS was rekindled in the early 1990s. Initially, LUS was introduced during laparoscopic cholecystectomy to screen the bile duct. Subsequently, LUS was performed for staging of abdominal malignancies and for diagnosing hepatic or pancreatic lesions. During the last several years, numerous experiences with LUS have been reported.

Instruments

Current LUS instruments employ a high-frequency (5 to 10 MHz) real-time B-mode ultrasound system, which is basically the same as
intraoperative ultrasound.\textsuperscript{1,2} Certain systems have a capability of duplex ultrasound (B-mode plus Doppler spectrum) or color Doppler imaging (display of blood flow in color on B-mode images), which facilitates quicker identification of blood vessels. A probe consists of transducers mounted on or near the tip of a slender shaft. It is usually 10mm in diameter and 40 to 70cm in length, and is introduced into the peritoneal cavity via a 10mm trocar, after cold gas sterilization. Several types of LUS system-probes are presently available. A system provides linear-array (producing rectangular images), convex or sector (producing pie-or fan-shaped images) transducers. A probe can be either front-viewing (scanning plane parallel to the probe shaft) or side-viewing (scanning plane at the right angle with the shaft). A front-viewing sector probe is suitable for scanning of the extrahepatic bile duct or the pancreas whereas a side-viewing convex or linear-array probe is essential for scanning of the liver. A rigid-shaft probe was originally made by manufacturers; currently, a flexible probe is also available. This has a flexible tip that is mobile in two or four directions (Figure 1). Although technically more demanding, a flexible probe facilitates scanning of areas that are difficult to delineate with a rigid probe (e.g., behind the dome of the liver), reduces the number of trocar insertion sites, and decreases the scanning time.

**Clinical Applications**

It is easily understandable that after rapid widespread performance of laparoscopic cholecystectomy in the early 1990s LUS was first introduced for examination of the biliary tract. Initial experiences demonstrated the technical feasibility of LUS to delineate the biliary anatomy and to detect bile duct calculi.\textsuperscript{7-10} Since then, several prospective trials have compared LUS with intraoperative cholangiography (that is a current standard) during laparoscopic cholecystectomy.\textsuperscript{11-15} LUS, once learned, required less time than intraoperative cholangiography (5 to 10 minutes versus 10 to 15 minutes). The accuracies (sensitivity and specificity) of both tests in diagnosing bile duct calculi showed no significant difference (Figure 2). An anatomic definition of the biliary tract (e.g., detection of bile duct...
anomalies) was slightly better provided by intraoperative cholangiography, while the surrounding structures such as the hepatic artery and portal vein were imaged only by LUS. Overall, LUS and intraoperative cholangiography are considered complementary to each other. Because of its safety and quickness, LUS can be the first-choice method for screening bile duct calculi; intraoperative cholangiography can be used selectively when LUS is incomplete or inconclusive or when the biliary anatomy needs to be clearly defined (e.g., suspicion of bile duct anomaly).

Laparoscopic exploration provides diagnostic information not obtainable by preoperative studies, and is considered an effective modality for diagnosing and staging abdominal malignancies. In many recent studies, laparoscopy has been shown to more correctly predict resectability of malignancies including hepatobiliary, pancreatic, and gastrointestinal cancers, and thereby to decrease remarkably the incidence of unnecessary laparotomy for unresectable cancers. Because of the known limitation of diagnostic laparoscopy, LUS has been lately introduced as an adjunct to laparoscopy for various abdominal malignancies. LUS provides surgeons with information that cannot be obtained by laparoscopic exploration alone. LUS can detect lesions located deeply in an organ such as the liver and pancreas; for example, invisible metastatic liver tumors can be diagnosed (Figure 3). Tumor invasion into surrounding structures, mainly major blood vessels, can be evaluated. Prior to extensive tissue dissection, LUS can identify enlarged or suspicious lymph nodes; this is difficult with laparoscopic visual examination alone. The information regarding cancer spread provided by LUS is similar to that by intraoperative ultrasound during open surgery. Several studies reported during the last few years demonstrated that LUS provided staging information in addition to that derived from laparoscopy alone in 10 to 40% of patients with liver, biliary, pancreatic and gastroesophageal cancers.\textsuperscript{16-22} In these studies, because of better LUS staging the predicted resectability was higher than 90 to 95%, confirmed by subsequent laparotomy.

There are a number of other applications suggested by recent reports of LUS during laparoscopic exploration or laparoscopic surgery. These include evaluation of gallbladder polyps, detection or definition of pancreatic pseudocysts, localization of pancreatic islet cell tumors, assistance during surgery of liver cysts, assistance during adrenal tumor resection, and evaluation of retroperitoneal tumors.

Intraoperative ultrasound has been used for guidance of various surgical procedures such as needle, cannula or probe placement and tissue dissection or resection. Such guidance techniques (so-called interventional ultrasound) can be used with LUS. LUS can guide a needle into target lesions for biopsy of tumors (e.g., liver or pancreatic tumors) or lymph nodes and for aspiration of cystic lesions. Non-resectional treatment of liver tumors such as laparoscopic cryoablation or thermal ablation that has been developed recently cannot be completed without LUS.\textsuperscript{23-25} In these procedures, cannula or probe placement is guided by LUS, and the treatment process is monitored by LUS images (Figure 4). LUS-guided laparoscopic resection of tumors (e.g., partial hepatic resection) has been reported.

**Perspective**

Although technically more demanding than intraoperative ultrasound during open surgery, LUS, when appropriately performed,
can provide versatile information and compensate for the limitation of laparoscopy. During laparoscopic cholecystectomy, LUS can be used as complement or alternative to intraoperative cholangiography: By using LUS as a first-choice screening method, the requirement for intraoperative cholangiography will be significantly reduced. During exploratory laparoscopy immediately prior to planned laparotomy for abdominal malignancies, in particular liver and pancreatic cancers, LUS can extend the diagnostic staging ability of laparoscopic surgeons, and thus can eliminate the need for laparotomy in many patients with unresectable cancers. In selected patients with liver tumors who are not candidates for surgical resection, laparoscopic ablation treatment with LUS guidance can be offered. At present, laparoscopic cancer surgery (e.g., laparoscopic colectomy for colon cancer) is being investigated by clinical trials. Once patients undergo laparoscopic resection of primary abdominal cancers, LUS will have a role, especially in examining the liver for metastasis.

Laparoscopic technology continues to advance rapidly, and laparoscopic surgery continues to apply to the larger numbers and various types of abdominal diseases. As well, ultrasound technology is advancing, e.g., 3-dimensional ultrasound and ultrasound contrast enhancement; such a technology may soon be introduced to intraoperative ultrasound, and possesses a variety of potentials. As technology is evolving and its applications are expanding in both laparoscopy and ultrasound, LUS as a new modality must be assessed carefully to better define its role (and also its limitation) in improving laparoscopic operations and patient outcome. LUS, when appropriately utilized, will show great promise as a valuable adjunct to laparoscopic surgery.

References
Laparoscopic Inguinal Herniorrhaphy: The New Gold Standard of Hernia Repair?

Andrew J. Oishi MD*, Barry N. Gardiner MD**, Nancy Furumoto MD*, Junji Machi MD*, Robert H. Oishi MD*

The surgical treatment of the common inguinal hernia has been one of the most analyzed and debated topics in medicine. Recently, with the success of laparoscopic cholecystectomy, interest in minimally invasive surgical techniques has led to its application for inguinal hernia repair. Current laparoscopic herniorrhaphies are based on the principles of conventional open preperitoneal repairs and are classified into two types: 1) transabdominal preperitoneal repair (TAPP) and 2) totally extraperitoneal repair (TEP). Common advantages to both techniques include a decrease in postoperative pain,1 earlier return to normal activity,2 and improved cosmesis. Both laparoscopic techniques have the disadvantage of requiring general or regional anesthesia and increased procedural costs.2 Lastly, there is a concern that laparoscopic hernia repair has not been around long enough to know the risk of late recurrences. Laparoscopic herniorrhaphy, however, is a viable alternative to standard open inguinal hernia repair.

Introduction
Surgical treatment of the common inguinal hernia has been one of the most analyzed and debated topics in medicine. Since the earliest inguinal hernia repair described by Celsus in 50 AD to the inception of the “modern” surgical treatment of inguinal hernias in the 19th century, hundreds of different repair techniques have been described and nearly 20 different repairs are currently in use. Furthermore, it is one of the most commonly performed surgical procedures with over half a million patients a year undergoing inguinal herniorrhaphy in the United States alone. Yet despite the long and storied history of inguinal herniorrhaphy and the abundance of clinical data, no single operation has emerged as the operation of choice. In fact, no operation in general surgery has undergone more modifications or is performed in more varying techniques than the routine inguinal repair. Until recently, however, whichever technique was used, the only way to repair an inguinal hernia, was through a relatively large incision on the abdomen. This has the major disadvantages of significant postoperative pain and prolonged disability not only due to the incision itself, but also due to the necessity of having to mobilize the cord structures and nerves in order to repair the inguinal floor. This is especially true for bilateral hernias which require incisions and dissection in both groins or recurrent hernias which require operating through the previous scar.

Recently, with the success of laparoscopic cholecystectomy, an explosion in the application of minimally invasive techniques for general surgical procedures has developed. Much of the incentive to develop these new minimally invasive techniques have been driven by patient demand, spurred on by the lay press and the Internet. Hospitals are also touting the benefits of minimally invasive surgery as a way of attracting more patients. Included in this wave of new applications are minimally invasive techniques to repair the common inguinal hernia.

Current Laparoscopic Herniorrhaphies
The first description of a laparoscopic hernia repair was in 1989 by Ger who reported a simple ligation of the hernia sac along with closure of the fascial defect. Subsequent methods included simple mesh plugs placed in the internal ring to occlude the hernia defect or intraperitoneal onlay patches to cover the defect. These early attempts at laparoscopic repair were associated with high recurrence rates or other complications and have since been abandoned. Current laparoscopic herniorrhaphies are based on the principles of conventional open preperitoneal repairs and can be classified into two types: 1) transabdominal preperitoneal repair (TAPP) and 2) the totally extraperitoneal repair (TEP). Both techniques have their advantages and disadvantages. Common advantages to both techniques include a decrease in postoperative pain,1 earlier return to normal activity, and improved cosmesis. However, unlike traditional open herniorrhaphy which can be performed under local anesthesia with sedation, both laparoscopic techniques have the disadvantage of requiring general or regional anesthesia. In addition, laparoscopic repairs are more expensive due to the need for disposable instruments, trocars and video equipment.2 Lastly, many surgeons claim that neither type of laparoscopic hernia repair has been around long enough to know the risk of late recurrences.
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### Transabdominal Preperitoneal Repair (TAPP)

Currently, the most popular laparoscopic technique is the TAPP repair. The procedure is performed intra-abdominally, placing a 10 mm laparoscope into the abdomen. The peritoneum just anterior to the internal ring is incised and the peritoneal surface is dissected off the abdominal wall. The pertinent anatomy is carefully exposed and a large panel of synthetic mesh is placed on the anterior abdominal wall and tacked in place to cover the hernia defects. The peritoneum is then closed over the mesh to completely cover it and separate the mesh from the intraperitoneal contents. The major advantages of the TAPP approach are that the operation is performed completely intraperitoneally, potentially exposing the peritoneal cavity to the risks of any abdominal surgery including vascular and intestinal trocar injuries, postoperative bowel obstruction and trocar site herniation.

### Total Extraperitoneal Repair (TEP)

Although this approach is technically the most difficult, it is perhaps the most satisfying of all laparoscopic hernia repairs developed thus far. The operation is performed according to techniques that have proven effective in open repair surgery. No compromises in technique are made to accomplish this. The procedure is performed by first creating a totally extraperitoneal working space using a air or fluid filled balloon to dissect the peritoneum off the abdominal wall and create a preperitoneal space. Once this space is created, a pneumo-preperitoneum is established using CO₂ gas insufflation. From this point, the operation is performed in a similar manner to the TAPP repair. The appropriate structures are identified and again a large panel of synthetic mesh is tacked in place to completely cover and reinforce the inguinal floor. Despite being the most difficult of all laparoscopic hernia repairs because of the limitation of a small working space in the preperitoneum, this operation is gaining popularity and may become the laparoscopic repair of choice. The TEP repair offers the same advantages as the TAPP repair but because it is performed totally extraperitoneally, it minimizes the risk of intra-abdominal complications. Furthermore, much of the hernia dissection is performed by the balloon so the creation of the preperitoneal space, saving and simplifying the identification of the anatomy.

### Indications and Patient Selection

The first and most important criteria is that the patient be a suitable candidate for general anesthesia. Unlike open hernia repairs, laparoscopic repairs cannot be performed using local anesthesia. Although laparoscopic herniorrhaphy has been performed using regional anesthesia, most surgeons feel that additional abdominal relaxation obtained with general anesthesia is important and routinely require it for this approach. Beyond the requirement that patients be suitable medical candidates for general anesthesia, selection of patients suitable for a laparoscopic approach is a subject of controversy. The benefits of decreased postoperative pain and earlier return to activity are greatest in patients who undergo simultaneous laparoscopic repair of bilateral hernias or those who have recurrent hernias. Patients with bilateral hernias benefit because instead of the large incision in each groin necessary for open repair, both hernias can be repaired laparoscopically through the same small incisions with minimal in-
crease in postoperative pain. Furthermore, patients who have recurrent unilateral or bilateral inguinal hernias, also benefit because the laparoscopic approach avoids having to operate through scar from the previous surgery. Also, patients whose occupation or lifestyle require returning to full activity as soon as possible can also benefit from laparoscopic herniorrhaphy. Unlike open repair which leads to a 3-6 week period of disability, most surgeons allow patients to resume normal activity as soon as they feel able to. Typically, most return to normal activity within a week, although many highly motivated individuals return to strenuous physical activity in 2-3 days following surgery.

Results
Both retrospective reviews and randomized, prospective trials have demonstrated the benefit of decreased postoperative pain and earlier return to normal activity for laparoscopic repair as compared to “tension free” open hernia repair.1,2,4 Postoperative pain has been significantly less and most studies have documented that patients are more comfortable and need less analgesia postoperatively. Patients return to work sooner, and this is especially true for those patients who must return to a physically strenuous job. The incidence of recurrence compares favorably to open hernia repairs and ranges from 0.3-5.0% for TAPP repairs and 0 - 8% for TEP repairs.5,6 The most common reasons for recurrences have been technical problems with placement of the mesh or missing a second hernia by not completely dissecting the direct and indirect spaces. Most reports demonstrate that the incidence of recurrence decreases as surgeons gain experience with this approach. Also, not surprisingly, large hernias, bilateral hernias and complex hernias have been associated with the highest risk of recurrences and likewise, these hernias are best performed by surgeons experienced with the procedure.7 Additional complications specific to the laparoscopic approach have been a small incidence of nerve entrapment syndromes resulting in chronic pain, trocar site hernias, and a slightly higher incidence of seromas. Lastly, the TAPP approach is associated with a 0.2% incidence of small bowel obstruction usually due to adhesions at the operative site.

Conclusions
Laparoscopic herniorrhaphy is a viable alternative to standard open inguinal hernia repair. It is associated with less postoperative pain and a quicker return to normal activity. It has recurrence rates comparable to standard open repair and can be performed with low morbidity. For patients with bilateral or recurrent inguinal hernias or those who need to return to activity quickly, laparoscopic herniorrhaphy may be the procedure of choice.

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The earliest applications of laparoscopy were for diagnostic procedures. The goal was to make a diagnosis while sparing the patient a major, and often futile, operation. However, the view was limited and it was not possible to palpate organs or masses. The recent development of advanced laparoscopic techniques and ultrasound have improved our view and restored our “sense of touch”. These innovations bring the goal of minimally invasive diagnosis and staging closer to reality. This paper reviews the current literature on the laparoscopic staging of cancer with an emphasis on patient selection, diagnostic accuracy, and the reduction in morbidity which can be achieved.

Introduction

Over the last decade therapeutic laparoscopy has undergone an explosive growth. Early success with laparoscopic cholecystectomy has encouraged innovative surgeons to apply minimal access techniques to a growing list of procedures. It has also led us to return to our historic roots. Before the advent of the CCD camera and the increasingly sophisticated instruments, laparoscopy was used primarily for diagnosis. Inspection of the viscera and biopsy of abnormal tissue were the primary goals.

Diagnostic laparoscopy was introduced by Ott, a Russian gynecologist, in 1903 and by Kelling. A few years later, the concept of the pneumoperitoneum was formulated and the word “laparoscopy” coined by Jacobeaus. He also described the diagnosis of cirrhosis, metastatic disease, and tuberculous peritonitis. As part of the worldwide effort to “stage” malignant diseases. Benedict was among the first to discover that gastric, colonic, and ovarian malignancies could produce ascites.

The development of a standardized system of staging malignant disease paralleled the progress in diagnostic laparoscopy. The early work of Pierre Denoit in the 1940s was formalized in the 1980s when the International Union Against Cancer (UICC) and the American Joint Committee on Cancer (AJCC) adopted the TNM (Tumor, Nodes, Metastases) system. Diagnostic laparoscopy can be complementary to other modalities and detect lesions beyond the resolution of other imaging methods. Its use to improve the staging and to allow the palliative treatment of advanced disease is becoming even more common.

Patient Selection and Techniques

Since general anesthesia and a pneumoperitoneum are generally required to optimize diagnostic laparoscopy, it is important to thoroughly evaluate the patient’s cardiac and pulmonary system. In elderly patients with compromised function, monitoring end-tidal CO₂ will be necessary to prevent respiratory acidosis. The decreased venous return which a pneumoperitoneum and the reverse Trendelenberg position can produce makes the accurate assessment of intravascular volume critical. Sequential compression stockings, a Foley catheter, and a beanbag to support the patient during frequent position changes are even more important in this high-risk group.

Alternate access techniques may be necessary if the patient has had prior surgery or if there are masses or ascites present. The first step is a thorough inspection of the entire peritoneal cavity. This may detect small serosal implants which have eluded preoperative imaging. Relatively advanced laparoscopic skills are required. The surgeon must be comfortable entering the lesser sac or the retroperitoneum and obtaining tissue by biopsy or nodal dissection. Intraoperative ultrasound may compensate for the inability to palpate structures during laparoscopy. Collaboration with a trained ultrasonographer will make this a much more rewarding effort. Changing the patient’s position will facilitate these procedures.

Staging Gastrointestinal Malignancies

There is ample evidence to suggest that the sensitivity and specificity of diagnostic laparoscopy can rival, and perhaps, surpass that of the usual preoperative imaging methods. When coupled with intraoperative ultrasound, this advantage may even be greater. Since neither chemoradiation therapy can provide significant long-term survival for patients with extensive metastatic disease, avoiding unnecessary open explorations and permitting less morbid palliative procedures are important goals in the care of cancer patients. However, the procedure is not without risk. It should only be used in those cases where the potential diagnostic gain outweighs any risk.
Tumors of the Esophagus and Cardia

The current staging of these tumors is aimed at assessing the depth of wall penetration, lymphatic spread, and systemic metastases. If paraesophageal nodal disease is present, five-year survival for most patients with esophageal carcinomas is unlikely. Early detection and careful staging can minimize the frequency of futile resections while identifying those who might benefit from aggressive treatment. Only accurate tumor staging allows an adequate selection of appropriate treatment and a correct assessment of the response to neoadjuvant therapy. Both endoscopic ultrasound and diagnostic laparoscopy can contribute to this precision. Stein, et al recently reported a prospective study of 127 patients with no evidence of metastatic disease referred for surgery or multimodal therapy. Diagnostic laparoscopy with peritoneal lavage was performed in each case. Because of technical problems with the probe, a complete laparoscopic ultrasound examination was completed in only 88 of the 127 patients. Forty-four relevant new findings were noted in 31 (24.4%) patients. Sixteen unsuspected liver metastases were found. Fourteen of these were only found by laparoscopic ultrasound. The sensitivity and specificity of laparoscopic ultrasound, percutaneous ultrasound, and CT in evaluating celiac axis lymph nodes are shown in Table 1.

Tumors of the Stomach

Although declining in incidence, gastric cancer remains a common problem. Since most patients present with advanced disease, it is still a major cause of cancer deaths. Resections for "cure" are undertaken in less than 60%. At celiotomy, more than 25% will be found to have been understaged by preoperative imaging. Since standard adjuvant chemotherapy has done little to improve survival, there is a growing interest in neo-adjuvant (treatment given prior to surgery) protocols for these patients. For this approach to be successful, the patients must be accurately staged prior to their treatment. Diagnostic laparoscopy might be very useful for those with apparently resectable disease.

In a recent series from Spain, 76 patients with presumably resectable cancers underwent diagnostic laparoscopic with intraoperative laparoscopic ultrasound. Thereafter, twenty-nine (40.8%) were found to be resectable. The main reasons were peritoneal metastases in 16, malignant ascites in 15, liver metastases in 12, Krukenberg tumor in 2, and retroperitoneal fixation in 8. The other 42 patients were judged resectable. Only one of those was found to be resectable at celiotomy. Consequently, the diagnostic accuracy of laparoscopy in determining resectability was 98.6% (70 of 71 patients). The sensitivity and specificity as confirmed by histology or celiotomy are shown in Table 2.

Results such as these have led to a wider application of diagnostic laparoscopy to select patients more precisely for neoadjuvant therapy and "curative" resection of gastric cancer.16

Pancreatobiliary Cancer

Primary pancreatobiliary carcinoma is an ideal opportunity for diagnostic laparoscopy. Despite the continuous development of noninvasive imaging techniques, a large number are found to have unsuspected metastatic disease at the time of exploration. Lavage studies indicate that as many as 40% of patients with pancreatic carcinoma already have diffuse peritoneal disease at the time of presentation.15 Early detection of disseminated disease may avoid unnecessary exploration in nearly a third of the patients sent for surgery19-21 and permit laparoscopic an/or endoscopic palliation. Visual laparoscopy alone is inadequate to thoroughly evaluate the pancreas or the biliary tract for evidence of locally resectable or distant disease. The addition of contact ultrasound has proven its worth in open surgery.22 The addition of biopsy guides to laparoscopic ultrasound probes will facilitate sampling from the pancreas and the retroperitoneum.

Pietrabissa, et al recently published their experience with 25 patients with suspected pancreatic cancer referred for surgery. Preoperative staging to select those suitable for surgical referral was accomplished with ultrasound; dynamic, contrast enhanced CT; selective visceral angiography; and ERCP. Ascites or peritoneal washings were sent for cytology at the beginning of each case. Visual inspection of the peritoneum and liver followed. Attention was then turned to the ligament of Treitz and the base of the mesentery. Laparoscopic access to the lesser sac permitted direct

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<th>Table 1. — The sensitivity and specificity of ultrasound and CT in evaluating nodes in the celiac plexus, Stein, 199713</th>
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<td><strong>Sensitivity</strong></td>
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<tr>
<td>Laparoscopic Ultrasound</td>
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<td>Percutaneous Ultrasound</td>
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<td>Computed Tomography</td>
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<th>Table 2. — Multicenter comparison of video-laparoscopic staging of gastric cancer, Ascencio, 199715</th>
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<td><strong>Sensitivity</strong></td>
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<tr>
<td>Serosal infiltration</td>
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<td>Lymph node metastases</td>
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<td>Liver metastases</td>
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<td>Peritoneal metastases</td>
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<td>Retroperitoneal infiltration</td>
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<td>Ascites</td>
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<th>Table 3. — Laparoscopic staging of pancreatic cancer, Pietrabissa, 199623</th>
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<td><strong>Standard Imaging</strong></td>
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<tr>
<td>25 suspected pancreatic carcinomas - believed to be resectable</td>
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<td>3 with locally advanced disease and/or portal vein encasement</td>
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<td>2 confined tumors</td>
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HAWAII MEDICAL JOURNAL, VOL 57, NOVEMBER 1998 706
A foundation of effects for the treatment of mild-to-moderate inflammatory acne.

- Normalization of keratinization.
- Antimicrobial activity.

<table>
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<tr>
<th>Drug</th>
<th>Normalization of keratinization</th>
<th>Antimicrobial activity</th>
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<td>AZELEX®</td>
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<tr>
<td>Retin-A®</td>
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<td>Differin®†</td>
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<td>Tropical Clindamycin†/Erythromycin†</td>
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<td>Sodium Sulfacetamide†</td>
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*The exact mechanism of action is unknown.

- The only acne medication that offers both normalization of keratinization and antimicrobial activity.
- Can be prescribed in conjunction with other acne medications.¹
- No reported interactions with other topical or systemic acne medications.
- No bacterial resistance reported to date.

AZELEX® has been shown in vitro to possess antimicrobial activity against Propionibacterium acnes and Staphylococcus epidermidis; the clinical significance is unknown.

¹Double-blind, comparative clinical studies have not been conducted to evaluate comparative efficacy.
AZELLEX
(azelai acid cream) 20%

For Dermatologic Use Only Not for Ophthalmic Use

DESCRIPTION: AZELLEX® (azelai acid cream) 20% contains azelai acid, a naturally occurring saturated dicarboxylic acid. Structural Formula: HOOC-(CH₂)₉-COOH. Chemical Name: 1-Heptadecanecarboxylic acid. Empirical Formula: C₁₇H₃₄O₂. Molecular Weight: 282.42. Active Ingredients: Each gram of AZELLEX® contains azelai acid 0.2 g (20%) w/w. Inactive Ingredients: United States, glycine, glyceral isoleucine and creatine alcohol and propylene and coaguladora. PEG-10 lauryl macadamia, propylene glycol and purified water. The preparation is present as a preservative.

CLINICAL PHARMACOLOGY: The exact mechanism of action of azelai acid is not known. The following in vitro data are available, but their clinical significance is not known. Azelai acid has been shown to decrease microcomedones against Propionibacterium acnes and Staphylococcus epidermidis. The antimicrobial action may be attributable to inhibition of microbial collagen protein synthesis. A normalisation of keratinization leading to an anticonfluent effect of azelai acid may also contribute to its clinical activity. Electron microscopic and immunohistochemical evaluation of skin biopsies from human subjects treated with AZELLEX® demonstrated a reduction in the thickness of the stratum corneum, a reduction in number and size of keratinocytes granules, and a reduction in the amount and distribution of filaggrin (a protein component of keratin) in epithelial layers. This is suggestive of the ability to decrease microcomedone formation.  

PHARMACOKINETICS: Following a single application of AZELLEX® to human skin in vivo, azelai acid permeates into the stratum corneum (approximately 3 to 5% of the applied dose) and other viable skin layers (up to 10% of the dose is found in the epidermis and dermis). Metabolite metabolism occurs after topical application. Approximately 4% of the topically applied azelai acid is systemically absorbed. Azelai acid is mainly excreted unchanged in the urine but undergoes 2-oxidation to shorter chain dicarboxylic acids. The observed half-lives in healthy subjects are approximately 45 minutes after oral dosing and 12 hours after topical dosing, indicating percutaneous absorption rate-limitated kinetics. Azelai acid is a dietary constituent (whole grain cereals and animal products) and can be formed endogenously from longer chain dicarboxylic acids, metabolites of ester acids, and an oxidation of dicarboxylic acids. Endogenous plasma concentration (10 to 80 ng/ml) and daily urinary excretion (4 to 20 mg of azelai acid) are highly dependent on dietary intake.  

ADVERSE REACTIONS: In clinical trials with AZELLEX® in human patients, plasma concentration and urinary excretion of azelai acid are not significantly different from baseline levels. INDICATIONS AND USAGE: AZELLEX® is indicated for the topical treatment of mild-to-moderate acne vulgaris. CONTRAINDICATIONS: AZELLEX® is contraindicated in individuals who have shown hypersensitivity to any of its components. WARNINGS: AZELLEX® should not be used on children and not for children use. There have been isolated reports of hypopigmentation after use of azelai acid. Since azelai acid has not been studied in patients with dark complexions, these patients should be monitored for early signs of hypopigmentation.

PRECAUTIONS: General: If chemical application of AZELLEX® results in erythema, drying, or stinging; the treatment should be discontinued and patients should consult their physician. (See ADVERSE REACTIONS.) Carcinogenesis, mutagenesis, impairment of fertility: Azelai acid is a human dietary component of a simple molecular structure. The safety and carcinogenic potential of azelai acid has not been demonstrated in any in vivo carcinogenicity test. Azelai acid is not expected to interfere with the lymph node test. Azelai acid is not mutagenic. Animal studies have shown no adverse effects on fertility. Pregnancy: Teratogenic Effects: Pregnancy Category C. Embryotoxic effects were observed in Segment I and Segment II studies with rats and rabbits at 2500 mg/kg/day of azelai acid. Similar effects were observed in Segment I and II studies in rabbits given 150 to 500 mg/kg/day and in monkeys given 500 mg/kg/day. The doses at which these effects were noted were all within toxic dose ranges for the dams. No teratogenic effects were observed. There are, however, no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, this drug should be used during pregnancy only if clearly needed. Nursing Mothers: Equilibrium dialysis was used to assess human milk pani lioning in patients using azelaic acid formulations, indicating that passage of drug into milk may occur. However, the clinical significance of exposure to azelai acid in the nursing infant is not known. The decision to use this drug should be based on the importance of the drug to the mother. 

AZELLEX® is a member of the class of drugs referred to as potent retinoids. Potent retinoids are known to cause irritation (pruritus, burning, or stinging) and may show erythema, hyperplasia, or hyperkeratosis of the skin. Since potent retinoids can also cause depigmentation, patients should be monitored for early signs of depigmentation. In addition, patients should be instructed to begin treatment with a dilution of 1% azelai acid cream and to increase the concentration as tolerated. Once a daily concentration of 20% is reached, patients should continue to use at that concentration. If irritation increases, treatment should be stopped until these effects have subsided. If troublesome irritation persists, use should be discontinued, and patients should consult their physician.

In a series of patients from the same institution undergoing open exploration from 1993-1992, 35% were found to be resectable. With the advent of laparoscopic staging in the later series, the rate of resection was increased to 76% (p < 0.00001)

Staging laparoscopy for presumed pancreatic malignancies should be confined to those cases where other, less-invasive modalities are negative or inconclusive. Used in this manner it can avoid unnecessary celiotomy in up to 42%.
years. Combining CEA levels and scanning, CT, diagnostic laparoscopy, and intraoperative ultrasound those patients with an early, potentially resectable, recurrence may be more rapidly and successfully treated.

**Prostatic and Ovarian Cancer**

Early enthusiasm for laparoscopic staging of prostate cancer has not been supported by clinical trials. Consequently, it is seldom performed.

Laparoscopy can be helpful in staging GYN malignancies by providing periaortic node samples and facilitating “second look” operations. However, because the findings seldom materially affect the need for or extent of surgery, it is not frequently employed.

**Diagnosis and Staging of Abdominal Lymphomas**

With the exception of Hodgkin’s Disease, the advent of high-quality imaging techniques has reduced the need for surgical staging of abdominal lymphomas. Although peripheral nodes may show the presence of lymphoma, abdominal exploration is still recommended for more than 85% of Hodgkin’s patients. 20-25% will be upstaged (more widespread disease) after abdominal exploration. Biopsy of the liver and periaortic nodes and splenectomy can be accomplished with yields similar to open surgery with less operative morbidity. Whole node excision or wedge biopsy is used to prevent crush artifact. Advanced laparoscopic skills are essential to a thorough staging procedure.

**Conclusion**

Diagnostic laparoscopy utilizing ultrasonography can provide a major advantage in the accurate staging of intraabdominal malignancies. As neoadjuvant protocols are developed for some tumors, such precise staging will be critical to optimizing treatment choices and monitoring treatment response. Further clinical trials are necessary to determine whether the trauma-induced immunosuppression seen after celiotomy will be mitigated by a laparoscopic approach. The issue of port site recurrence has reduced the early enthusiasm for laparoscopic colectomies. A similar concern must be expressed about the use of laparoscopy for staging malignancies. Careful attention to technique and surveillance will be critical to characterizing and minimizing this threat.

**References**

Advanced Laparoscopy: “The Next Generation”  
The Adrenal, Kidney, Spleen, Pancreas, and Liver

John H. Payne, Jr., MD*, Wilfred Tashima MD*, Brandt Lapschies MD**, Robert Washecka MD*, Anandon Hariharan MD*, Quan-Yang Duh MD***

Following the rapid acceptance of laparoscopic cholecystectomy, a few adventurous surgeons “dared to boldly go where no one had gone before.” They sought to achieve the same reduction in morbidity while accomplishing the same surgical goals. This paper will briefly review the current status of minimal access surgery for the solid organs of the abdomen. It will focus on the indications, risks, limitations, and on the balance between the trauma of access and the trauma of the procedure itself. As new techniques and equipment emerge and experience and data are accumulated, this balance may shift. Some of these procedures are in their infancy while others are rapidly becoming the new “Gold Standard”.

Introduction

In March of this year laparoscopic cholecystectomy celebrated its eleventh birthday. Who in 1987 would even have thought of it? Open cholecystectomy was a well-established procedure which any competent surgeon could perform with a minimum of morbidity. Even Mouret, who was aware of the latest laparoscopic techniques, thought little of it. One day, as he finished a gynecological procedure on a patient who also had symptomatic choledolithiasis, he shifted his laparoscope to the subhepatic area and found a fairly free and supple gallbladder. When he decided to perform the operation laparoscopically rather than opening her upper abdomen, he fired the first salvo in a surgical revolution which continues to this day. Mouret was not particularly impressed and did not report the operation. However, other surgeons in France, the US, and elsewhere adopted and polished the technique. As a result, laparoscopic cholecystectomy has become the “Gold Standard” for the treatment of symptomatic choledolithiasis.

After the success of this initial procedure, creative surgeons have turned their attention to adapting laparoscopic or minimal access techniques to other surgically treatable conditions. The attempts to assess or to remove all or portions of the solid organs of the abdomen have been among the most innovative and challenging of them all. In deciding whether a minimal access technique has merit, we must consider the balance between the trauma of the access and the trauma of the procedure. Laparoscopic cholecystectomy has been so successful because the major trauma of the procedure - the subcostal incision - has been replaced by 3-4 small access ports. For other procedures: appendectomy, inguinal hernia repair, etc. hospital stays are short and differences in access trauma are harder to prove. As a result, the acceptance of these procedures has been more gradual.

This paper will briefly review the current status of minimal access surgery for the solid organs of the abdomen. It will focus on the indications, risks, limitations, and on the balance between the trauma of access and the trauma of the procedure itself. As new techniques and equipment emerge and experience and data are accumulated, this balance may shift. Some of these procedures are in their infancy while others are rapidly becoming the new “Gold Standard”.

The Adrenal

Adrenalectomy is a relatively recent addition to the catalogue of laparoscopic or minimal access techniques. In their retroperitoneal location along the medial aspect of each kidney, the adrenal glands are ideally suited to such an approach. Laparoscopy may improve exposure, hemostasis and specimen retrieval while reducing the morbidity of the access considerably. Careful localization and characterization is necessary to assure safe and complete removal of adrenal lesions.

Indications for Laparoscopic Adrenalectomy

Adrenal Cortical Adenomas

Cushing’s Syndrome

The most common cause of Cushing’s syndrome is the pituitary hypersecretion of adrenocorticotropic hormone (ACTH). This accounts for 60-70% of cases. Primary adrenal tumors which produce excessive glucocorticoids account for 15-20% of patients with the syndrome. The remainder have ectopic ACTH-secreting tumors. Patients with elevated cortisol levels and low plasma ACTH should undergo a CT or MRI to search for a primary adrenal lesion. One of
our patients was a young woman with the typical features of Cushing’s syndrome who presented with an acute psychotic break due to the excess production of cortisol. After the laparoscopic removal of a unilateral adenoma, her “psychosis” abated and the Cushingoid stigmata are gradually resolving. Unilateral laparoscopic adrenalectomy is appropriate for discrete masses. Bilateral adrenalectomy is an option for those with bilateral adrenal hyperplasia who have failed to respond to treatment of a primary pituitary cause.

Aldosteronoma

Conn’s syndrome is the result of an excess production of aldosterone by cells of the adrenal glomerulosa. Refractory hypertension and spontaneous hypokalemia should prompt the search for a tumor. Sixty-five percent of primary hyperaldosteronism is due to an adenoma. Bilateral adrenal hyperplasia accounts for most of the remaining cases. Once the diagnosis of primary aldosteronism is made the distinction between adenoma and hyperplasia must be made to assure the proper treatment. The most useful tests to make this distinction are CT, MRI, and adrenal venous sampling of aldosterone levels. The small size (1-3 cm) of benign aldosterone-producing adenomas makes them ideal for laparoscopic removal.

Adrenal Medullary Tumors

Pheochromocytoma

These lesions are catecholamine-secreting tumors that arise within the chromaffin tissue of the sympathetic nervous system. They are very uncommon and account for only 0.1% of patients with diastolic hypertension. They appear far more often on examinations than in the clinic. Although the majority of these tumors occur within a single adrenal gland, they may be bilateral in 10%, may occur in ectopic sites in 10-15%, and may be malignant in 10%. Consequently, the precise characterization and localization of a suspected pheochromocytoma must precede any attempt to remove it.

The classic patient presents with recurrent paroxysmal hypertension, headaches, palpitations, anxiety, and sweating. Increased urinary catecholamines and their metabolites (VMA and metanephrines) establish the diagnosis. Localization with CT, MRI, or 131I-metaiodobenzylguanidine (131I-MIBG) scanning is essential for preoperative planning. During a MRI, T2 weighted images of pheochromocytomas are very bright while those of adrenal cortical adenomas have a lower signal density. Since 131I-MIBG is taken up by pheochromocytomas, but not by normal adrenal medullary tissue, this scan complements the MRI in excluding extra-adrenal or malignant lesions.

There is at least one family in Hawaii with the genetic mutation associated with the Multiple Endocrine Neoplasia syndrome (MEN II). Family members with this mutation are being screened for pheochromocytoma prior to undergoing a prophylactic thyroidectomy to avoid developing a medullary carcinoma. We have recently performed bilateral laparoscopic adrenalectomies for one member of this family who was found to have 8 cm pheochromocytomas. She did well and is now recovering from her radical thyroidectomy for her medullary carcinoma.

Other Adrenal Tumors

Masses discovered incidentally on CT scan should be evaluated for the excess production of cortisol, aldosterone, and catecholamines. If these tests are negative and the lesions are <3 cm, they may be followed with serial CT scans. Because of the higher risk of carcinoma, lesions >6 cm should be removed irrespective of their functional status. The availability of laparoscopic adrenalectomy may make this the preferred treatment for incidentally discovered tumors which are 3-6 cm in size.

Laparoscopic Adrenalectomy

The first laparoscopic adrenalectomies were performed through an anterior transabdominal approach. This proved to be tedious and the exposure is significantly improved by placing the patient in a lateral decubitus position. In this position, gravity increases the exposure as the viscera fall away from the operative field. Posterior and retroperitoneal laparoscopic approaches have their advocates. It is clear that the procedure should be tailored to the number, size, and location of the tumor(s) as well as to the surgeon’s preference and experience.

Results of laparoscopic adrenalectomy

The early learning curve associated with any new procedure will result in longer operative times and higher costs. With experience, laparoscopic adrenalectomy can be performed with operative times comparable to more traditional methods. Hospital stay, narcotic requirements, and recovery are all improved when minimal access techniques are used. Further follow-up will be required to be sure that the recurrence rate and the incidence of missed lesions, both ectopic and bilateral, is equivalent to open methods. Improved imaging techniques should make this a very rare occurrence.

Prinz RA7 reported an early comparison of laparoscopic adrenalectomy to two open approaches. His results are summarized in Table 1.

Michel Gagner, who was one of the first to perform a laparoscopic adrenalectomy, recently reviewed his first 100 cases from the Cleveland Clinic. These results are shown in Table 2. Table 3 Summarizes our experience with open and laparoscopic adrenalectomy.

Conclusions

Laparoscopic adrenalectomy is a relatively new procedure. Its safety and efficacy in experienced hands has been clearly demonstrated in a growing number of reports. By reducing the trauma of access, it has definite advantages over the traditional open methods. However, open adrenalectomy is still the preferred method for patients with adrenal cortical malignancies.

The Kidney

The first successful human nephrectomy was performed in 1869 by Gustav Simon. Although it has become a standard operation for urologists, the large incision required is associated with significant pain, prolonged recovery, and the risks of infection and herniation. The successful application of minimal access techniques to nephrectomy would reduce the trauma of access and hasten recovery. After working out their technique in the animal lab, Drs Clayman and Kavoussi performed the first laparoscopic nephrectomy in June of 1990.

Indications for Laparoscopic Nephrectomy

Benign renal diseases requiring nephrectomy are suitable to the laparoscopic approach. These include end-stage reflux nephropa-
thy; renal vascular hypertension; poorly functioning kidney due to chronic obstruction; recurrent pyelonephritis; and, with extensive experience, living-related donor nephrectomy. Laparoscopic total or radical nephrectomy has also been reported for small (<5cm) renal tumors.

Operative Approaches

Both the lateral, transabdominal\(^1\) and the retroperitoneal\(^2\) approaches have been described. The latter is facilitated by the use of dissection balloons first described by Gaur.\(^3\) These balloons are now commercially available and are similar to the ones used for laparoscopic inguinal hernia repair. This is particularly valuable for patients who have had prior abdominal operations. The choice of approach will also be governed by the surgeon's experience and preferences.

Results of Laparoscopic Nephrectomy

Clayman, et al have one of the largest series of laparoscopic nephrectomies. A recent report\(^4\) of their initial experience is presented in Table 4. Table 5 summarizes several authors’ results with laparoscopic retroperitoneal nephrectomy.

Two patients have undergone laparoscopic nephrectomy for benign disease at the Kaiser Foundation Hospital in Honolulu. Learning from these early pioneers and from our own experience in other complex laparoscopic procedures, we have had very similar results.

Laparoscopic Donor Nephrectomy

Donor nephrectomy is a unique operation. It confers absolutely no benefit to the patient and damage to the removed kidney harms two patients. Open donor nephrectomy is not without risk. Clayman cites several series where the complication rate was similar to those reported in his series listed above. However, Flowers\(^5\) (Table 6) has reported excellent results in a case-controlled series which is now >150 patient donors. He has proposed that if the procedure were more available, more relatives might choose to become donors.

Conclusion

For properly selected patients, laparoscopic nephrectomy offers the benefits of minimal access surgery while accomplishing the same surgical goals. Those considering this approach should collaborate with experienced laparoscopic colleagues to shorten the “learning curve”. Whether laparoscopic donor nephrectomy will find broader acceptance and increase the donor pool will require careful monitoring of results from the pioneer centers.

The Spleen

The first successful splenectomy was performed during an exploratory operation for a suspected ovarian tumor. The surgeon, Jules Pean (1830 - 1898), was a well respected pioneer in French surgery. He was, perhaps, the first of the French surgeons whose efforts were pivotal in the development of minimal access surgery. His skill in removing a very large splenic cyst and the remaining spleen is evident in his report.\(^6\) The operation took two hours and "less than 100 gms of blood were lost". This was well before the availability of electrosurgical, argon beam, ultrasonic, or surgical stapling devices. The patient seemed to have had more trouble from the chloroform-induced vomiting than from the operation!
Indications for Laparoscopic Splenectomy

Splenectomy is often indicated for hematological diseases which result in the damage or destruction of the formed elements of the blood or for staging hematological malignancies. These include immune-mediated and idiopathic thrombocytopenic purpura, hemolytic anemia,5,20 or Hodgkin’s lymphoma.21 Early in one’s experience, small spleens in patients without significant co-morbidities are the most appropriate. However, more experienced laparoscopists are reporting the removal of very large specimens - in excess of 300 grams. Preoperative angiographic embolization of the splenic artery may be helpful with these large spleens or early in a surgeon’s experience. It is not usually necessary with the smaller ones and may cause pancreatitis, especially if gel foam is used for the embolization.19 We have not used preoperative embolization for our laparoscopic splenectomies.

Searching for accessory spleens is an important step in the procedure. Advanced laparoscopic skills and repositioning the patient frequently to improve exposure are essential. Although there is not general agreement on whether preoperative scanning is necessary to identify accessory splenic tissue, it may be valuable in obese patients or early on the a surgeon’s “learning curve”.

Most resected spleens are placed into a sturdy sac and morcellized for removal. While this has raised questions about the suitability of the specimen for pathological examination, the large pieces are adequate in most cases.

Results of Laparoscopic Splenectomy

Until randomized, prospective trials are available, case-controlled studies are helpful in evaluating the procedure. One such trial was recently published by Diaz.22 (Table 7)

Conclusions

As with the previously described procedures for adrenalectomy and nephrectomy, laparoscopic splenectomy may permit us to reduce the trauma of access while accomplishing the same surgical goals. This is another “ideal operation” for laparoscopy and is well on the way to establishing itself as the “gold standard” for the procedure.18

The Pancreas

Pancreatic resections are usually performed for cancer, for the intractable pain of chronic pancreatitis or for the drainage or resection of pseudocysts.23 For peripancreatic cancer, pancreatectoduodenectomy with adequate node clearance has shown steadily improving results. With thorough staging,24 patients can be more accurately chosen for exploration and attempted resection. Laparoscopic surgery of the pancreas is still in its early stages of development. Although the entire gland can be visualized laparoscopically, it cannot be thoroughly palpated. Laparoscopic ultrasound may allow us to overcome this obstacle.

Laparoscopic pancreatectoduodenectomy has been successfully accomplished by a few exceptionally skilled surgeons.25,26 However, even they feel that the procedure is of little real benefit to the patient. Currently, laparoscopic pancreatic surgery is best suited for the localization and enucleation of benign islet cell tumors and distal resections for chronic pancreatitis. Staging malignant tumors laparoscopically and bypassing those which are unresectable are also becoming more widely done.
The Liver

The size and complexity of the liver make it a formidable surgical challenge. It remains the last of the abdominal organs to be approached laparoscopically. From the method of exposure to the removal of the specimen, evolving technology will be required to make laparoscopic hepatic surgery safer and more effective.

Indications for Laparoscopic Hepatic Surgery

Diagnostic laparoscopy with intraoperative ultrasound can detect primary and metastatic lesions which may have eluded prior studies. The management of hepatic cysts has been changed by the advent of laparoscopy. Unroofing and fenestration can lead to the resolution of such cysts.27,28 The reduced trauma of access can allow a much more rapid recovery and occasionally spare the patient an unnecessary celiotomy.29

The Future of Laparoscopic Hepatic Surgery

A small lesion metastatic to the left lobe may be considered for laparoscopic resection. Using blunt and ultrasonic dissection such a lesion can be resected with an adequate (2cm) margin of normal tissue. When a major hepatic vein is encountered, switching to mechanical lifters and a "gasless" laparoscopic environment may help to prevent a CO2 embolism. Adventurous surgeons in Europe have attempted larger resections on both sides of the falciform ligament.29 However, better instruments for dissection and hemostasis as well as the FDA’s approval of fibrin glue will be necessary if such procedures are to become more commonly performed in the US.

Comment

Laparoscopic surgery has grown considerably from the early "observation" and simple diagnostic efforts of physicians seeking to avoid a surgical procedure for their patients. Surgeons skilled in the techniques of minimal access surgery are now able to approach nearly every organ of the body. While some of these procedures remain developmental and controversial, others have become the new "Gold Standard". Since many of the problems reviewed are relatively rare and the techniques can be difficult to learn, it may be appropriate to concentrate the experience in a few very experienced laparoscopists. This has been the approach at UCSF, Kaiser in Hawaii, and at other institutions. The challenge for surgeons as we wage an unwinnable battle against obsolescence is to carefully evaluate each new innovation and be certain that fundamental surgical principles are honored and treatment goals are realistic. As Lord Moran, Churchill’s personal physician, observed:

"The feasibility of an operation is not the best indication for its performance."

References

If a physician you care about is at risk...
If you need someone to turn to...

COMMITTEE ON PHYSICIANS’ HEALTH
A Confidential Program of the HMA
For physicians and their families

Members of the HMA Committee on Physicians’ Health are available by phone to colleagues and their family members who feel they need help with their situation. We assist physicians who become unable to practice medicine with reasonable skill and ignore the safety of their patients. Chemical, mental, emotional and physical impairment are considered by the Committee. The Committee will assist within a confidential system to restore the physician to a state where he or she will be able to practice medicine.

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fax (808) 528-2376
Life in These Parts
Words that Won't Gladden Any Doctor's Heart
"My social worker says you have to fill this in."
"My real doctor always gives me amoxicillin when I have a cold."
"He hates doctors. Don't you honey?"
"My mother's doctor doesn't do house calls. Could you go out and see her?"
"I need time off work."
"I just want to ask a question."
"I don't need to come in and see you; I just need a form filled out to say I can't work."
"You tell me; you're the doctor!"
"Can you please come and see my husband. But don't tell him I called you. He refuses to see a doctor."
"You're rich, Doctor!"
"While I'm here..."
"It was a little white pill."
"I'm allergic to everything."
"I don't like taking pills so I'm taking garlic instead."
"I've got burn-out but the insurance company doesn't accept that. Fill this out with something else."
"All the doctors I've been to have been useless."
"I don't believe in doctors."
"It's not what I eat, because I hardly eat anything!"
"I'm a lawyer specializing in personal injury."
And finally, of course: "I'm from the government and I'm here to help you."

Dr Jeannie Rosenberg, Stitches, May 1998

Ethnic Jokes Helped Us Laugh at Ourselves
Richard Lee-Ching MD (Hilo), Extracts therefrom

"As a Pake plantation alumnus who loves ethnic jokes, here's another viewpoint. The purpose of the jokes is totally different from the Mainland. On the Mainland, ethnic jokes are always about others, never about one's own group. They are often meant to reinforce one's superiority by stereotyping others.

Locally, at least in my generation, jokes were meant to be inclusive. We tried to laugh with others about their group and laughed at our own group. By laughing at our stereotypes, we got the ethnic stuff out of the way and could relate on common ground.

For that reason, favorite jokes would start, "a Portuguese, a Filipino, and a Pake" because everyone was included and the biggest hit involved one's own ethnic group.

The Beamer's Mr San Cho Lee is a classic with the biggest gag at Hawaiians. Frank De Lima may tell a lot of jokes, but always the most about Portuguese. Often I wish he would tell more Pake jokes because I feel left out.

The best jokes seem to come out of the plantations rather than the towns because of the close contact involved and the need to break down barriers with co-workers. The interactions included groups at equal social levels and poked fun at quirky behavior and required the ability to laugh at oneself. Why so few haole jokes? In the 1950s, relationships on the plantations were not equal between haole and workers. We did not see them socially because they were our bosses. Actually, the major point was that in those days, we did not see them as funny.

Times are a-changing and we must change. I understand that ethnic groups today just do not have the same feelings for each other as we did on the plantations. We are more urbanized and relationships are different. But, because I feel the way I do, I will continue to look for good Pake jokes and appreciate Frank De Lima's performances because if we cannot laugh at ourselves and with each other, we will have lost something of what makes Hawaii special.

Potpourri
(Condensations of Medical Anecdotes from Stitches)

Pet Therapy
Mrs. T. came in complaining of weakness and fatigue. She carried a wiry old dog in her purse that trembled and barked continuously. After a brief review of her medical history and presenting complaints, it became clear that her main problem was loneliness and depression. She was a widow of 10 years who lived alone with her only companion Bailey, an 8-year-old terrier that never left her side. She agreed to a low dose trial of Zoloft.

She returned one month later, with a barking dog, complaining of no improvement in her mood. I patiently advised her that the medication could take another 2 to 4 weeks and she left with more Zoloft.

I didn't hear from her again for over two months and became concerned. We telephoned her to come in.

She arrived that afternoon, dressed very brightly, smiling, her dog with a bow in its hair. She told me her life has been very busy recently and she hadn't had time to see me. When offered another prescription, she declined, stating she had all the Zoloft she'd need for now. She reluctantly told me that she had stopped taking the pills, but she was cutting them into quarters and giving them daily to Bailey. The dog was calmer and no longer barked excessively and she was able to visit her family and friends more regularly.

Dr Mitchell Rubin, North Vancouver, B.C.

Slip of the Pen
I was asked to see an earnest young man urgently, for purposes of providing a complete exam. He'd recently been accepted to the seminary and was required to provide evidence of good health before entry the following week.

My diligent exam was followed by a handwritten note intended to convey the healthy outcome of his exam. Both patient and letter were dispatched in good order.

The following day, the young priest-to-be sheepishly returned, requesting that I review the letter and revise it as appropriate. In doing so, I discovered my report concluded with "...examined this man on this date and find him to be in good health and fit for the cemetery."

Revisions were accordingly provided. Dr Kevin Doady, Parkdale, P.E.I.

Miscellany
The kindergarten teacher had just finished a science demonstration on magnets. As usual, she wrapped up the lesson by asking the kids to summarize what she'd explained.

"My name begins with M, and I pick things up," she said. "What am I?"

"A mother," was the instant reply from several kids.

Conference Notes
Eighth Annual Hawaii Gastroenterology Symposium, July 11, Sat, Hawaii Prince Hotel, chaired by Stanley S. Shimoda, Division Chief, Gastroenterology, John A. Burns School of Medicine and sponsored by Astra Merck.

GERD Treatment & Cost Effectiveness
Nimish Vakil, Professor of Medicine, University of Wisconsin School of Medicine.

**The goal of maintenance Rx is to control sy's and prevent complications. GERD = is likely to relapse and needs maintenance Rx, esp in pts with severe esophagitis.

Pts who have relapsed require long term maintenance Rx; otherwise quality of life and risk of complications.

- NERD (Negative endoscopic reflux dis) need long term maintenance Rx to prevent progression to erosive disease.

- Pts with esophageal strictures treated with dilation: Maintenance Rx with PPI delays or prevents recurrence

- Barretts Esophagus: Maintenance Rx (controversial at present)

- GERD a/c pulmonary and otolaryngeal lesions (asthma, reflux laryngitis, vocal cord granulomas): Long term PPI warranted.

Choice of Rx for GERD: severity, long term safety, cost effectiveness

- Non-erosive and mild sy's - Life-style modification - Cisapride - H2 blocker

- Advances erosive disease and complicated esophagitis: PPI

- Moderate disease: Either higher dose H2 blocker or PPI

Pharmaco-Economic Studies:
- Comparing PPI's and H2 Blockers: Cost of symptom free model over 7 mos period: 43% less with PPI than H2 Blocker or life-style modification.

- Comparison of Costs (1 yr direct cost)
**Colo-rectal Ca Screening**

Douglas Rex, Professor of Medicine, Indiana School of Medicine.

**Summary of Screening Modalities:**
- Currently, no ideal screening mechanism for colorectal polyps and Ca.
- Flexible sig: insensitive for proximal colon Ca and relatively expensive.
- Combined annual FOBT beginning at age 50 and flex sig q 5 yrs = appropriate combination for current use.
- BE = too insensitive for large colon polyps and early stage cancers.
- Colonoscopy is too expensive for use in average risk persons.
- "My own preference in average risk persons equals single low cost colonoscopy at age 55 to 60 performed by an experienced colonoscopist. A second colonoscopy 7 to 10 yrs later when negative."
- Colonoscopy is procedure of choice in HNPCC (hereditary non-polyposis colorectal cancer syndrome) kindreds and in persons with positive family hx.

**Screening in Specific Risk Groups:**
- Breast Ca pts = average risk for colorectal CA: (same screening measures)
- Ovarian & Uterine Ca pts: Higher risk for colorectal Ca i.e. same screening
  - 1.4 for endometrial Ca, measures as average risk woman
  - 1.6 for ovarian Ca
- Previous cholecystectomy: 2.0 increased relative risk for Rtsd colon Ca 15 yrs post op.
- HNPCC: Colonoscopy q 2-3 yrs beginning at age 20
- Familial polyposis: If positive genetic testing, flex sig q 6 mos till polyps appear.
  If negative genetic testing, flex sig at ages 18, 25 and 35.

Cardiology Update 1998, VP Gregg Fonarow from UCLA, Friday, August 28, QMC

**Introduction**

Coronary atherosclerosis is a progressive disease. While the short term prognosis may be improved with medical management and revascularization, the long term survival must be addressed by treating the underlying atherosclerotic disease. All the trials i.e. REGRESS, CARE, LIPID, and Post CABG show that "statins" reduce total mortality in pts with CAD. Statins are both anti-inflammatory and anti-atherogenic (total LDL is not important), the lowering of LDL with statins is a fundamental therapy of atherosclerosis. The diagnosis of atherosclerosis is the prognostic index for CAD, cerebrovascular and peripheral vascular events.

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Is it progress or a hi-tech circus?

In New Jersey, a 35-year-old man was injured in a motor vehicle crash, and later brought a malpractice suit against his doctors. He was treated for two broken legs, but he contended that doctors missed a fractured cervical vertebra, which ultimately resulted in permanent paralysis and dependence upon a ventilator. The judge granted permission for the patient to testify from his bed via a live internet-based video conference hookup. When defense attorneys had an opportunity to view how the video picture of the bedfast patient on his ventilator would look to a jury, the case was settled. The amount of the settlement was not disclosed, but it was described as the largest single award for pain and suffering in New Jersey history.

Assisted suicide is very controversial, but the truth is, a lot of people want to get the—outta here. G. Carlin

A recent issue of the Journal of the American College of Cardiology presented the findings of a report on the application of medical and surgical intervention near the end of life. These procedures are a tempting target for the bean counters cutting costs in medical care. Rejecting physician-assisted suicide and also futile interventions, the authors of the study emphasize that physicians have an ethical obligation to protect these vulnerable patients and provide high quality care. Of course, patients might take the advice of an LPN in Indiana. To avoid the agony she saw on patients on life support, she stipulated that no such measures should apply for her. To make certain the message was known, she had her living will tattooed on her abdomen.

Same subject — part 2

Perhaps the first step down the "slippery slope" regarding physician assisted suicide has already occurred in Oregon. The Oregon Health Services Commission voted to include physician-aided death on the list of health services available to Oregon’s Medicaid people. This decision to fund assisted suicide for poor people with taxpayers dollars has expanded the government’s involvement in an issue which properly is a matter of choice and personal conscience. Whatever one thinks about Dr. Death, Jack Kevorkian does not charge for his services, and no one can offer the opinion that he is selling suicide. Now, due to the recently affirmed Oregon law, it appears that the federal government will provide an E & M code with appropriate billing.

What they gain from their wealth is only the fear of losing it.

After six years of their money grubbing monopoly, Pillar Point Partners has been dissolved. Vixx and Summit laser companies have agreed to grant each other royalty-free cross-license to use their respective patents. It was not the good old American free enterprise desire to compete. No, the obvious force was the March lawsuit brought by the Federal Trade Commission against both companies, calling their partnership illegal and alleging an attempt to "fix, stabilize, raise and maintain the per-procedure fee." The FTC agrees that a charging fee is legal, but calculated an overcharge of $150 per procedure was being assessed. Supposedly, neither Vixx nor Summit has plans to decrease the per-procedure charge, but now the fee will go directly to the company that built the laser. Competition will have an impact, and as the market for new lasers approaches saturation, the user fee will decline.

Society always uses a leaky bucket to move money from rich to poor.

A study by the Florida Hospital Association revealed that 103,000 Floridians were added to the rolls of uninsured in 1996 alone, making 18% of the population without health insurance. That figure puts Florida sixth in the nation behind Arizona, Texas, Arkansas, New Mexico and Louisiana. Despite a strong mainland economy, low premium increases, and some health insurance reforms, the ranks of the uninsured continue to increase. Experts blame increasing benefits costs, conversion of full-time to part-time positions and contract work, and also the shift of more workers into service employment where health benefits are less common. While a national health insurance plan appears to be tabled for the present, the spectre looms. With data like that, Congress will be increasingly pressured to enact a government sponsored health plan.

Slavery is banned in America, except for hospital house doctors.

Under New York law, a resident physician can work no more than 80 hours a week over a four week period and no more than 24 consecutive hours at any one time. The New York State Department of Health has penalized the New York University Medical Center $16,000 for violations found during a surprise inspection by the health department. According to investigators, two-thirds of residents worked 30 to 36 hours straight, and four first year cardiovascular surgery residents were putting in 110 to 130 hours a week. The NYU hospital and several other had previously been cited for non-compliance, and the state plans to continue its unannounced inspections of all teaching hospitals.

Just to prove that all the idiots are not at HCFA.

Are we in the hands of imbeciles or what? Now the Department of Transportation has established a "peanut-free zone" on aircraft. The area consists of the passenger’s row as well as the one immediately in front and behind the person allergic to peanuts. This is not a Dave Barry joke, but a DOT decision responding to whining from self-identified victims. Some airlines have responded by switching to nothing but pretzels, to prevent the problem and to avoid having FAA snooping through the snack bar. Now you will not merely be checked for firearms, knives, scissors, hat pins, and explosive devices, you will have to declare the peanuts in your snickers candy bar. If peanuts must fall, can mac nuts, cashews, almonds and pecans be far behind? Soon, the only nuts will be in the Department of Transportation.

A woman's a woman till the day she dies, but a man's only a man as long as he can.

Questions still linger about the possible long term effects of sildenafil citrate (Viagra) on retinal diseases. While the drug is very effective for erectile dysfunction, Professor Michael Marmor MD, at Stanford is concerned that no objective tests such as electroretinograms or measuring retinal function after light stimulation, have been included in the long term studies. Not to worry says Pfizer, stating “Viagra’s occasional effect on vision, characterized by a blue color tinge or light sensitivity, is mild and transient.” According to late night talk show host Conan O’Brien, now you can make love alright, but you feel like it’s with a smurf.

Now here is another group of watchbirds, watching you.

Starting in January, the Department of Health and Human Services will reward Medicare patients and others who report suspected fraud by doctors and other health care providers, if it leads to recovery of overpayments. Under the program, seniors could receive 10% of the recovered funds, or $1,000, which ever is larger. Identities of the whistle-blowers will be kept confidential. HHS receives 130,000 fraud and abuse reports of the whistle-blowers will be kept confidential. HHS receives 130,000 fraud and abuse reports of. Funded assistedsuicideforpoorpeople ended up funding futile interventions. The author of the study emphasizes that physicians have a moral obligation to protect their patients and provide high quality care. Of course, patients might take the advice of an LPN in Indiana. To avoid the agony she saw on patients on life support, she stipulated that no such measures should apply for her. To make certain the message was known, she had her living will tattooed on her abdomen.

Addenda

- In 1992, 2,421 people checked into emergency room with injuries caused by house plants.
- If you would make the gods laugh, tell them your plans.
- Blind people don’t skydive, because it scares hell out of their seeing-eye dogs.
- Aloha and keep the faith — rts ■
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