

Surgery Update

NEWS FROM THE MEDICAL COLLEGE OF WISCONSIN DEPARTMENT OF SURGERY

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Message from the Chairman

The Department of Surgery newsletter serves as a source of clinical and scientific information provided by the residents and faculty of the Medical College of Wisconsin.

by **Douglas B. Evans, MD**

Donald C. Ausman Family Foundation Professor of Surgery; Chairman, Department of Surgery, Medical College of Wisconsin

As the Department of Surgery newsletter enters its second year, we begin with two articles from our nationally recognized Division of Trauma and Critical Care: Panna Codner, MD, reviews the current surgical management of pancreatic injuries and Travis Webb, MD, examines data on the use of laparoscopy in caring for acutely injured patients. Minimally invasive surgery is no longer considered just for elective operations.

Dennis Foley, MD, FACR, reviews the controversial and often misunderstood topic of radiation exposure from diagnostic imaging studies, especially computed tomography (CT) scans. Dr. Foley provides the data necessary for us to understand the risk associated with repeated CT imaging.

Weight gain and obesity remain a national health crisis. Bradley Javorsky, MD, from the Division of Endocrinology describes the approach taken to managing obesity at Froedtert & The Medical College of Wisconsin. Dr. Javorsky works closely with a multi-disciplinary team of healthcare providers caring for obese patients, a team that includes James Wallace, MD, PhD, and Matthew Goldblatt, MD, FASC, in the Department

of Surgery. Expect to read more about the management of this complex and all-too-frequent problem in many future editions of *Surgery Update*.

Few diseases are more challenging for the patient, the family and treating physicians than inflammatory bowel disease (IBD). Complications of the disease, its treatment (immune modulating and suppressive

medications, surgery, etc.) and the frequent youth of the patient add great complexity to all medical decision making. Tom Sato, MD, reviews the approach he and his colleagues take to the IBD patient at Children's Hospital of Wisconsin.

Tina Yen, MD, MS, is a National Institutes of Health-funded clinician/

scientist in the Department of Surgery who works closely with Ann Nattinger, MD, (interim chair, Department of Medicine) studying a variety of outcomes measures in breast cancer. Dr. Yen describes her research approach to the complication of postoperative lymphedema.

For those of you who care for breast cancer patients, note the number "five" in

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Stuart Wilson, MD and Sam Pappas, MD, exemplify their collaborative approach to the art and science of surgery, performing the Whipple procedure.

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MANAGEMENT OF TRAUMATIC PANCREATIC INJURIES

Injuries to the pancreas are uncommon, since the pancreas lies deep in the middle of the upper abdomen behind the stomach and other larger organs.

by **Panna A. Codner, MD**, *Assistant Professor of Surgery*

The retroperitoneal location and character of the pancreas present a number of challenges to the trauma surgeon faced with a pancreatic injury. Recently, I cared for an 18 year-old man who sustained an isolated pancreatic injury after a garage door fell on his abdomen. Upon transfer to our facility, a computed tomography (CT) scan of the abdomen showed a Grade III pancreatic injury. He eventually made a full recovery. I will outline important points regarding pancreatic injury and discuss principles of treatment.

The first report of a blunt pancreatic injury was by Travers in England in 1827.² Today, the most common cause of a pancreatic injury involves high-speed automobile crashes.^{2,3} However, any strong blow to the mid-abdomen can injure the pancreas. Other causes include gunshot wounds, stab wounds and explosive blasts. The result of these forces on the pancreas can range from a bruise to complete transection.

There are several classification systems for pancreatic injury (Table 1).⁴ Classification is useful, because surgical management varies with the type of injury. Diagnosing pancreatic injury can be difficult. Abdominal examination is unreliable, since the pancreas is located closer to the back than to the front of the abdomen. Back pain may be present, but most patients have minimal pain and tenderness immediately after injury. Our patient did not have significant abdominal pain. The absence of clear signs of pancreatic injury on physical examination frequently leads to diagnostic delay. Plain abdominal X-rays are not usually helpful. Serum amylase measurement is generally unreliable as a diagnostic test, but may be beneficial post-operatively as an indication of complications. For example, serum amylase levels may be normal in 30 percent to 35 percent of complete pancreatic transections.⁵ Diagnostic peritoneal lavage is a useful diagnostic tool in blunt abdominal trauma. However, false negative results are common with pancreatic injuries due to its retroperitoneal location, although a positive result from injury to an associated organ may lead to identification of the pancreatic injury during laparotomy. CT is useful for evaluating the stable bluntly injured patient. Associated injuries are more commonly identified by CT evaluation. However, CT imaging soon after presentation may miss major pancreatic injuries; CT appears normal in approximately 40 percent of patients with significant pancreatic injuries.

The gold standard for identification of pancreatic injuries is intra-operative evaluation at the time of laparotomy. A high index of suspicion is mandatory for detecting pancreatic injury. Signs that should raise suspicion include upper abdominal location for the injury, bruising or blood staining around the stomach or gastrocolic omentum between the stomach and transverse colon.

The operative management scheme for pancreatic injury follows the same principles as any trauma operation. First, hemorrhage is controlled and then, further gastrointestinal contamination is avoided. Several techniques for dealing with pancreatic injuries have been described. Simple drainage is employed for lesser injuries and when the main duct is intact. Damage to the pancreatic duct in the body or tail to the left of the mesenteric vessels should not be repaired, but rather a distal pancreatectomy and drainage should be undertaken. Creation of Roux-en-Y limb of jejunum is a versatile option for injury to the head of the pancreas, tail, or both. Pancreaticoduodenectomy should be reserved for extensive damage to the head of the pancreas or duodenum.

Distal pancreatectomy and splenectomy is the preferred management for many injuries to the body of the pancreas. In some cases, the spleen is uninjured and a splenectomy is performed to expedite pancreatic resection. This is reasonable in a hemodynamically unstable patient or a patient with multiple injuries. However, splenectomy in a stable patient for the sake of expediency is not justified due to the importance of the spleen in preventing overwhelming post-splenectomy sepsis and current techniques available for splenic preservation.^{7,8} One technique utilized in our patient involved first mobilizing the spleen by carefully incising its retroperitoneal attachments, allowing the spleen to be delivered into the midline wound. The pancreas was then transected just proximal to the injury and dissected off the splenic vessels in a retrograde fashion. Peri-pancreatic drains were placed and the spleen was preserved.

Mortality and morbidity rates for pancreatic injuries remain high at 20 percent and 36 percent respectively.^{6,9} The rate of associated injury is also high and contributes to morbidity and mortality. Complications include fistula formation, abscess, pancreatitis, pseudocyst formation, hemorrhage, wound sepsis, exocrine and endocrine insufficiency and death. Our patient developed a superficial surgical site infection that was drained and managed

by local wound care at the bedside; he has recovered well. If the management described herein is not part of a standardized approach to injured patients, such uncommon injuries may pose a therapeutic challenge.

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References:

1. Townsend, C.M. Jr., Beauchamp, R.D., Evers, B.M., et al. Sabiston Textbook of Surgery. 18th ed. Elsevier: 2008: 976-79, 1589-92.
2. Jones, R. C., G. T. Shires. Pancreatic Trauma. Archives of Surgery. 1971; 102:424-30.
3. Jone, R.C. Management of Pancreatic Trauma. Southern Surgical Association. 1978; 187(5):555-64.
4. Moore EE, Cogbill TH, Malangoni MA, et al. Organ injury scaling. Surg Clin N A 1995; 75:293-303.
5. Wilson, R. H. and R. J. Moorehead. Current Management of Trauma to the Pancreas. Br. J. Surg. 1991; 78:1196-1202.
6. Jordan Jr, G. L. Pancreatic Trauma. Contemporary Surgery. 1985; 26:11-17.
7. Pachter, L.H., Hofstetter, S.R., Liang, H.G., et al. Traumatic Injuries to the Pancreas: The Role of Distal Pancreatectomy with Splenic Preservation. J Trauma. 1989; 29(10):1352-55.
8. Dawson, D.L., Scott-Conner, C.E.H. Distal Pancreatectomy with Splenic Preservation: The Anatomic Basis for a Meticulous Operation. J Trauma. 1986; 26(12):1142-45.
9. Heitsch, R.C., Knutson, M.D., Fulton, R.L., et al. Delineation of Critical Factors in the Treatment of Pancreatic Trauma. Surgery. 1976; 80(4):523-29.

Table 1. Pancreas Injury Grading Scale

Grade	Description
I	Minor contusion without duct injury Superficial laceration
II	Major contusion without duct injury or tissue loss
III	Distal transection or parenchymal injury with duct injury
IV	Proximal transection or parenchymal injury involving ampulla
V	Massive disruption of pancreatic head

Moore EE, Cogbill TH, Malangoni MA, et al. Organ injury scaling. Surg Clin N A 1995; 75:293-303.

TRAUMA CARE IN MILWAUKEE: SCOPING OUT THE FUTURE

One of this year's great debates concerns health care in the United States. Cost containment and preventive health measures are hot topics.

by **Travis P. Webb, MD**, *Associate Professor of Surgery*

Missing from much of the healthcare reform discussion is the number one cause of deaths for individuals between one and 44 years of age: traumatic injury. Traumatic injury is a world-wide healthcare problem that remains largely ignored in the world of healthcare reform. Morbidity and subsequent loss of production associated with trauma is a greater than \$400 billion drain on U.S. society. Yet, we continue to ignore the need for support in the areas of injury prevention, acute care and rehabilitation.

Froedtert & The Medical College of Wisconsin staff the only adult level I trauma center in eastern Wisconsin. Our programs provide care for injured patients in our community and education for students, residents and the public on the affect traumatic injuries have on our community. Over the past 10 years, the Division of Trauma and Critical Care has created a rich environment focused on education, patient care and outcomes research. Since 2000, in-house board certified critical care surgeons have staffed trauma and acute care surgery services 24 hours per day, seven days per week. The Trauma Center provides initial care to more than 3,000 injured patients per year.

While falls and motor vehicle crashes account for most injuries, our community has a high percentage of injuries from penetrating trauma. Penetrating injuries account for 26 percent of admissions to our level I Trauma Center. Our Injury Research Center has taken a lead role in trying to establish the magnitude of handgun violence in our city and preventive strategies that can be applied in the city of Milwaukee and surrounding communities.

The care of the injured patient continues to be an area of research, discovery and change. New concepts in the resuscitation of severely injured patients are now being evaluated. These treatment strategies include hypotensive resuscitation, hypertonic saline infusion and alterations in transfusion ratios (fresh frozen plasma and packed red blood cells) during massive transfusions. Other innovations include the greater use of laparoscopy and increases in the use of advanced endovascular therapeutic interventions, such as in the case of thoracic aortic disruption from trauma. The use of non-operative management

for trauma has become the standard of care for the majority of patients with liver and spleen injuries.

As previously mentioned, one area of interest for many trauma surgeons is whether laparoscopic techniques can or should be utilized when caring for the acutely injured. Our institution has used laparoscopy selectively to evaluate and treat injured patients. A modest amount of data in the literature supports the current limited role of laparoscopy in this population.

Diagnostic laparoscopy has gained some popularity for clearly defined indications. Laparoscopy has been used to accurately identify peritoneal penetration from suspected tangential gunshot or stab wounds.¹ Some authors have also recommended using laparoscopy to evaluate for occult diaphragm injuries from penetrating trauma.^{1,2} When used diagnostically, it is clear that the patient must be otherwise asymptomatic with no signs of peritonitis. If peritoneal penetration is identified, the same principles of identifying all injuries and the tract of the bullet must be followed. Though the data is limited, laparoscopy has been shown to decrease laparotomy rates, length of hospital stay and costs.^{1,4,5}

Data in support of therapeutic laparoscopy is even scarcer. Case reports and series of laparoscopic repair of limited gastrointestinal injuries are in the literature.⁶ However, skilled surgeons must perform these repairs, and systems issues frequently hinder the widespread use of therapeutic laparoscopy. Most centers are not prepared to perform complex laparoscopic procedures in the middle of the night due to personnel, space and equipment limitations. One indication of laparoscopy we have found useful has been to perform a delayed washout of intra-peritoneal blood and/or bile following significant spleen or liver injury.⁷

Due to current limitations and lack of supporting data, it would seem appropriate to continue to rely on standard open abdominal exploration for the majority of trauma patients. Certainly, any patient who is in shock demands this treatment. Questions still remain in regard to costs and long-term outcomes of laparoscopy in trauma, and since cost containment is a real issue, these questions cannot be ignored. However, as experience and data is gathered, surgeons will likely utilize laparoscopy more and more frequently for the care of the injured patient.

It is important for surgeons to remember that we should not be looking for more uses of laparoscopy; we should look for innovative ways to improve patient care and outcomes.

In the end, the focus of trauma care is on the patient and our community. The trauma team at Froedtert & The Medical College of Wisconsin remains committed to providing the highest quality of care.

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References:

1. Leppaniemi A, Haapiainen R. Diagnostic laparoscopy in abdominal stab wounds: a prospective, randomized study. *J Trauma*. 2003;55:636-645.
2. Friese RS, Coln CE, Gentilello LM. Laparoscopy is sufficient to exclude occult diaphragm injury after penetrating abdominal trauma. *J Trauma*. 2005 Apr;58(4):789-92.
3. Powell BS, Magnotti LJ, Schroepel TJ, Finnell CW, Savage SA, Fischer PE, Fabian TC, Croce MA. Diagnostic laparoscopy for the evaluation of occult diaphragmatic injury following penetrating thoraco-abdominal trauma. *Injury*. 2008 May;39(5):530-4.
4. Sosa JL, Baker M, Puente I, Sims D, Sleeman D, Ginzburg E, Martin L. Negative laparotomy in abdominal gunshot wounds: potential impact of laparoscopy. *J Trauma*. 1995; 38: 194-197.
5. Marks JM, Youngelman DF, Berk T. Cost analysis of diagnostic laparoscopy vs laparotomy in the evaluation of penetrating abdominal trauma. *Surg Endosc*. 1997;11:272-276.
6. Mathonnet M, Peyrou P, Gainant A, Bouvier S, Cubertafofond P. Role of laparoscopy in blunt perforations of the small bowel. *Surg Endosc*. 2003; 17: 641-645.
7. Carrillo EH, Reed DNJ, Gordon L, Spain DA, Richardson JD. Delayed laparoscopy facilitates the management of biliary peritonitis in patients with complex liver injuries. *Surg Endosc*. 2001;15:319-322.

CT SCANNING AND RADIATION DOSE

It is estimated that computed tomography (CT) scanning accounts for 17 percent of hospital departmental work load, but 70 percent to 75 percent of the collective dose from medical radiation.

By **W. Dennis Foley, MD, FACR**, *Chief of Digital Imaging, Professor of Radiology and Medicine*

It is estimated that computed tomography (CT) scanning accounts for 17 percent of hospital departmental work load, but 70 percent to 75 percent of the collective dose from medical radiation. These figures mirror the introduction of the first single detector helical CT machine in the late 1980's and multidetector array CT scanning in the late 1990's. This summary will attempt to provide basic information on radiation dose and biological risk and guidelines for the clinically responsible and effective use of CT scanning.

The average background radiation dose is 3 mSv. This is variable, dependent upon altitude and background radon and is obviously higher in Denver, Colo. than in Milwaukee, Wis. International airline pilots also receive a higher annual radiation dose up to 10 mSv per year.

The lifetime risk of lethal cancer in the North American population is 25 percent. It has been estimated that a dose of 10 mSv (a usual dose from abdominal CT) increases this average population risk by 0.05 percent. This determination is based on data from Japanese atomic bomb survivors (approximately 75,000 individuals) who at the low end were estimated to have received 100 mSv. Of the 5,936 total cancer deaths reported in that population, 5,592 were expected, based on the incidence of spontaneous cancer in the Japanese population. Fifty-five percent of the excess cancers occurred in the first 25 years and 45 percent in the next 11 years. Unfortunately, there are no reliable data for individuals exposed to radiation in the range of 0-100 mSv. In addition, the Japanese population received an acute dose of radiation as distinct from repeated small doses of radiation given to patients. Although estimates of radiation bioeffects assume a "linear no threshold effect" for doses between 0 and 100 mSv, this supposition remains unproven.

The effect of radiation is greater in more rapidly dividing cells, such as bone marrow, thyroid and breast. The risk is greater in pediatric and young adult patients and declines progressively as the target population ages. Given the expected latency period, a minimal to no risk is expected for patients older than age 60. Nevertheless, the principle employed in CT scanning is to utilize the ALARA principle (i.e., as low as reasonably achievable).

In the last 20 years, a number of technical improvements have lowered radiation dose in CT scanning. Chief among them is an "automatic exposure control" that modulates dose during longitudinal acquisition by varying the tube current according to the thickness and absorption of the directly irradiated region of anatomy. Studies in which there is intrinsic high contrast, such as evaluation for renal/ureteral calculi, are deliberately under-dosed as reflected in the noisy appearance of the images.

The relatively high dose of cardiac CT (10-15 mSv) as initially implemented using retrospective gating and intended wide application in the community caused controversy. Cardiac CT is now performed with prospective gating resulting in a dose reduction of 80 percent and an average patient radiation dose of 2-4 mSv. This compares to a cardiac nuclear medicine stress test with a dose approximating 7.5 mSv.

CT vendors have been designing and developing new forms of image reconstruction which tolerate significantly higher levels of noise in the projectional data, but produce identical image quality to the standard technique of filtered back projection which has been employed for the last 40 years. This new technique is called "adaptive statistical iterative reconstruction" (ASIR). It was tested on a General Electric prototype CT scanner evaluated in our institution in 2008. A clinical unit was delivered to Froedtert & The Medical College of Wisconsin in mid-December 2009. This unit produces equivalent image quality at half the radiation dose to the standard 64 MDCT scanner. Within the next several years, this initial form of iterative reconstruction will most likely be superseded by a new technique labeled MBIR (model based iterative reconstruction) which will likely reduce the radiation dose by another 50 percent.

Importantly, when considering CT imaging, dose reduction should be balanced against over-utilization, particularly in the young to middle aged adult. In addition, alternative imaging techniques, such as sonography and MRI can be considered if the image information is likely to be comparable to CT.

In our patient population, imaging of suspected inflammatory bowel disease at first presentation is usually CT scanning and CT scanning is most commonly used for suspected complications, including abscess and fistula. In monitoring of patients receiving anti-inflammatory agents, MR enterography may become the

technique of choice, particularly if a disease flare rather than abscess is suspected.

Urolithiasis is best evaluated with a low dose CT scan, which should be the initial imaging study. However, there should be a good clinical indication for repeat studies.

In younger patients with a normal chest X-ray, V/Q scanning for suspected pulmonary embolism has a better negative predictive value than CT and a lower radiation dose.

CT scanning in pregnancy should be used in limited circumstances, including evaluation of blunt abdominal trauma and appendicitis. The radiation dose delivered to a fetus during a single abdomen/pelvis CT scan is not associated with any known deleterious biological effect.

Radiation dose in CT scanning is an important issue, but one which has been relatively over-dramatized in the public media. As relayed by Douglas Evans, MD, a former working principle at MD Anderson suggested applying the rule of 10: "If a patient was going to live 10 years and may receive more than 10 CT scans, consideration would be given to MRI." This could be understood in the context of a 10 mSv dose per CT scan resulting in 100 mSv total accumulated dose, equivalent to the lowest levels received by the Japanese atomic bomb survivors, albeit delivered in small incremental doses rather than a single acute dose. Given the improvements in scanner performance and in particular, image reconstruction techniques (ASIR), one could anticipate an average radiation dose of 5 mSv for abdomen CT scanning and 1-2 mSv for cardiac CT scanning. Within the next several years, MBIR may drop these figures by another 50 percent.

The Division of Pediatric Surgery Welcomes John C. Densmore, MD

The Department of Surgery is pleased to announce the successful recruitment of John C. Densmore, MD, to the Division of Pediatric Surgery. Dr. Densmore received his medical degree from the University of Illinois College of Medicine, Peoria, Ill. and completed his residency training in general surgery at the Medical College of Wisconsin, Milwaukee, Wis. He completed surgical research and pediatric surgery fellowships at Children's Hospital of Wisconsin, Milwaukee, Wis.

COMPREHENSIVE OBESITY MANAGEMENT: THE MULTIDISCIPLINARY APPROACH

Over the last several decades, the understanding of appetite regulation and obesity management has increased enormously. The impetus for this research has grown from the alarming increase in the prevalence of obesity and its medical, social and economic consequences.

by **Bradley R. Javorsky, MD**, *Assistant Professor of Medicine*

“To promise not to do a thing is the surest way in the world to make a body want to go and do that very thing.”

MARK TWAIN

Few conditions frustrate physician and patient alike as does treatment of excess weight. No doubt, this is related to the paucity of treatment options available and the difficulty in trying to change genetically and environmentally entrenched behaviors. For many patients, long-term success with diet alone is disappointing, on the order of 5 percent weight loss at one year follow up. Similar results are observed with exercise, behavioral interventions, or pharmacotherapy alone. Combined, however, these strategies can result in weight loss of 10 percent to 15 percent.

Bariatric surgery remains the most effective means of achieving weight loss. Maximum weight loss is observed around one year, resulting in a 38 percent decrease for gastric bypass and a 21 percent decrease for gastric banding. At 10 years of follow up, weight loss remains decreased by 25 percent for gastric bypass and 13 percent for gastric banding. Bariatric surgery, however, is not a feasible option for many patients. For some, the stigma or complications of surgery are deemed unacceptable. For others, health insurance coverage is unavailable or eligibility criteria cannot be fulfilled.

The most effective strategies employ a multidisciplinary team working in concert to achieve individualized weight loss goals. This includes the endocrinologist, dietitian, exercise physiologist, behavioral therapist and bariatric surgeon. To this end, a centralized, comprehensive obesity management approach is available at Froedtert & The Medical College of Wisconsin. The goal of this union is to facilitate patient referrals to the appropriate specialist and maintain continuity of care.

The role of the endocrinologist (or equivalent medical provider) is to assess risk based on the type and severity of obesity, evaluate for secondary causes of obesity, evaluate and treat complications of obesity such as diabetes and dyslipidemia, coordinate care among other team members, prescribe

pharmacotherapy, and prepare the patient for bariatric surgery when appropriate.

The etiology of obesity in most patients is a combination of genetic predisposition and lifestyle factors. However, some treatable medical conditions present as obesity and should be promptly identified. These include thyroid disorders, medication side effects (e.g., from glucocorticoids, anti-psychotics/anti-depressants, antiretroviral therapy and insulin), Cushing’s syndrome, hypothalamic tumors, depression, insulinoma, and genetic conditions such as Prader-Willi syndrome.

Diet and exercise remain the cornerstone of obesity therapy with or without pharmacotherapy and bariatric surgery. There are numerous popular weight loss diets with varying macronutrient compositions. Many large, controlled clinical studies have concluded that all perform comparably; only adherence and calorie content appear to be important for weight loss. An experienced dietitian will help patients find a diet that is appropriate for medical needs, fits with lifestyle, and that has a calorie deficit. Similarly, an exercise physiologist assesses a patient’s capacity for exercise and prescribes a regimen that can be done at home, at a local gym or in one-on-one sessions.

Many patients have difficulty making healthy choices because of psychological stress, depression, anxiety and learned behaviors. Behavioral therapists work with patients on stress management, goal setting, problem solving, stimulus control, self-monitoring and reinforcement. Behavioral therapy has been shown to have significant effects on weight loss, especially when added to diet and exercise. A Cochrane review found that patients treated with psychological interventions, plus diet and exercise lost an additional 4.7 kg compared with diet and exercise alone.

Pharmacotherapy for obesity is still in its infancy. Currently, there are only two FDA-approved medications for long-term use in obesity management — sibutramine (Meridia®) and orlistat (Xenical®). Orlistat is also now available over the counter as Alli®. These medications are only recommended for patients with an initial BMI ≥ 30 kg/m², or BMI ≥ 27 kg/m² with other risk factors (e.g., diabetes, high cholesterol, controlled high blood pressure). Combined with lifestyle and behavioral changes, these medications can achieve a weight loss of 10 percent to 12 percent.

There are many medications now in phase I, II and III clinical trials. Although none have yet matched the weight loss achieved with bariatric surgery, several have fulfilled efficacy and safety criteria and are in the process of seeking FDA approval.

Lorcaserin is the first agent in a new class of selective serotonin 2C receptor agonists. This receptor is expressed in the hypothalamus, an area involved in the control of appetite and metabolism. Two combination drugs, phentermine/topiramate and naltrexone/bupropion, boast greater weight loss and tolerability than the individual compounds they are made from. Finally, pramlintide, a functional analog of the naturally occurring pancreatic hormone amylin (which is currently FDA-approved for the treatment of type 1 and type 2 diabetes mellitus), has shown promise in trials of obese patients without diabetes mellitus, especially when added to recombinant methyl-human leptin.

Endocannabinoid receptor antagonists such as rimonabant initially demonstrated great promise, but were denied approval by the FDA because of adverse psychological effects, including suicidality. Second generation agents with peripheral activity may prove effective with fewer central complications.

For many patients, sufficient or sustained weight loss cannot be achieved despite great efforts from the patient and healthcare team. It is an important job of the treating physician to recognize these patients and determine the appropriateness of referral to an experienced bariatric surgeon. Current guidelines reserve surgery for patients with BMI ≥ 40 kg/m², or BMI ≥ 35 kg/m² with obesity-related co-morbidities. Many insurance companies require three to six months of physician supervised weight loss therapy prior to making patients eligible for bariatric surgery. Physicians must, therefore, be forward-thinking to ensure criteria are met to prevent unnecessary delays in patients receiving appropriate care.

A careful transition to bariatric surgery is important since dietary requirements after surgery are often different than standard weight loss diets. Adherence to specific recommendations for meal size, frequency and macronutrient composition is essential for maximal weight loss, sustained weight loss and prevention of surgical complications. Finally, close collaboration between surgeon and

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SURGICAL MANAGEMENT OF INFLAMMATORY BOWEL DISEASE IN CHILDREN

Inflammatory bowel disease (IBD) describes a spectrum of idiopathic, lifelong and progressive intestinal inflammatory conditions that includes Crohn's disease, ulcerative colitis and indeterminate colitis.

by **Thomas T. Sato, MD, FACS, FAAP**,
*Professor of Surgery, Medical College
of Wisconsin, Children's Hospital of
Wisconsin*

Genetic and environmental factors appear to have significant impact on IBD pathogenesis, and there has been a worldwide increase in the incidence rates of Crohn's disease and ulcerative colitis. In comparison to adults, IBD occurring in the pediatric population has a number of unique clinical characteristics and surgical management considerations.

A recent systematic, statewide population-based study in Wisconsin demonstrated a pediatric IBD incidence rate of 7.05 per 100,000.¹ This is the highest pediatric IBD incidence rate reported in the world to date. The incidence rate of Crohn's disease was 4.56 per 100,000, more than twice the rate of ulcerative colitis, and significantly more boys were diagnosed with Crohn's disease compared to girls. Additionally, there was equal disease distribution across all ethnicities, and no effect of population density on disease incidence (rural versus urban living environment). Data from the prospective, statewide pediatric IBD registry demonstrated that the majority of children with ulcerative colitis present with symptomatic pancolitis, and that extraintestinal manifestations in newly diagnosed children with IBD are uncommon.

Pediatric Crohn's Disease: Indications for Operative Management

Current medical and surgical management of Crohn's disease is designed to control intestinal inflammation and improve the quality of life in children. Contemporary treatment of Crohn's disease requires multidisciplinary management involving pediatric gastroenterologists, pediatric surgeons, radiologists and dietitians. Effective management must account for age-specific issues such as growth and development, delayed puberty, school attendance and ability to interact with family and peers on a social and emotional level.

Surgical management of pediatric Crohn's disease is targeted toward disease control and treatment of disease complications. The major indication for operative management is failure to control disease activity despite optimal medical management. Virtually all children with established IBD will be medically managed with immunomodulating drugs, and potential

drug effects must be accounted for in the perioperative period. Operative intervention is indicated when complications of the disease occur, such as intestinal perforation, abscess, bowel obstruction, fistula or hemorrhage. Unique to the child or adolescent, growth failure, nutritional deficiency and delayed puberty are clinically significant issues that may lead to operation despite medically controllable symptoms. The use of chronic steroids to suppress IBD symptoms has been largely abandoned. Finally, quality of life issues such as subjective pain, school attendance, and self-esteem are relative indications for operative intervention [See Table 1].

Children and their families should be counseled that Crohn's disease is a lifelong inflammatory condition and there is currently no curative treatment. Therefore, operative management is directed at providing symptom relief or treating disease complications while preserving intestinal length. Successful operations for Crohn's disease require accurate localization of clinically significant disease. A careful history and clinical examination may help to identify the presence of a palpable right lower quadrant mass from an inflammatory phlegmon or the presence of perianal or enterovesical fistula. Pediatric patients require esophago-gastroduodenoscopy and colonoscopy with biopsy under general anesthesia for definitive diagnosis. In the presence of persistent symptoms despite escalating medical therapy, helical CT scan imaging of the abdomen and pelvis with intravenous and oral contrast is the most helpful diagnostic imaging modality. More recently, wireless capsule endoscopy has been successfully used to identify small intestinal disease in children with equivocal endoscopic results or contrast studies. Retention of the capsule from intestinal stricture in Crohn's disease is an indication for prompt, but not emergent, operative exploration.

Other than endoscopy, the most commonly performed operation for pediatric Crohn's disease is ileocecal resection. Resection of involved bowel is limited to grossly involved disease, as frozen section analysis to clear microscopic margins does not improve outcome.² Open or laparoscopic segmental intestinal resection with primary anastomosis is preferred when feasible.³ There are no pediatric-specific, evidence-based data comparing hand-sewn to stapled anastomosis in childhood Crohn's disease. Additionally, it remains unclear whether a minimally invasive approach will lead to a lower incidence of

postoperative adhesive small bowel obstruction. In the setting of established intra-abdominal infection or inflammatory phlegmon with fistula, resection of the grossly diseased intestine with temporary diverting enterostomy may be required. For a chronically inflamed, fibrotic stricture seen more commonly in older adolescents and adults, site-directed stricturoplasty is preferred. Children undergoing exploration for suspected appendicitis who are found to have Crohn's disease should be referred to a pediatric gastroenterologist for complete work-up. An appendectomy can safely be performed in this setting if the appendiceal base and cecum are not inflamed.

Persistent inflammatory symptoms of Crohn's colitis despite optimal medical management is well-treated by segmental or total abdominal colectomy. Current data support the concept of performing segmental or total abdominal colectomy with primary anastomosis, avoiding diverting colostomy or ileostomy when possible.⁴ While ileoanal pouch reconstruction is the procedure of choice for children with ulcerative colitis, results for pouch procedures with Crohn's disease have been discouraging secondary to disease recurrence and higher reoperation and complication rates.⁵ Perianal disease is observed in approximately 13 percent of pediatric patients with Crohn's disease and may be anatomically complex. Severe, intractable perianal Crohn's disease generally occurs with established colorectal disease and may require colectomy with diverting colostomy for symptom control.

Postoperative complications following operations for Crohn's disease are, unfortunately, common and include small bowel obstruction and intra-abdominal infection.⁶ Recurrent disease should be anticipated, particularly in children with colonic disease or severe, aggressive disease at the time of initial operation. Recurrence rates of symptomatic disease following initial operation have been reported to be 17 percent at one year, 38 percent at three years and 60 percent at five years.⁷ Whether contemporary recurrence rates are lowered by the use of maintenance therapy and biological modifiers remains to be determined.

Surgery for Ulcerative Colitis

Compared to adults, at least 25 percent of children with ulcerative colitis require urgent or emergent operation for failure of optimal medical management, gastrointestinal bleeding, intestinal perforation, toxic megacolon or systemic sepsis [See Table 1]. Hematochezia

requiring transfusion is common in severe pediatric ulcerative colitis. In the emergent setting, typically occurring with concomitant high-dose corticosteroids and immunosuppressive agents, most surgeons prefer subtotal colectomy with diverting end ileostomy. Restorative procedures are performed electively weeks to months later. Colon cancer is rare in the pediatric population. The estimated risk of developing carcinoma with ulcerative colitis is approximately 1 percent per year after eight to 10 years of active disease; therefore, ongoing endoscopic surveillance and biopsy is required. Similar to adults, dysplasia is an absolute indication for colectomy.⁸

In contrast to operations for Crohn's disease, ulcerative colitis can be surgically cured with acceptable morbidity and excellent long-term outcome. Therefore, timing of operative intervention for pediatric ulcerative colitis should account for symptom severity, quality of life issues, surgeon experience and patient/parent preferences. Operative management of ulcerative colitis is aimed at removing the colon and rectum with preservation of anal sphincter integrity and function. Definitive management of pediatric ulcerative colitis includes removal of the rectal mucosa — the use of endorectal dissection in children with ulcerative colitis was popularized in 1978 by Martin and LeCoultre, applying the dissection technique described for the treatment of Hirschsprung's disease by Soave.⁹

The most commonly performed operation for pediatric ulcerative colitis is total abdominal proctocolectomy with either a direct (straight) ileoanal anastomosis or construction of an ileoanal pouch (J-pouch) anastomosis. Pouch reconstruction was driven by the desire to reduce stool frequency and urgency. Data support this concept as stool frequency and rates of urgency and nocturnal incontinence tend to be lower following ileoanal pouch procedures compared to straight ileoanal reconstruction. This difference tends to diminish over time, and therefore, decisions between these two approaches should reflect consideration of the patient's age, lifestyle, preference and surgeon experience. Excellent outcomes have been reported using total abdominal proctocolectomy with ileoanal pouch reconstructive procedures in children and adolescents. These procedures are currently being performed using minimally invasive surgical techniques with similar excellent outcomes.¹⁰ There are no pediatric-specific data comparing hand-sewn to stapled ileoanal anastomosis, but the latter approach has gained increased popularity in the setting of minimally invasive approaches. Postoperative complications are common and include anastomotic leak, stenosis, infection, small bowel obstruction and pouchitis. Less commonly, bladder dysfunction, impotence, dyspareunia, infertility and ileovesical or ileovaginal fistula have been observed.

Table 1. Indications for Operative Management in Pediatric IBD

Failure of Medical Management	Non-compliance to Medical Management Adverse Drug Reactions or Medication Side Effects Persistent, Symptomatic Disease Activity
Disease Complications	Growth Failure; Delayed Onset of Puberty Malnutrition Bleeding (Hematochezia); Anemia Intestinal Perforation, Fistula, Abscess Intestinal Obstruction, Stricture, Stenosis Perianal Fistula Toxic Megacolon (ulcerative colitis) Dysplasia (ulcerative colitis)
Quality of Life	Inability to Attend School Inability to Participate in Athletic or Social Functions Fatigue Frequent or Uncontrollable Stools Chronic Abdominal Pain

Surgical Outcome

Pediatric patients with symptomatic Crohn's disease treated with operative resection will generally have a good to excellent outcome. Most children return to activity and school, and there may be significant postoperative improvement in weight for age, height for age, weight for height and resting energy expenditure.¹¹ However, patients and parents must be educated that because surgical intervention is largely directed at complications of a life-long disease, continued medical treatment is required and a high likelihood of future operative procedures exists. Most children and adolescents report good to excellent quality of life following colectomy and ileoanal reconstruction for ulcerative colitis.¹² A reasonable long-term functional goal is normal fecal continence, stool frequency of four to six bowel movements per 24 hours, with normal urinary and sexual function. Children and adolescents require modification of eating behavior for optimal outcome, and initially, anti-diarrheal medications such as loperamide or diphenoxylate and supplemental bulk fiber agents are commonly used.

Summary

IBD remains an infrequent but important surgical problem in the pediatric population. The contemporary treatment of pediatric IBD is a model for the multidisciplinary management of potentially life-long disorders. Well-planned surgical management of Crohn's disease and ulcerative colitis can have a major impact on growth, development, and quality of life in children and adolescents with IBD.

Resources

The Inflammatory Bowel Disease Center at Children's Hospital of Wisconsin is a nationally recognized center designed to provide comprehensive care for children and adolescents with IBD. The center is under the

direction of Michael Stephens, MD, assistant professor of Pediatrics in the Division of Pediatric Gastroenterology. Faculty members of the Division of Pediatric Surgery have advanced pediatric laparoscopic and minimally invasive skills to provide contemporary surgical management of IBD. For an appointment, call Children's Hospital Central Scheduling at 414-607-5280 or 877-607-5280.

Dr. Sato can be reached at 262-266-6550 or tsato@mcw.edu.

References:

1. Kugathasan S, Judd RH, Hoffman RG et al. Epidemiologic and clinical characteristics of children with newly diagnosed inflammatory bowel disease in Wisconsin: a statewide, population-based study. *J Pediatr* 2003;143:525-531.
2. Telander RL, Schmeling DJ. Current surgical management of Crohn's disease in childhood. *Semin Pediatr Surg* 1994;3:19-27.
3. von Allmen D, Markowitz JE, York A, Mamula P, Shepanski M, Baldassano R. Laparoscopic-assisted bowel resection offers advantages over open surgery for treatment of segmental Crohn's disease in children. *J Pediatr Surg* 2003;38:963-965.
4. Andersson P, Olaison G, Bodemar G, et al. Surgery for Crohn colitis over a twenty-eight-year period: fewer stomas and the replacement of total colectomy by segmental resection. *Scand J Gastroenterol* 2002;37:68-73.
5. de Oca J, Sanchez-Santos R, Rague JM, et al. Long-term results of ileal pouch-anal anastomosis in Crohn's disease. *Inflamm Bowel Dis* 2003;9:171-175.
6. Patel HI, Leichtner AM, Colodny AH, Shamberger RC. Surgery for Crohn's disease in infants and children. *J Pediatr Surg* 1997;32:1063-1068.

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STUART D. WILSON FESTSCHRIFT

A festschrift will be held in honor of Stuart D. Wilson, MD, on Friday, June 4, 2010 at Froedtert & The Medical College of Wisconsin. A gala dinner follows at the Pfister Hotel.

The conference (12:30 PM - 4:30 pm) will consist of the following topics and speakers:

Primary Hyperparathyroidism: An Endocrine Perspective

Irene M. O'Shaughnessy, MD, FACP

The Evolution of Imaging for Pancreatic Surgery

W. Dennis Foley, MD, FACR

Molecular Medicine and the Story of Adrenocortical Cancer

Michael J. Demeure, MD, MBA

Mechanisms of Thyroid Cancer Invasion

Sonia Sugg, MD

Radiation-induced Thyroid Cancer—The Chicago Experience

Edwin Kaplan, MD

Hormone Guided Parathyroidectomy

George Irvin, MD

The Evolution of Endocrine Surgery in Wisconsin

Herbert Chen, MD

For more information about the festschrift and dinner for Dr. Wilson, please contact **Tracy Milkowski** at tmilkows@mcw.edu.

Stuart D. Wilson, MD, is an active faculty member of the Department of Surgery and an internationally known expert in the fields of oncologic and endocrine surgery. He joined the faculty of the Medical College of Wisconsin and became a professor of surgery in 1979. Dr. Wilson has been president of the Milwaukee Academy of Surgery, the Milwaukee Surgical Society, the Wisconsin Surgical Society, and most notably, in 1991, he was president of the American Association of Endocrine Surgeons. He has also served two terms as governor at large (Wisconsin) of the American College of Surgeons. Dr. Wilson has made many seminal contributions to published literature on diseases of the pancreas, extrahepatic bile ducts and endocrine system. His work with Dr. Ellison on the Zollinger-Ellison Syndrome is internationally recognized. Dr. Wilson has published more than 100 peer-reviewed manuscripts, more than 25 book chapters, and has made numerous presentations throughout the world. Most importantly, Dr. Wilson has trained many surgeons throughout Wisconsin and the Midwest and his skills as a surgical educator are frequently the subject of surgical lore by graduates of the Medical College of Wisconsin training program.



Stuart D. Wilson, MD

OBESITY MANAGEMENT *continued from page 7*

endocrinologist facilitates monitoring of metabolic complications of obesity, as well as issues that may arise postoperatively, including bone loss and micronutrient deficiencies.

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Select References:

1. Sacks FM, Gray GA, Carey VJ et al. Comparison of weight-loss diets with different compositions of fat, protein, and carbohydrates. *New England Journal of Medicine* 2009;360(9):859-73.
2. Shaw KA, O'Rourke P, Del Mar C, Kenardy J. Psychological interventions for overweight or obesity. *Cochrane Database of Systematic Reviews* 2005, Issue 2.
3. Sjostrom L, Narbro K, Sjostrom CD et al. Effects of bariatric surgery on mortality in Swedish obese subjects. *New England Journal of Medicine* 2007;357(8):741-52.
4. Sjostrom L, Rissanen A, Andersen T et al. Randomised placebo-controlled trial of orlistat for weight loss and prevention of weight regain in obese patients. *Lancet* 1998; 352:167-73.
5. Smith SR, Aronne LJ, Burns CM et al. Sustained weight loss following 12-month pramlintide treatment as an adjunct to lifestyle intervention in obesity. *Diabetes Care* 2008;31(9):1816-1823.
6. Wadden TA, Berkowitz RI, Womble LG et al. Randomized trial of lifestyle modification and pharmacotherapy for obesity. *New England Journal of Medicine* 2005;353(20):2111-20.

NATIONAL COLON CANCER AWARENESS MONTH EVENT

March is designated National Colon Cancer Awareness Month. The designation was made in 2000 with the goal of raising awareness about the importance of regular colon cancer screening to save lives. Colorectal cancer is the second leading cause of cancer-related deaths in the U.S. after lung cancer.

The Colorectal Surgery multidisciplinary group at Froedtert & The Medical College of Wisconsin will host a community education event on a Sunday in March at the Froedtert & The Medical College

Clinical Cancer Center (date pending). Experts in the field will make presentations. **Kia Saeian, MD**, a gastroenterologist, will address the topic of colon cancer risk factors and screening modalities. **Kirk Ludwig, MD**, and **Lauren Kosinski, MD**, colorectal surgeons, will discuss innovative surgical options available for the treatment of colorectal cancer. Clinicians will also be available to answer patients' questions.

Please watch froedtert.com for future details about this event and encourage your patients to attend.

LYMPHEDEMA AFTER BREAST CANCER SURGERY

Lymphedema, or arm/hand swelling, is an important source of treatment-related morbidity among breast cancer survivors.

by **Tina W.F. Yen, MD, MS**, *Assistant Professor of Surgery*

Lymphedema causes physical discomfort and disability, as well as a cosmetic deformity which can result in psychosocial issues (anxiety, depression, and emotional distress) that further adversely affect activities of daily living and quality of life. Minimizing treatment-related morbidity in breast cancer survivors is important.

Despite the well-known morbidity of this chronic problem, a better understanding of lymphedema risk factors is important to moving this field ahead. Two well-established risk factors for lymphedema are the extent of axillary lymph node dissection (ALND) and the combined treatment of axillary radiation and ALND. The relative contribution of several other factors to the development of lymphedema needs to be better studied. These factors include patient age, body mass index, hand dominance, extent of disease, type of breast and axillary surgery, and various treatment modalities (modern radiotherapy, chemotherapy and hormonal therapy). Furthermore, since axillary surgery results in the iatrogenic disruption and damage of lymphatic channels, it is likely that surgeon technique plays a role in the development of lymphedema.

The current literature has two main limitations. First, there is a paucity of population-based studies. Almost all studies are retrospective, largely single-institutional with small numbers of patients. In addition, these studies are difficult to compare as patient populations were diverse, surgery and radiation treatments differed and duration of follow-up varied. There is no standard definition or measurement of lymphedema or standard time interval to assess for its development. Finally, these studies have the potential for substantial selection bias of patients and surgeons. Therefore, these study results may not be applicable to the at-large population of breast cancer patients who are operated on mostly by community surgeons who perform relatively few breast cancer operations annually.

The second limitation is that much of the literature relates to older surgical techniques. Most of the previous studies were performed 20 to 30 years ago, when more radical breast and axillary surgeries were performed and axillary radiation therapy was more frequently utilized. Now, we have improved techniques.

The combined treatment of ALND and axillary radiation has not been routinely recommended since around the late 1980s. Current guidelines recommend less extensive axillary dissections (levels I and II only in most situations) and the avoidance of circumferential stripping of the axillary vein and removal/splitting of the pectoralis minor muscle. More women are candidates for less invasive breast and axillary surgery: breast-conserving surgery, or BCS (lumpectomy followed by breast radiation) and sentinel lymph node biopsy, or SLNB. SLNB has probably been the biggest technical advance in decreasing lymphedema and other arm morbidities.

Given these limitations, we evaluated potential risk factors for lymphedema in a large population-based cohort of 3,083 older women (ages 65-89) undergoing incident breast cancer surgery in 2003. These women were drawn from the Medicare population in four large, geographically diverse states (California, Florida, Illinois, New York) and completed four telephone surveys. Surveyors collected information on demographic variables, disease extent, treatments, recurrent disease and quality of life measures. State tumor registry and Medicare claims information was also collected. Our initial work in 1,338 women who reside in California and Illinois and were operated on by 707 different surgeons showed that 14 percent of these women had self-reported lymphedema at four years post-operatively. When controlling for patient age, tumor size, type of breast cancer, type of breast and axillary surgery, receipt of radiation, chemotherapy and hormonal therapy, and surgeon case volume, the only independent predictors of lymphedema were the removal of more than five lymph nodes and the presence of lymph node metastases. Of particular note, in contrast to many older studies, the receipt of radiation therapy was not associated with lymphedema development. Furthermore, the number of lymph nodes removed was more predictive of lymphedema than whether a SLNB or more extensive ALND was performed. In subsequent analyses of more than 1,800 women in this cohort, the overall incidence of lymphedema at five years was 20 percent and the removal of more than five lymph nodes and the presence of lymph node metastases remained predictors of lymphedema. Furthermore, other potential risk factors (patient body mass index, hand dominance, surgeon volume and hospital volume) were not associated with lymphedema development.

The finding that the risk of lymphedema is substantial with the removal of more than five lymph nodes is of significant clinical importance for patients undergoing SLNB alone, as the actual number of lymph nodes removed is a modifiable factor that is controlled by the surgeon. We advocate that a sufficient number of lymph nodes need to be removed to accurately determine nodal status. However, among women who undergo SLNB and are found to have a positive/metastatic sentinel lymph node, the metastatic sentinel lymph node is identified in the first three sentinel nodes in 97 percent to 100 percent of patients. For patients who undergo SLNB alone, the increased morbidity of removing more than five sentinel lymph nodes may need to be weighed against the possible additional information gained (if a positive node is identified after the fourth or higher sentinel node) that may alter treatment for a small number of patients.

Finally, our initial work demonstrates no association between surgeon and hospital volume and lymphedema development. Although surgeon volume is one surrogate for surgical technique, we believe surgeon experience and expertise with breast cancer care may also be important features in defining a high-quality breast cancer surgeon. Compared to surgeon case volume, we therefore propose that other surgeon-specific characteristics (for example, number of years in practice, percent of practice focused on breast cancer and membership in the Society of Surgical Oncology) might serve as more sensitive measures of surgeon technique, experience and expertise. In addition to surgeon expertise in breast cancer care, we hypothesize that hospital expertise and commitment to cancer care are important factors in determining a woman's risk of developing lymphedema. Certain hospital characteristics (hospital breast cancer case volume, the presence of an American Cancer Society-approved cancer program, availability of oncology, radiation therapy and physical/occupational therapy programs) might serve as measures of hospital expertise and interest in quality breast cancer care.

We will further explore the relationship between surgeon and hospital characteristics, including volume, and the development of lymphedema after breast cancer surgery. If a relationship exists and can be explained by hospital-specific characteristics, the care for women with breast cancer may be improved with regionalization or by introducing better

programs/systems to more reliably ensure appropriate care. If a relationship exists and can be explained by surgeon-specific factors, regionalization of surgical treatment may be the preferred strategy to improve the quality of care of breast cancer survivors in the United States. Given the potential cost and inconvenience of regionalizing care for such a common disease, making the distinction is critical from a health policy perspective.

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References:

1. Petrek JA, Pressman PI, Smith RA. Lymphedema: current issues in research and management. *CA Cancer J Clin* 2000;50:292-307.
2. Sparaco A, Fentiman IS. Arm lymphoedema following breast cancer treatment. *Int J Clin Pract* 2002;56:107-10.
3. Erickson VS, Pearson ML, Ganz PA, Adams J, Kahn KL. Arm edema in breast cancer patients. *J Natl Cancer Inst* 2001;93:96-111.
4. Paskett ED, Naughton MJ, McCoy TP, Case LD, Abbott JM. The epidemiology of arm and hand swelling in premenopausal breast cancer survivors. *Cancer Epidemiol Biomarkers Prev* 2007;16:775-82.
5. Neuner JM, Gilligan MA, Sparapani R, Laud PW, Haggstrom D, Nattinger AB.

Decentralization of breast cancer surgery in the United States. *Cancer* 2004;101:1323-9.

6. Edge SB, Niland JC, Bookman MA, et al. Emergence of sentinel node biopsy in breast cancer as standard-of-care in academic comprehensive cancer centers. *J Natl Cancer Inst* 2003;95:1514-21.
7. Fleissig A, Fallowfield LJ, Langridge CI, et al. Post-operative arm morbidity and quality of life. Results of the ALMANAC randomised trial comparing sentinel node biopsy with standard axillary treatment in the management of patients with early breast cancer. *Breast Cancer Res Treat* 2006;95:279-93.
8. Yen TW, Fan X, Sparapani R, et al. A contemporary, population-based study of lymphedema risk factors in older women with breast cancer. *Ann Surg Oncol* 2009; 16:979-88.

The 2010 Carl W. Eberbach Memorial Lectureship Speaker is Chosen

The Department of Surgery is proud to introduce Samuel Wells, Jr., MD, as the presenter for the 2010 Carl W. Eberbach Memorial Lectureship. Dr. Wells was chair of Surgery at Washington University School of Medicine for many years. After retiring from Washington University, he returned to his roots at Duke University and launched the American College of Surgeons Oncology Group (ACOSOG). After the ACOSOG was up and running, Dr. Wells joined the National Institutes of Health to focus on developing tyrosine kinase (TK) inhibitors for patients with metastatic thyroid cancer, an area of life-long research for which he is internationally recognized.

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CHANGE IS COMING TO CME: MEDICAL COLLEGE OF WISCONSIN - TODAY AND TOMORROW

Physicians think about continuing medical education (CME) primarily at the time of license renewal. Signing the attendance sheet before a lecture is another reminder of the requirement to accrue credits for the annual minimum of CME hours.

By **Robert K. Ausman, MD**, *Clinical Professor*; **Jon B. Mayer, MBA**, *Administrator, Department of Surgery*

As a major department in a teaching institution, the Department of Surgery offers qualifying presentations designed to meet the needs and interests of physicians in community practice, as well as those who spend their professional time on the Medical College of Wisconsin campus or visit occasionally. Some CME opportunities occur weekly; others have a different periodicity, such as annual endowed lectures. Finally, there are limited subject in depth symposia which feature departmental expertise or celebrate a seminal event.

In total, the Department of Surgery and its divisions offer 448 hours of qualifying CME activities each year. In many instances, these presentations also meet the criteria for credit in associated professions (pharmacy, nursing, etc.). In a continuing commitment to graduates of Medical College of Wisconsin surgery training programs and to surgeons and others in the extended geographic area it embodies, the department has examined how it fulfills the obligation of teaching at all professional levels. “Change,” recently a very important and popular word in our lexicon, is coming to the CME programs at the Medical College of Wisconsin Department of Surgery.

CME is designed to update practitioner post-graduate knowledge, even though CME has been criticized as insufficient or ineffective. To provide greater CME availability and to serve more surgeons with useful information, particularly those graduated from Medical College of Wisconsin training programs, change is being embraced by the Medical College of Wisconsin Department of Surgery.

The new program, an addition to the present, is titled **Medical College of Wisconsin Department of Surgery — Today and Tomorrow**.

Some History

Organized continuing education for the medical profession developed from a recognition that practitioners were not maintaining proficiency as the pace increased for introduction of new concepts and technologies. The prevalent method of delivery has been essentially the same for

more than three decades. To guarantee use of CME, state licensure agencies made mandatory attendance requirements a condition of license renewal. At this time, essentially all jurisdictions have a minimum requirement of 20 CME hours per year, enforced at the state level.

In recognition of the need for CME qualifying presentations to meet standards countrywide, a national governing agency, Accreditation Council for Continuing Medical Education (ACCME), was established. It sets provider qualifications and gives accreditation to organizational entities entitled to develop and sponsor CME activities. In the U.S., there are approximately 1,600 recognized organizations which can award CME credit hours. At the Medical College of Wisconsin, the program is under the overall academic purview of a senior associate dean, with day-to-day supervision provided by a full time director for the Office of Continuing and Professional Education.

More than 6 million CME credit hours are earned annually in the U.S. They fall in two primary categories: personal encounters and enduring materials. The former comprises about 90 percent of the total and represents credits earned by the presence of the physician at the learning site. Examples are single or multi-subject seminars, free-standing presentations (individual lectures, etc.), or annual meetings of specialty societies. To receive credit, the sponsoring entity must have received prior approval from an accredited organization (such as the Medical College of Wisconsin Office of Continuing and Professional Education) which means not just any lecture or similar event will meet the standard. While it is the most common, the primary disadvantages to this mode of CME are its often high cost and inconvenience. Personal attendance frequently means travel away from the home site, missed patient contact, and the need to make arrangements to cover a practice — not always easy.

Timing of current CME experiences is dictated by the sponsor; often, it does not blend well into patient care and personal schedules. A final problem is the fit of the subject matter to the needs of the participant. Programs are made to satisfy a majority of audience members, which may not parallel individual interests. In the multi-lecture

(often all day) format only a portion of the presentations may have relevance to the listener. For these and other reasons, personal encounter CME is a diminishing share of total claimed CME credits.

The alternative, enduring materials, relies upon a learner implemented CME experience, thus favorably impacting patient care duties, convenience and personal cost. Enduring materials requirements for quality, prior approval and sponsorship are the same as personal encounter CME. As to relevance, the learner selects the subject to be heard or viewed, avoiding materials not specific to immediate practice activities.

Medical College of Wisconsin Department of Surgery — Today and Tomorrow is based on the enduring materials concept. Credits earned are generally comparable to those obtained through personal encounter.

Division of Education

In this section, we will describe how the Medical College of Wisconsin Department of Surgery is confronting the opportunity to expand its frontier in the education field.

The department has established a Division of Education whose chief is Philip Redlich, MD, PhD, Schmitz Professor of Surgery. Dr. Redlich also serves as the Associate Dean for Curriculum at the medical school and maintains an active practice in surgery at the Clement J. Zablocki Veterans Administration Medical Center. The Division of Education has oversight for undergraduate teaching in the department and resident education. Now, its activity will also encompass the expanding program for CME described below.

The raw material for off-campus CME is readily available in the Department of Surgery. Each week, there are several scheduled presentations; many have been qualified prospectively for credit. The department has consent to authorize participant credit under the categories of personal encounter and enduring materials for these presentations.

The proprietary engine to operate **Medical College of Wisconsin Department of Surgery — Today and Tomorrow** has been developed by a faculty member in the department in collaboration with a skilled technical person who is on the Education School faculty at another university. The basic

system puts regular and special department lectures on the Internet in a protected space in a synchronized audio and visual format that faithfully and realistically reprises the original lecture. They remain in place and accessible for up to three years.

Several features differentiate this Internet learning experience from other CME which has appeared from time to time. These include:

- Sponsorship and control by a major academic department of a medical school
- User selection from the department teaching program
- Realistic reproduction of the original presentation
- Pause, resume and repeat user options
- Full device compatibility; access from any computer or personal device
- Immediate recognition and user site printing of CME credits

Expenses and Charges

The issue of who is paying for physician CME has become an important focus politically and educationally. A major U.S. Senate subcommittee has expressed concern about drug company and medical device sponsorship; committee members believe the CME material sponsored and/or prepared by for-profit companies often contains biased statements. By not giving physicians all the information, patient interests are served adversely. This thought has been joined by several medical schools which have decided not to accept support from for-profit healthcare organizations. To avoid further criticism, most companies have announced policies which will effectively discontinue their former support, leaving CME activities to manage on their own and raising the possibility that physicians will be paying the total cost of their CME in the near future.

EVANS *continued from page 1*

her article — a number with obvious clinical implications and a much lower number than I would have guessed — therein the tremendous value of such research. Finally, Robert Ausman, MD, and Jon Mayer, MBA, describe the exciting creation of Medical College of Wisconsin Department of Surgery — Today and Tomorrow. We invite all of you to take advantage of this new educational opportunity.

There has been other sponsorship in the past, such as not-for-profit foundations not connected with industry. However, drug and medical device companies previously have carried more than 90 percent of the burden amounting to millions of dollars. What will replace this massive dollar infusion is not yet clear. For now, it seems unlikely a single or even a group of entities can or will step into the breach. People usually responsible for forming public policy have been heard to say it is time physicians begin to bear the cost of their post-graduate education as do attorneys, accountants and others. Another important thought has been that medical schools, traditionally responsible for medical education at other levels, are the best equipped and qualified to carry this burden as part of the overall teaching mission. At this time, a comprehensive final pathway or its alternatives is not apparent.

As part of the Medical College of Wisconsin, the Department of Surgery perceives a responsibility for the ongoing education of physicians, especially those practicing in the specialties encompassed by the teaching programs of the department. Department faculty and administration desires to be the lifetime “surgery home” for its trainees and a resource for surgeons in the area served by the Medical College of Wisconsin. To offer **Medical College of Wisconsin Department of Surgery — Today and Tomorrow** without barriers or extraneous concerns now prevalent in CME, the following basic principles of operation have been established:

- No financial sponsorship will be sought or accepted from commercial organizations for any operational costs of **Medical College of Wisconsin Department of Surgery — Today and Tomorrow**.

IBD *continued from page 7*

7. Baldassano RN, Han PD, Jeshion WC, et al. Pediatric Crohn's disease: risk factors for postoperative recurrence. *Am J Gastroenterol* 2001;96:2169-76.
8. Fonkalsrud EW. Surgical management of ulcerative colitis in childhood. *J Pediatr Surg* 1994;3:33-38.
9. Martin LW, LeCoutre C. Technical considerations in performing total colectomy and Soave endorectal anastomosis for ulcerative colitis. *J Pediatr Surg* 1978;13:762-764.
10. Georgeson KE. Laparoscopic-assisted total colectomy with pouch reconstruction. *Semin Pediatr Surg* 2002;11:233-236.

- There will be no charge for use of **Medical College of Wisconsin Department of Surgery — Today and Tomorrow** by licensed physicians. Required participant registration will be for record-keeping and maintaining ACCME certification.
- No charge will be made to physicians for earning and recording CME credits from the Medical College of Wisconsin. Regular rules for CME qualification will apply.

A beta test (clinical trial) has been completed recently. **Medical College of Wisconsin Department of Surgery — Today and Tomorrow** is ready for prime time. A library of more than 20 lectures covering many subjects in surgery and beyond, especially including guest lectures on diverse subjects, is ready to be accessed and downloaded for your edification and CME credit. One to three additions will be made each month. To register, please visit mcw.edu/surgery and follow the Grand Rounds link.

With the introduction of **Medical College of Wisconsin Department of Surgery — Today and Tomorrow**, the Department of Surgery has taken another step forward in fulfilling its education mission. Important pertinent components of the department teaching program have been made available to physicians in a manner compatible with their professional activities and schedules, allowing them to serve patients better. In addition, license requirements can be accommodated with little or no personal disruption. Direct and related personal costs are no longer a factor in obtaining a good post-training educational experience which can be self-structured for relevance to practice activities.

Medical College of Wisconsin Department of Surgery — Today and Tomorrow is not the end of change for CME within the department. Further advances in technology and communication are in the development stage.

11. Sentongo TA, Stettler N, Christian A, et al. Growth after intestinal resection for Crohn's disease in children, adolescents, and young adults. *Inflamm Bowel Dis* 2000;6:265-269.
12. Shamberger RC, Masek BJ, Leichtner AM, Winter HS, Lillehei CW. Quality-of-life assessment after ileoanal pull-through for ulcerative colitis and familial adenomatous polyposis. *J Pediatr Surg* 1999;34:163-165.

ANNOUNCEMENTS

Look for more information about the following topics in the next issue of *Surgery Update*:

T. Clark Gamblin, MD, (University of Pittsburgh) named chief of the Division of Surgical Oncology and the inaugural holder of the **Wilson Chair**.

The Alonzo Walker Chair in Surgery announced; recruitment to open under the direction of **James Wallace, MD, PhD**.

FIRST ANNUAL PANCREAS SYMPOSIUM

The First Annual Pancreas Symposium, "Multidisciplinary Approach to Pancreatic Tumors and Pancreatitis" will take place at Froedtert & The Medical College of Wisconsin on Saturday, February 27, 2010.

The Pancreas Symposium is being directed by **Kathleen K. Christians, MD,** and **Sam G. Pappas, MD.**

Our invited guest is **Charles Frey, MD,** an international authority in pancreatic surgery. He is widely known for the operation that bears his name: the Frey procedure. The symposium will consist of the following topics and presenters:

Diagnostic Algorithm for the Patient with Pancreatic Cancer

Sam G. Pappas, MD

CT Imaging

W. Dennis Foley, MD, FACR

EUS-FNA, ERCP

Abdul H. Khan, MD

Localized Disease: Treatment Sequencing

Douglas B. Evans, MD

Pancreatic Surgery: Technique, Volume/Outcome, Institutional Support/Volume

Kathleen K. Christians, MD

Chemotherapy for Pancreatic Cancer

Paul S. Ritch, MD

Adjuvant Radiation Therapy

Beth A. Erickson-Wittmann, MD

Neuroendocrine Tumors of the Pancreas

Edward J. Quebbeman, MD, PhD

Cystic Lesions of the Pancreas, Work-up and Treatment

Douglas B. Evans, MD

GI Interventions for Pancreatitis

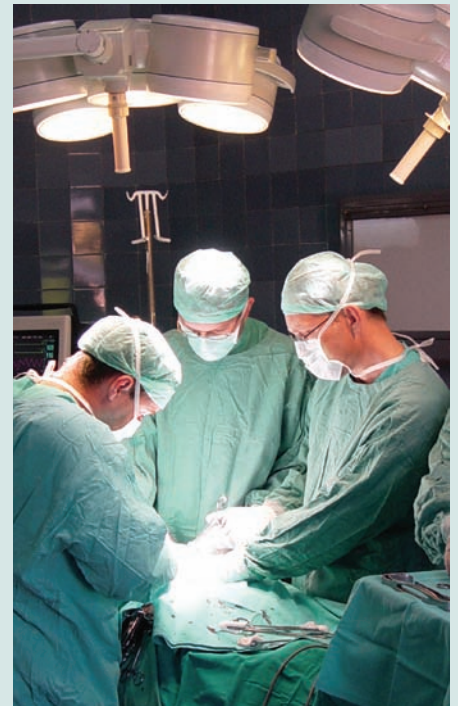
Kulwinder S. Dua, MD

Frey Procedure: Local Experience

Sam G. Pappas, MD

History of the Frey Procedure

Charles Frey, MD



To receive further information regarding the First Annual Pancreas Symposium, please contact Tracy Milkowski at 414-805-5602 or tmilkows@mcw.edu.