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Surgery Update

NEWS FROM **THE MEDICAL COLLEGE OF WISCONSIN DEPARTMENT OF SURGERY**

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DEPARTMENT OF SURGERY

Dedicated to Clinical Care, Research and Education

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Message from the Chairman

By **Douglas B. Evans, MD**
Donald C. Ausman Family Foundation Professor of Surgery;
Chairman, Department of Surgery, The Medical College of Wisconsin

The Medical College of Wisconsin (MCW) Department of Surgery has a long tradition of excellence in surgical education. We take great pride in our residents' accomplishments, and highly value our faculty's diverse talents – the foundation of our training program. Philip N. Redlich, MD, PhD, leads our Division of Surgical Education, and on June 1, Paula M. Termuhlen, MD, will assume leadership of the Residency Program from Alonzo P. Walker, MD (see page 13). Associate Residency Program directors include Kirk A. Ludwig, MD, Travis P. Webb, MD, Kellie R. Brown, MD, and Thomas T. Sato, MD. I suspect few departments of surgery boast as strong a commitment to education as The Medical College of Wisconsin (article by Jill S. Whitehouse, MD, page 13). Bren Heaton, MD, (pictured below with Dr. Walker) and all of our residents have learned from the best; a combination of dedicated curriculum and a wide range of mentored clinical opportunities will ensure their success. Our match list for next year's interns has been submitted. We are fortunate to have such talented medical students interested in our Residency Program.

I would like to acknowledge the efforts of those who contributed to this edition of *Surgery Update* including: Kathleen K. Christians, MD, director of the Hepatopancreaticobiliary (HPB) Fellowship Program, and Rebecca L. Keim, MD, the current HPB fellow; Charles E. Edmiston, Jr., MS, PhD, CIC, director of the Surgical Microbiology Research Laboratory (I hope you attended his superb grand rounds presentation on the Surgical Care Improvement Project); Daryl P. Pearlstein, MD, who cares for patients throughout greater Milwaukee and established "MCW Thoracic" in collaboration with his thoracic surgery partners; Sam G. Pappas, MD, Division of Surgical Oncology; Dave R. Lal, MD, Division of Pediatric Surgery; Kellie R. Brown, MD, director of the Comprehensive Vein Clinic, Division of Vascular Surgery; and Jill S. Whitehouse, MD, a talented fourth year resident who worked "whipple" into her excellent article on education at MCW. Finally, we remain indebted to Stuart D. Wilson, MD, for his continued contributions to the department and *Surgery Update*. (You may enjoy his "history challenge," page 15).

(left to right) Bren Heaton, MD, (fourth year resident) and Alonzo Walker, MD

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BORDERLINE RESECTABLE PANCREATIC CANCER: BRIEF REPORT AND COMMENT

Pancreatic cancer remains the fourth leading cause of adult cancer death and efforts to change this at The Medical College of Wisconsin include basic, translational and clinical research.

By **Kathleen K. Christians, MD**
Associate Professor, Department of Surgery, Division of Surgical Oncology

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Pancreatic cancer remains the fourth leading cause of adult cancer death, and efforts to change this at The Medical College of Wisconsin include basic, translational and clinical research. In addition to advances in systemic therapy and innovations in treatment sequencing, we now have a general consensus among physicians on how the disease should be staged prior to beginning treatment. The cornerstone of local tumor assessment is computed tomography (CT), and the assessment of resectability no longer requires a laparotomy. Resectability is now assessed preoperatively using high-quality CT or magnetic resonance imaging (MRI). However, there remains a subset of patients whose tumors may extend to adjacent vessels, raising concern for a positive margin of resection. This distinct patient subset has been termed "borderline resectable."[1] Patients with borderline resectable disease comprise a group that reside on an imprecise continuum between radiologically and technically resectable and unresectable disease. Borderline resectable tumors are defined as those that abut the superior mesenteric artery (SMA), abut or encase the common hepatic artery over a short segment, or occlude the superior mesenteric vein-portal vein (SMV-PV) confluence with suitable vein above and below such that venous reconstruction is possible.[2] Patients with borderline resectable disease are at higher than usual risk for perioperative complications owing to the additional complexity of surgery and are at high risk for early systemic failure due to the advanced nature of the primary tumor. They are also at high risk for a margin-positive resection with surgery alone. Therefore, we have employed neoadjuvant systemic chemotherapy and chemoradiation rather than surgery as the initial treatment modalities. Placing surgery last in the treatment sequence is done in an attempt to separate this patient population into two groups: those with more rapidly progressive disease in whom surgery directed at the primary tumor would provide no clinical benefit or would carry prohibitive risk; and those in whom systemic and local treatment response increases the potential for complete resection of the primary tumor and a more favorable survival duration.

Case Report

Surgical resections performed in patients with borderline resectable pancreas cancer are more technically demanding than those for resectable disease. They often require venous resection and reconstruction, temporary or permanent mesocaval or splenorenal shunts, thorough microdissection of adjacent arteries, and occasionally, short-segment hepatic artery reconstruction. The following case is an example of a patient with a borderline resectable tumor treated with neoadjuvant chemotherapy followed by chemoradiation. His tumor was then successfully resected with vascular resection and reconstruction, including creation of a splenorenal shunt.

An otherwise healthy man with borderline resectable pancreas cancer was referred to the Froedtert & The Medical College of Wisconsin Pancreatic Cancer Program for a second opinion regarding local tumor resectability and overall treatment sequencing. CT imaging revealed tumor-induced encasement of the SMV-PV confluence and abutment of the SMA. He underwent induction chemotherapy followed by chemoradiation with a good clinical response. The serum level of CA 19-9 decreased significantly, and there was no evidence of tumor progression on repeat CT imaging performed at two-month intervals after chemotherapy and again after chemoradiation (Fig. 1). The patient underwent pancreaticoduodenectomy with en-bloc resection of the SMV-PV confluence with primary end-to-end anastomosis and distal splenorenal shunt. Because the segment of SMV-PV that required resection included the splenic vein confluence, his splenic vein was anastomosed to the left renal vein (Fig. 2).[3]

When venous resection is necessary, as is the case for most borderline resectable tumors, the SMA is usually exposed medial to the SMV, and the SMA dissection is completed prior to separating the tumor from the SMV-PV.[4] This is a complex maneuver, but when completed, leaves the specimen attached only to the SMV-PV confluence. Systemic heparin is then administered, a Rommel tourniquet is applied to the SMA for in-flow occlusion, vascular clamps are placed two to three cm proximal (on the PV) and distal (on the SMV) to the involved venous segment, and the specimen is resected. The vein is then reapproximated with interrupted 6-0 Prolene sutures. If length is needed, as in the case of an intact splenic vein, an interposition graft is utilized. We commonly use the internal jugular vein. In the event that the IMV enters the SMV rather than the splenic vein, the IMV cannot provide for splenic vein decompression when splenic vein ligation is necessary (as in this case). In such situations, it has been our practice to mobilize the splenic vein from the pancreatic substance and create a

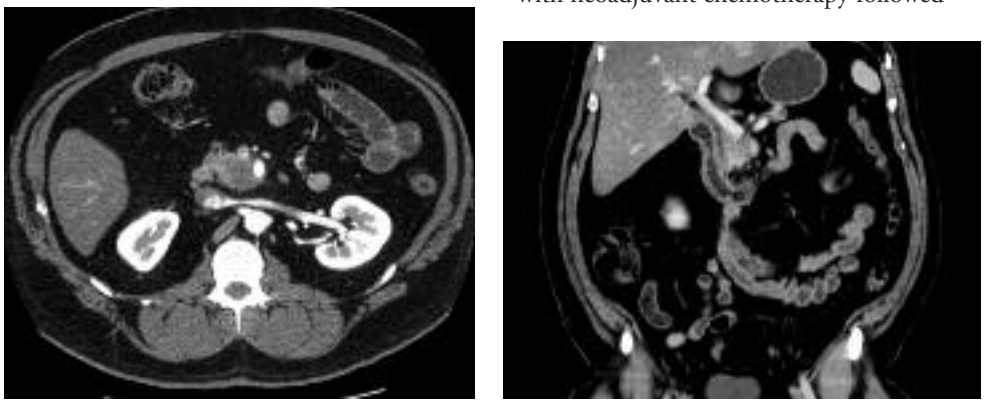

Figure 1: CT scans showing the cancer in the head of the pancreas with abutment of the SMV/PV confluence.

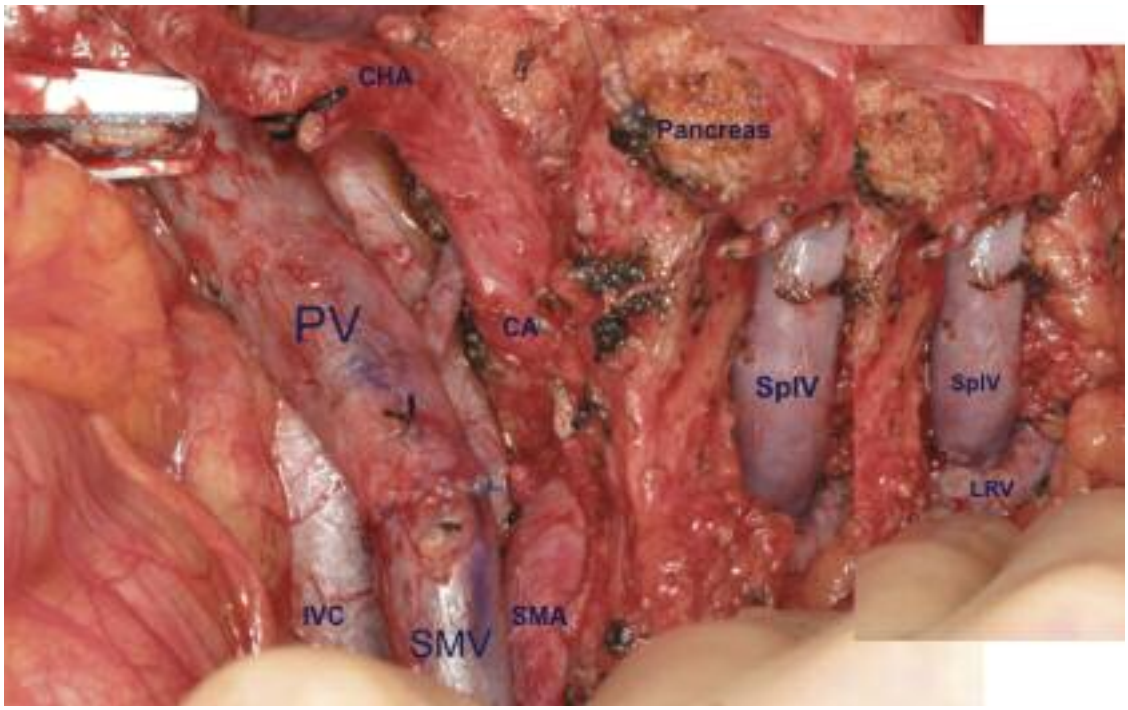

Figure 2: Intraoperative photo demonstrating the Whipple resection bed with primary end-to-end superior mesenteric vein reconstruction and splenorenal shunt. (CHA – common hepatic artery; PV – portal vein; IVC – inferior vena cava; SMV – superior mesenteric vein; CA – celiac axis; SMA – superior mesenteric artery; SplV – splenic vein; LRV – left renal vein.)

splenorenal shunt to avoid postoperative left-sided portal hypertension and possible gastrointestinal hemorrhage. This patient's postoperative course was uneventful and the final pathology was T3N0 with negative margins (refer to Fig. 1 and 2).

Definitions of Borderline Resectable

Varadhachary and colleagues introduced the term "borderline resectable" utilizing a CT-based anatomic classification system.[2] Borderline resectable included tumors with limited arterial abutment (tumor-vessel contact <180) and/or venous abutment or encasement (tumor-vessel contact >180). Following this initial description of borderline resectable pancreatic cancer, greater emphasis was placed on pretreatment CT staging to determine the optimal treatment sequence for patients with localized pancreatic cancer. A consensus conference sponsored by the AHPBA and SSO published in the *Annals of Surgical Oncology* in 2009 defined borderline resectable patients as (not only) having abutment of the SMA, but also included a more liberal view of SMV-PV "involvement" to include even minimal abutment.[5] This definition reflected the concern most surgeons have over vascular resection and reconstruction at the time of pancreaticoduodenectomy. The consensus panel concluded that patients with borderline resectable pancreatic cancer should receive chemotherapy and chemoradiation as initial treatment, rather than a surgery first strategy. They also emphasized the importance of performing these operations at institutions experienced with the technical aspects of vascular resection and reconstruction.

Treatment Sequencing Rationale

After chemotherapy (usually a gemcitabine doublet; other combinations are now being considered[1]) and chemoradiation (usually gemcitabine-based), those patients with improved performance status, fully-evaluated comorbidities, and absence of evolving metastatic disease on post-treatment (preoperative) restaging are considered for pancreatic resection. Theoretical advantages of preoperative chemoradiation include: the greater potential efficacy of chemoradiation in the setting of an intact tumor blood supply before surgical devascularization; decreased hypoxia-induced resistance to chemoradiation; and few late complications from radiation as the majority of the radiated tissue is resected. In situ tumors are usually hypervascular (in contrast to persistent microscopic disease following surgery), which may also increase the effectiveness of systemic therapy and radiosensitizing chemotherapy. In the Katz, et. al., landmark article,[6] median survival for patients completing all therapy, including pancreaticoduodenectomy, was 40 months, as opposed to 13 months for patients who did not undergo pancreatectomy ($p<0.001$). This report concluded that the neoadjuvant treatment schema "allowed for identification of a subset of patients that was most likely to benefit from surgery, as evidenced by the favorable median survival." Neoadjuvant treatment also allows identification of those patients with rapidly progressive disease in whom surgery will offer no survival advantage. For additional information on this topic, see references, visit *mcw.edu/surgery*, or contact the authors:

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Rebecca L. Keim, MD – *rkeim@mcw.edu*
Douglas B. Evans, MD – *devans@mcw.edu*

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SURGICAL MICROBIOLOGY RESEARCH LABORATORY

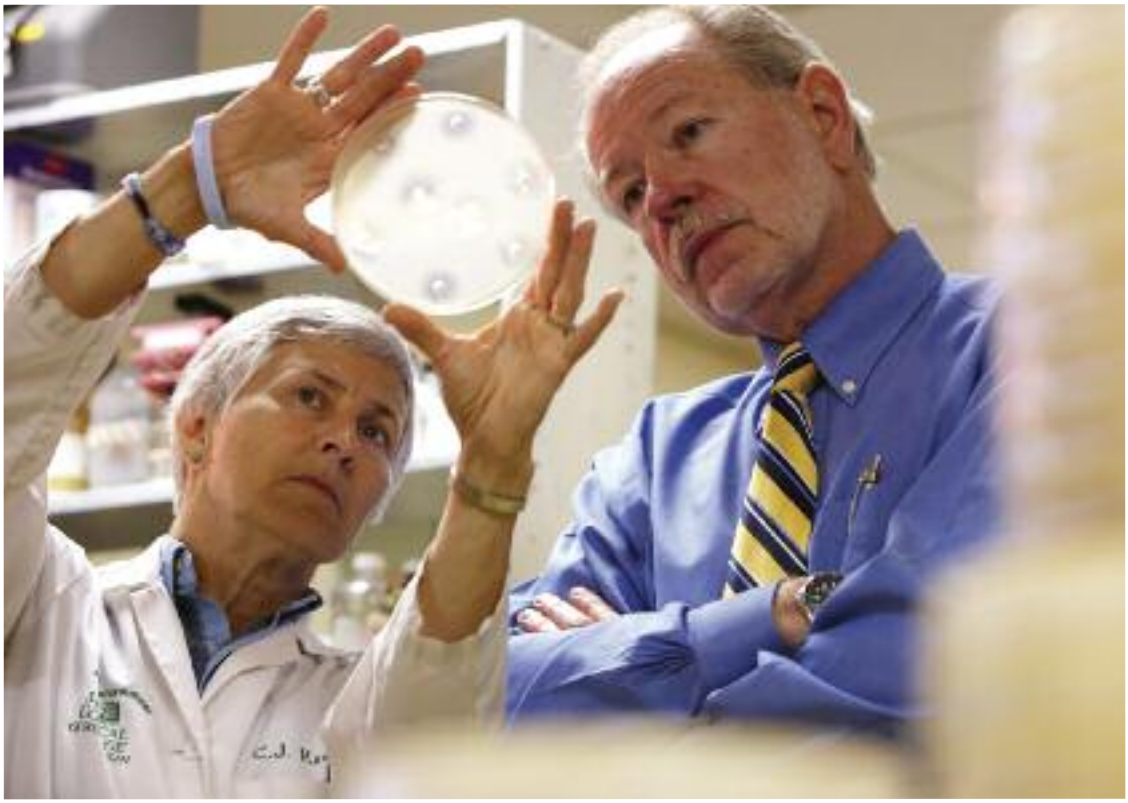
Three Decades of Investigating the Epidemiology, Pathogenesis, Management and Prevention of Surgical Site Infections

By **Charles E. Edmiston, Jr., MS, PhD, CIC**
Professor, Department of Surgery, Division of Vascular Surgery, Hospital Epidemiologist

In 1982, the Surgical Microbiology Research Laboratory (SMRL) was established in the Department of Surgery by Robert E. Condon, MD, chairman of the Department of Surgery. Carol Spiegel, PhD, was the first director of the laboratory and Candace Krepel, MS, was recruited to supervise its daily activities. In 1984, Dr. Spiegel departed to assume the position of director of Clinical Microbiology at UW-Madison and after a national search, Charles E. Edmiston, Jr., MS, PhD, CIC, was named laboratory director in December 1984. The laboratory was originally established as an independently funded facility to support the various anti-infective trials that were being conducted at the VA and Milwaukee County Hospital.

Over the past 29 years, the SMRL has focused on several productive areas of clinical and basic research, including: the pharmacokinetics and therapeutic efficacy of new anti-infectives in surgical patients; mechanistic studies of biomedical device-related infections; the disease causing role of biofilm-forming bacteria in postoperative SSIs in the critical care patient population; the clinical efficacy of innovative skin antiseptic preparations; the impact of using antimicrobial coated technologies to reduce the risk of healthcare-associated infection; and the molecular epidemiology of surgical site infections. Numerous anti-infective clinical and laboratory studies involving many antimicrobial agents (aztreonam, ampicilin-sulbactam, cefazolin, ceftriaxone, cefuroxime, clindamycin, imipenem, daptomycin, meropenem, ciprofloxacin, garenoxacin, temafloxacin, fleroxacin, moxifloxacin, linezolid, and novel neolipoglycopeptides antibiotics active against vancomycin-resistant enterococci) have been conducted over the past three decades in the SMRL.

The SMRL has played a major role with improving clinical outcomes of medical and surgical patients through laboratory and clinical investigations documenting the efficacy of antibiotic lock therapy (Hickman catheters), preadmission and perioperative skin antisepsis (utilizing chlorhexidine gluconate), using molecular epidemiology to document the impact of intraoperative aerosols in the development of postoperative device-related infections, and the role of antibacterial sutures as an innovative SSI risk-reduction strategy. In the late 1990s, the laboratory assumed a new role as a support facility for the Infection Control Program at Froedtert & The Medical College of Wisconsin. Dr. Edmiston, who is also the hospital epidemiologist, with the assistance of Candace Krepel, has used the SMRL to investigate the acquisition and dissemination of hospital acquired pathogens within the hospital environment. Using basic epidemiologic tools, the lab has been able to identify the microbial and molecular identity of potential hospital acquired pathogens (MRSA, VRE and multi-drug resistant, gram-negative bacteria). In the process, the SMRL has assisted in developing effective interventional strategies for reducing the risk of healthcare-associated infections in medical and surgical patients. In this role, the staff of the SMRL have partnered with Froedtert & The Medical College of Wisconsin and its healthcare professionals in their mission to improve patient outcomes by ensuring a safe and effective patient care environment.



Charles E. Edmiston, Jr., MS, PhD, CIC, director, Surgical Microbiology Research Laboratory, and Candy Krepel, MS, laboratory supervisor, examining bioassay results from tissue samples obtained from patients undergoing selected surgical procedures to determine the impact of BMI on antibiotic prophylaxis.

The mechanistic etiology of postoperative surgical site infections has always been an area of focused research for the laboratory. For more than 150 years, it has been well recognized that the patient's own intrinsic skin flora can play a major role in the development of an SSI. Recent SMRL studies have documented that by using a preoperative standardized application regimen of 2 percent or 4 percent chlorhexidine gluconate, antimicrobial concentration can be achieved on the patient's skin which range from 25 to 350 times the concentration required to inhibit or kill selected surgical pathogens, including MRSA. Recent evidence-based publications have validated this approach as an effective risk reduction strategy. Two recent clinical studies have documented the impact of body mass index (BMI) as a potential SSI risk factor. Patients who receive a 2 gram prophylactic dose of cefazolin and have a BMI greater than 30 demonstrate a markedly suboptimal antimicrobial tissue concentration for gram-positive and gram-negative surgical pathogens. Therefore, these studies suggest that any patient with a BMI greater than 30 should receive a 3 gram prophylactic loading dose prior to surgery, rather than the traditional 2 gram dose.

Recent innovative clinical studies have suggested that two additional mechanistic pathways may exist leading to development of a postoperative SSI. The first involves the role of intraoperative nasopharyngeal shedding. Studies conducted during vascular, orthopaedic and cardiothoracic surgical procedures document that microbial shedding originating from members of the operative team can lead to contamination of the surgical field, including the wound. A study conducted in the SMRL and published in *Surgery* demonstrated the molecular relationship between intraoperative nasopharyngeal shedding and development of late-onset vascular graft infection. A second line of research has revealed that surgical glove failure during surgery may lead to postoperative infection in which bacteria from the surgeon's hands migrate across the surgical glove through microperforations (undetected defects) resulting in microbial contamination of the wound bed. A SMRL study to be published in 2011 in the *American Journal of Infection Control* demonstrated that an innovative antimicrobial surgical glove was highly effective at preventing microbial migration across the glove barrier following multiple microperforations. These studies would suggest that contamination of the surgical wound is a multi-factorial event, requiring innovative solutions for reducing intraoperative risk.

In almost 30 years of existence, the SMRL has achieved notable accomplishments, including: publishing more than 200 peer-reviewed papers and book chapters; helping train more than 50 healthcare professionals (medical students, residents, surgical and ID fellows, visiting professors, international master's and doctoral graduate candidates); sending several current and former laboratory associates on to esteemed clinical/academic careers or public service (CDC, FDA); and the distinction of having two former members of the laboratory become president of the Surgical Infection Society (Robert E. Condon, MD, and Mark A. Malangoni, MD). Dr. Condon's goal in starting the SMRL was to create a laboratory that fostered a collegial environment where applied and basic questions relating to the pathogenesis, treatment and prevention of surgical site infections could be addressed in a thoughtful, evidence-based manner. While the scope of clinical interest has evolved significantly over time, the SMRL has continued to function as a collegial resource for our colleagues at The Medical College of Wisconsin and surgical investigators throughout the U.S. and abroad (South America, Asia and Europe). For additional information on this topic, visit *mcw.edu/surgery* or contact the author directly at *edmiston@mcw.edu*.

Recent Selected Publications

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ELECTROMAGNETIC NAVIGATION DIAGNOSTIC BRONCHOSCOPY PERFORMED BY THORACIC SURGEONS: ONE CENTER'S EARLY SUCCESS

By **Daryl P. Pearlstein, MD**

Assistant Professor, Department of Surgery, Division of Cardiothoracic Surgery

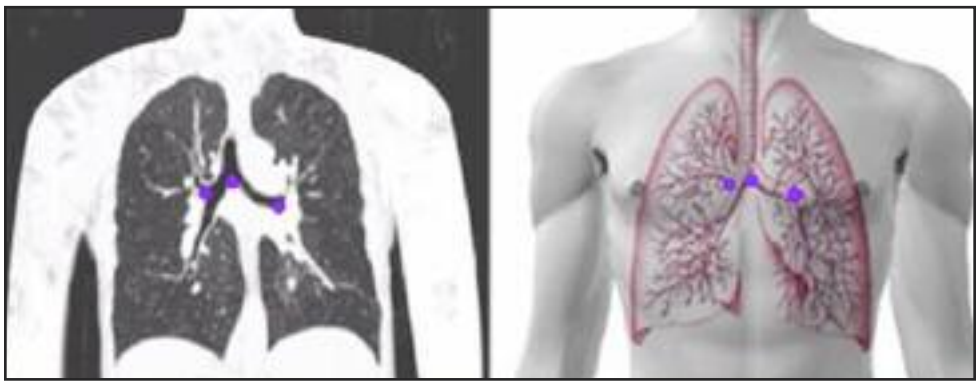

Figure 1: Registration points (purple) merging computer generated anatomy with patient's real anatomy.

Lung cancer remains the number one cancer killer in the United States, claiming approximately 160,000 lives per year[1], more than the next four deadliest cancers (colorectal, breast, pancreatic, and prostate) combined. Traditionally, lung cancer has had a very low cure rate, less than 15 percent. This is largely due to delays in diagnosis. Some studies have suggested that if lung cancer is caught early and treated appropriately with surgical resection, five year survival rates can be as high as 92 percent.[2] While screening trials with CT scans such as the NLST and I-ELCAP demonstrate early detection of suspicious nodules in high risk patients is very realistic,[2,3] tissue diagnosis remains a challenge in which the algorithm is yet to be clearly defined. If lung cancer screening becomes commonplace, there will be a large volume of newly discovered pulmonary nodules of which greater than 90 percent are benign.[4] It will be incumbent upon physicians managing these patients to establish effective ways of making accurate tissue diagnoses of these lesions, thus avoiding unnecessary operations in large numbers of patients.

Conventional bronchoscopy, while safe, has very low diagnostic yields for peripheral lesions - in some cases as low as 30 percent.[5] CT guided biopsies performed by interventional radiologists have better diagnostic yields, but are generally applicable only to pulmonary lesions situated in the outer third of the lung. This approach suffers from the problem of having a high pneumothorax rate; in most series it is higher than 20 percent.[6]

Within the past several years, electromagnetic navigation bronchoscopy (ENB) has proven very effective at assessing pulmonary nodules accurately with very low complication rates. ENB consists of four elements:

1) Computer software that utilizes thin-slice CT to create a three-dimensional rendering of the lung and tracheobronchial tree, which can then be used for virtual bronchoscopy.
2) An electromagnetic field encompassing the patient's thorax, so the real anatomy can be merged with the computer-generated (virtual) anatomy by use of standard "registration points" (e.g., carina, takeoff of the right upper lobe bronchus, bifurcation between the left upper and lower lobes, Figure 1).
3) A sensor probe that fits through the small working/suction channel of a bronchoscope with a steering mechanism. Because the sensor probe is recognizable within the electromagnetic field, it can be navigated through the small airways of the lung toward peripheral lesions not reachable by conventional bronchoscopy (Figure 2).
4) A hollow, extended working channel (EWC) that can be secured in a small peripheral airway and used to pass diagnostic instruments such as brushes, aspirating needles and biopsy forceps.

In most studies, the diagnostic yields of ENB range from 62 percent to 80 percent.[7-10] Virtually all of these studies have been published by interventional pulmonologists who, in most cases, have subspecialty expertise and limit their practice to interventional bronchology. These highly specialized physicians, while very skilled, are limited in number and are not available in most medical centers. Another shortcoming of the published experience of ENB biopsies is that nearly all series tend to include relatively small numbers of cases.

Our feeling was that thoracic surgeons might possess the appropriate skill set to effectively utilize this new technology. Our hope and expectation was to demonstrate that thoracic surgeons, with no previous experience in ENB, could learn this technique and have excellent early results. Below is a summary of our first 104 patients who underwent ENB for the purpose of diagnosing pulmonary lesions. (Results presented at the annual meeting of the Society of Thoracic Surgeons in San Diego, Calif., February 2011).

Methods

We conducted a retrospective analysis of the first consecutive 104 patients undergoing diagnostic ENB by two thoracic surgeons at a single center between April 2008 and October 2009. The ENB training regimen for both thoracic surgeons was limited to a weekend course provided by the manufacturer of the system (SuperDimension, Minneapolis, Minn.). Each procedure utilized general anesthesia (GA) and rapid on-site examination of cytopathology (ROSE). All patients had pulmonary lesions suspicious for malignancy. Patients having biopsies negative for malignancy subsequently underwent additional procedures or follow-up imaging. True negative biopsies were defined as lesions which were removed surgically and found to be benign and lesions which disappeared on subsequent imaging or demonstrated stability over a one year period.

Results

Of the 104 patients, three were excluded due to insufficient follow-up. The remaining 101 patients had a median lesion size of 2.8 cm. Sixty-seven (82 percent) of the 82 lesions ultimately determined malignant had a positive diagnosis upon ENB. Of the 34 lesions without a positive ENB biopsy, 19 (56 percent) were categorized as true negatives: eight had benign surgical biopsies, six disappeared and five demonstrated stability. Consequently, 86 of 101 cases had an accurate ENB biopsy for a diagnostic yield of 85 percent. There was insufficient evidence to demonstrate an association between the size of the lesion and diagnostic accuracy. In other words, statistically speaking, small lesions had the same diagnostic yield as large ones. In terms of

complications, there were six pneumothoraces (5.8 percent) which required chest tube placement. There were no long term sequelae as a result of the pneumothoraces and no mortalities.

Discussion

Based upon these results, it appears it is possible for thoracic surgeons with no prior experience in ENB to learn the technique and succeed immediately with high diagnostic yields and low complication rates. Our diagnostic yields are higher than those published by any large study to date. Our early success may be attributed to several factors. First, we utilized ROSE in each case, which allowed us to continue taking samples and in some cases, reposition our working channel until pathologists were satisfied we had obtained diagnostic material. Secondly, each procedure was performed with the patient under GA and paralyzed, whereas most of the previous studies by pulmonologists only used deep sedation for their procedures. Because the calibration between virtual and real anatomy takes place at the beginning of the case, any movement the patient exhibits after this calibration will likely decrease diagnostic accuracy. Therefore, performing the procedure with the patient under GA may improve diagnostic yield by preserving the CT-to-body divergence.

Because the emergence of screening for lung cancer with CT scans seems imminent, the volume of suspicious pulmonary nodules is likely to grow markedly in the near future. It will be imperative that we develop a strategy to obtain tissue diagnoses that is accurate, safe and widely available. By all accounts, ENB seems to be a very useful diagnostic procedure. Because subspecialty trained interventional pulmonologists are in short supply, if ENB is to be utilized widely, it will be incumbent on physicians from other disciplines to perform this procedure well. We believe thoracic surgeons have the skill to master this technique quickly and perform it with excellent early results. Furthermore, there seems to be the suggestion that using GA and ROSE improve diagnostic accuracy. Of course, utilizing GA and ROSE adds to the overall cost of the procedure, but when factoring in the cost of follow-up imaging and procedures incurred after non-diagnostic tests, the additional up-front cost may not be significant. While further analysis is needed, our early results suggest thoracic surgeons utilizing ENB may play an important role in the early diagnosis of lung cancer in the future.

For additional information on this topic, visit *mcw.edu/surgery* or contact the author: *dpearlstein@mcw.edu.*

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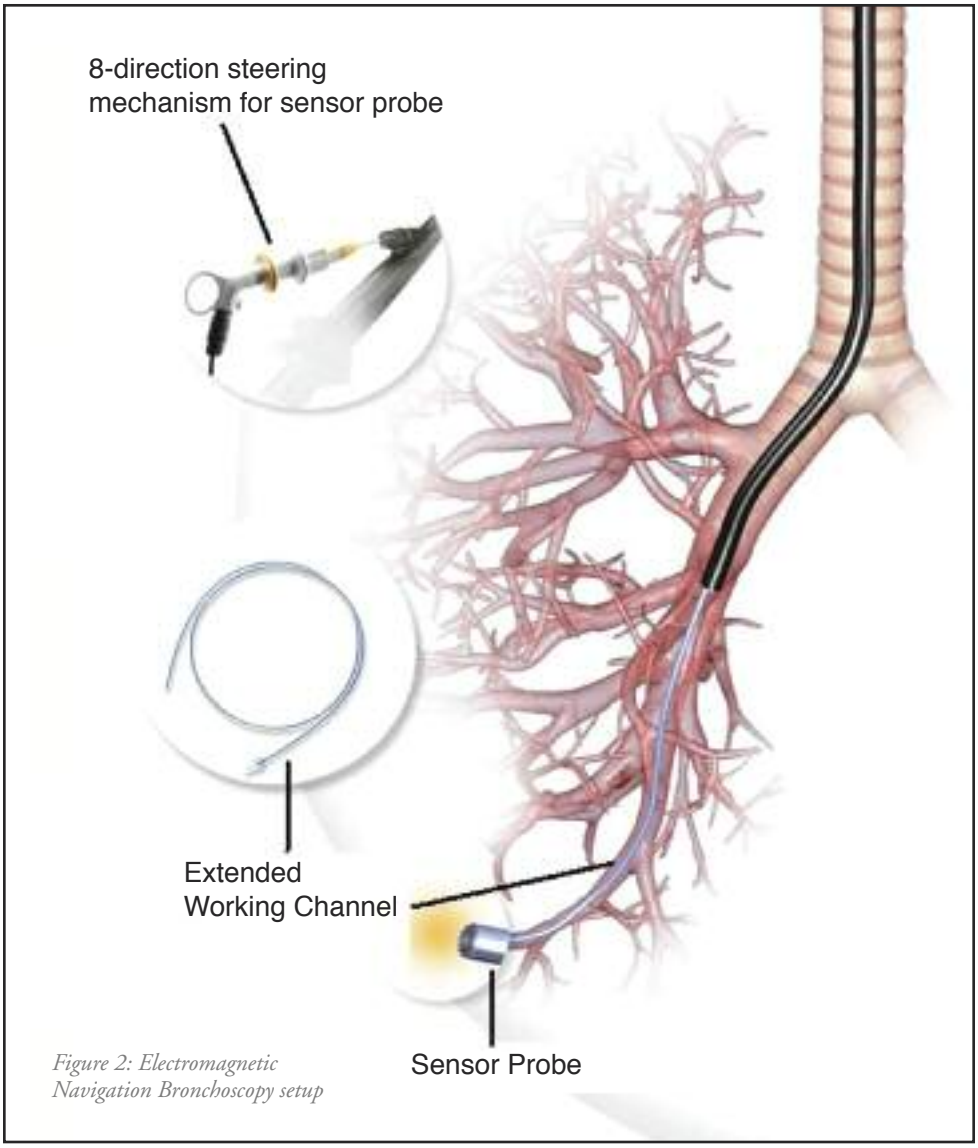

Figure 2: Electromagnetic Navigation Bronchoscopy setup

MONSTERS OF THE RETROPERITONEUM
RETROPERITONEAL SARCOMAS: CURRENT MANAGEMENT STRATEGIES

There are about 1,000 cases of RPS per year in the United States, and local recurrence is the main cause of disease-related morbidity and mortality.

By **Sam G. Pappas, MD**

Assistant Professor, Department of Surgery, Division of Surgical Oncology

Retroperitoneal sarcomas (RPS) are a rare group of heterogenous tumors arising posterior to the abdominal viscera. They comprise about 10 percent of soft-tissue sarcomas, and possess unique characteristics demanding distinctly different management than extremity sarcomas. If one considers the rarity of such tumors, and the fact that they are comprised of different histologies, the question becomes "how does one appropriately manage these tumors based on the available evidence?" There are about 1,000 cases of RPS per year in the United States, and local recurrence is the main cause of disease-related morbidity and mortality.

Clinical Presentation and Computed Tomography (CT) Staging

Most commonly diagnosed in the 6th decade of life, RPS typically cause few symptoms until they acquire a large enough size to compress or invade adjacent structures.[1] (Figure 1) A complete history and physical exam aids in narrowing the differential diagnosis and should include questions related to germ cell tumors or lymphomas. Questions should focus on symptoms of fevers and night sweats and physical exam should include evaluation of all nodal basins.

Axial CT and magnetic resonance imaging (MRI) are the primary imaging modalities used to assess tumor resectability and potentially segregate lower-grade from higher-grade tumors. When features of less aggressive tumors are suggested on imaging, no further diagnostic testing is needed. Moreover, preoperative imaging can often accurately identify higher-grade lesions making their under-treatment unlikely.[2] Most extravisceral soft tissue masses are RPS.

Complete Surgical Resection

Surgical resection remains the only potential curative therapy for patients with RPS. The role of pre-treatment biopsy remains controversial and should be used selectively. Biopsy potentially helps define the biology of the lesion and determine whether or not the patient will be at a higher risk of local recurrence (higher-grade lesion). At institutions where preoperative treatment strategies are available, biopsy of suspected high-grade lesions is appropriate and may help better stratify patients for risk of recurrence and for enrollment into clinical trials.

Given their large size, surface area and anatomic relations, it is often not reliable to assess the status of the microscopic margins of RPS. Complete resections or macroscopically negative margins may be a more meaningful and reproducible goal as compared to microscopically negative resections. There is typically no role for incomplete resection in patients with RPS. Surgeons should be familiar with non-traditional incisions to aid in complete surgical resection of RPS (Figure 2).

Histologic-based Prognostication

The 6th edition AJCC staging system for STS is felt by many to inadequately stage RPS patients. Several large institutional studies have advocated histologic-based risk stratification to help identify those at highest risk for recurrence and select patients for clinical trials.[3] These large institutional series are extremely valuable, as RPS is a relatively uncommon malignancy.

Indicators of tumor aggressiveness, histological grade, histologic subtype and invasion of adjacent structures have been shown to be significant predictors of survival. Using these parameters, Anaya, et. al., have developed a RPS postoperative nomogram to stratify patients at greatest risk for recurrence and predict survival.[4] Tools like this one can help in counseling patients and for selection of individuals that may benefit from adjuvant therapies or inclusion in clinical trials.

Complementary Chemotherapy and Radiation

Although radiotherapy is an adjuvant tool which holds promise, national trials evaluating its role have failed to accrue adequate numbers of patients. Contributing to the poor accrual is institutional or physician bias regarding the perceived merits or futility of radiation for RPS.

A recent review by Pawlik, et. al., examined the long-term results of two well-designed prospective neoadjuvant radiotherapy trials.[5] They reported 89 percent of patients were able to complete planned radiotherapy prior to resection. For those patients who underwent complete macroscopic resection, the five-year recurrence-free, disease–free and

Figure 1: Patient with a large (>15cm) high grade leiomyoscaroma of the retroperitoneum with tumor involvement of the anterior abdominal wall and iliac bone, as well as the lower border of the right lobe of the liver and right hemidiaphragm.

overall survival was 60 percent, 46 percent and 61 percent respectively. Although these findings are provocative and perhaps provide future direction, this must be further examined with well-designed randomized prospective trials.

Conclusion

Complete surgical resection remains the only potentially curative therapy for patients with RPS. Adequate preoperative imaging with CT scan or MRI is necessary to plan the surgical approach and carefully select the patients most likely to benefit from surgical extirpation. Histologic subtype is the most predicative variable of disease-free and overall survival. Patients with high-grade RPS, or those patients where R0 resection appears unlikely, should be considered for preoperative neoadjuvant chemoradiation. Larger trials specifically addressing the role of each of these therapies are warranted.

For additional information on this topic, visit *mcw.edu/surgery* or contact the author: *spappas@mcw.edu*.

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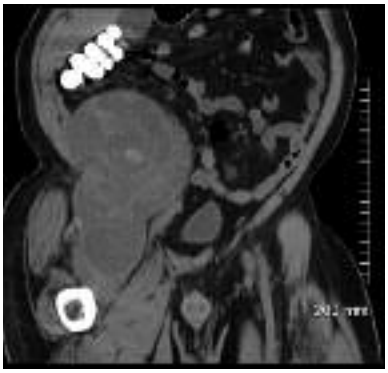
Abdominoinguinal approach



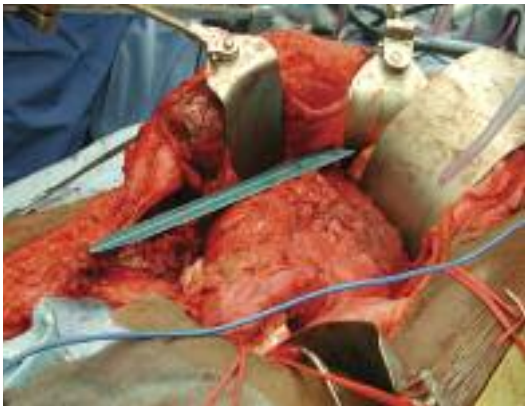


Figure 2: In the past year, we have managed five patients who had abdominoinguinal tumors using an abdominoinguinal approach to facilitate complete resection.

ADVANCED DENTAL SPECIALISTS FUND PROVIDES EDUCATIONAL OPPORTUNITY FOR ORAL AND MAXILLOFACIAL SURGERY RESIDENTS

By **Meg M. Bilicki**

Director of Development, Department of Surgery, The Medical College of Wisconsin

A new fund at The Medical College of Wisconsin will provide sustained support for the education of residents within the Division of Oral and Maxillofacial Surgery to foster development as competent, compassionate and humane physicians.

"This gift from Advanced Dental Specialists allows The Medical College of Wisconsin to broaden and strengthen its unwavering commitment to medical education," said Ma' Lou Sabino, DDS, assistant professor and director, Residency Program.

Support from the fund will benefit residents as the division grows and makes significant contributions in academic oral and maxillofacial surgery nationally and internationally.

The Division of Oral and Maxillofacial Surgery cares for patients at Froedtert & The Medical College of Wisconsin, Children's Hospital of Wisconsin, and Clement J. Zablocki VA Medical Center. The goals of the division are to provide tertiary care to the community, to engage in clinical research and educate residents.

A variety of opportunities are available to support the Department of Surgery. For more information, please contact Meg M. Bilicki at *mbilicki@mcw.edu* or 414-805-5731.

Top Row: Robert W. Trettin, DDS, president, Advanced Dental Specialists, Christopher J. Meyers, DDS, Advanced Dental Specialists; Bottom Row: Gerald D. Patterson, DDS, Advanced Dental Specialists, Ma' Lou Sabino, DDS, assistant professor and Residency Program director; during visit to the Division of Oral and Maxillofacial Surgery at The Medical College of Wisconsin.

CURRENT MANAGEMENT OF CONGENITAL ESOPHAGEAL ATRESIA AND TRACHEOESOPHAGEAL FISTULA

Treatment of esophageal atresia and tracheoesophageal fistula is a success story of modern medicine.

By **Dave R. Lal, MD**
Assistant Professor, Department of Surgery, Division of Pediatric General and Thoracic Surgery

Congenital atresia of the esophagus and tracheoesophageal fistula (TEF) occur in one of every 2,500 to 3,000 live births. Treatment of esophageal atresia (EA) and TEF is a success story of modern medicine. First described in the 1600s, this condition was universally fatal until the mid-1900s. After repeated failures, surgical pioneers including Ladd, Leven and Haight persisted and improved their anatomic knowledge. Their persistence paid off, allowing them to develop new surgical techniques that led to the first EA and TEF survivors. Today, further advancements in neonatal intensive care, surgery, anesthesiology, and parenteral nutrition have improved survival to greater than 90 percent.

Anatomic Classifications

Five types of esophageal atresia have been described. Vogt and Gross initially created nomenclature to describe the types of atresia; however, the more accepted classification is to describe the atresia based on anatomic abnormality. Figure 1 illustrates the different types of atresias with their incidence, anatomic findings and archaic classification according to Vogt and Gross. The most common type of EA is with a distal TEF.

Associated Anomalies

The association between EA and other congenital anomalies is well known. The most common association is described by the acronym VACTERL and includes: anomalies of the vertebrae (similar to those of spondylocostal dysplasia); intestinal atresia; cardiac malformations (patent ductus arteriosus, atrial septal defect, or ventricular septal defect); tracheoesophageal fistula; renal anomalies (urethral atresia with hydronephrosis); and limb anomalies (hexadactyly, humeral hypoplasia, radial aplasia, and proximally placed thumb).

Diagnosis

Polyhydramnios is present in 50 percent of mothers carrying infants with esophageal atresia. Other antenatal ultrasound findings include microgastria and/or a distended upper esophageal pouch.

After birth, the presence of excessive drooling or aspiration and coughing with feeds must lead to an evaluation for EA. Confirmation of the diagnosis can be made by attempting to pass a 10 French orogastric tube into the stomach and meeting resistance.

Preoperative Studies

Once the diagnosis of EA is made, a search for associated anomalies is required. Prior to performing operative repair, it is imperative that an echocardiogram be performed for two reasons. The first is to rule out cyanotic congenital heart anomalies that may require immediate repair. Secondly, it is necessary to determine if the aortic arch is left or right sided. In patients with a left-sided aortic arch, a routine right thoracotomy is performed for repair of the EA. However, in the rare instance (2 percent) of patients with a right-sided arch, a left thoracotomy is required.

Other necessary studies include a babygram (full body X-ray) to evaluate for vertebral anomalies, and a renal ultrasound. Spinal ultrasound or MRI for tethered cord, and a voiding cystourethrogram should be performed prior to discharge to complete the VACTERL evaluation.

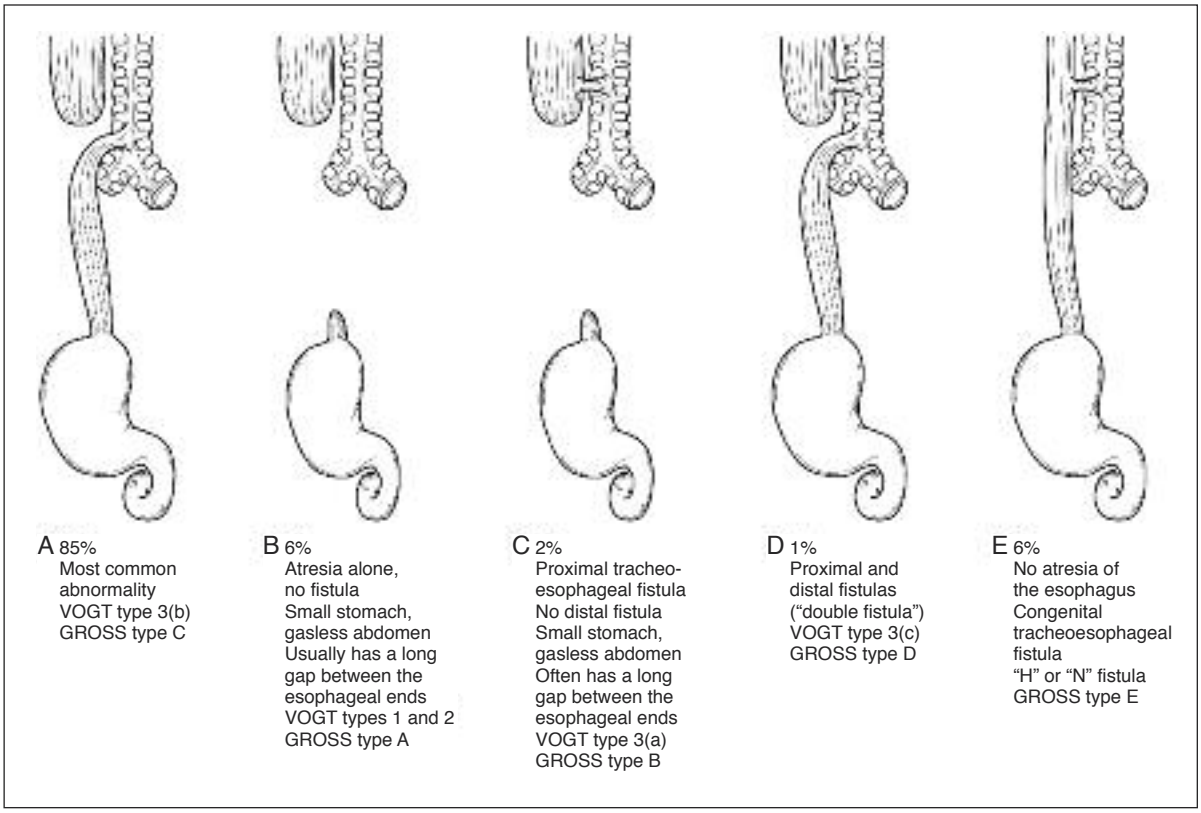


Figure 1: Various types of esophageal atresia along with their incidence (percent), anatomic findings and Gross/Vogt classifications. (From Beasley SW. Esophageal Atresia and Tracheoesophageal Fistula. In: Oldham KT, Colombani PM, Foglia RP, Skinner MA, editors. Principles and Practice of Pediatric Surgery. Philadelphia: Lippincott Williams & Wilkens; 2005. p. 1040; with permission.)

Esophageal Atresia with Distal Tracheoesophageal Fistula

Timing and selection of surgical intervention in patients with EA and distal TEF is determined by the degree of prematurity, patient weight, overall clinical condition, other associated anomalies, and length of the gap between the ends of the esophagus. In healthy near-term or full-term infants without other severe anomalies and minimal pneumonitis, closure of the fistula and primary esophageal anastomosis is typically performed within the first 24 to 72 hours after birth. Usually, the esophageal gap is 1 to 2 cm, allowing primary anastomosis of the two ends without tension. This repair can be performed with an extrapleural or transpleural approach. The advantage of the extrapleural approach is the avoidance of pleural contamination if an anastomotic leak occurs.

In infants with severe pneumonia, prematurity or other significant medical problems that increase the risk of major surgery, gastrostomy tube placement is an effective method to decompress the intestinal tract and allow for medical optimization prior to esophageal repair. In patients with severe respiratory distress, emergent gastrostomy tube placement, fistula ligation and division can be a life-saving treatment to improve oxygenation. Once stabilized, the patient can complete this staged approach with later primary esophageal repair.

Esophageal Atresia Without Tracheoesophageal Fistula

Infants with esophageal atresia without a tracheoesophageal fistula present with excessive oral secretions, drooling and choking, similar to EA and TEF patients. The difference can be diagnosed by physical exam and X-ray. Babies who have EA without fistula will have flat, gasless abdomens. If fed, they are unable to swallow, and diagnostic studies confirm the presence of a blind upper esophageal pouch. The length of the atretic segment varies, but a wide gap usually divides the upper and lower ends of the esophagus, thus making primary anastomosis difficult or impossible.

Initial management of these patients includes gastrostomy tube placement and intra-operative determination of the gap length. Primary repair can usually be achieved if the gap is less than two vertebral spaces. For gaps spanning three to six vertebrae, delayed esophageal anastomosis is planned in two to three months with the hope that the proximal esophagus will grow, decreasing the gap.

Figure 2: Gastric Transposition with esophagogastric anastomosis.

Primary esophageal repair is unlikely to succeed if the gap is wider than six vertebrae. In such instances, conduits for esophageal replacement include gastric tube, gastric transposition, colonic and jejunal interposition grafts. Although controversy exists as to the best conduit for esophageal replacement, our group has favored gastric transposition with an esophagogastric anastomosis (Figure 2). Traditionally, gastric transposition for long gap esophageal atresia has been performed via an open surgical method. However, as minimally invasive techniques have advanced, a handful of surgeons have pioneered a laparoscopic approach. The most compelling argument for the laparoscopic approach is improved safety with the ability to perform the posterior mediastinal dissection under direct vision. This is in comparison to the blind digital dissection with the open technique. Additionally, cosmetic results are superior with the laparoscopic method (Figure 3).

Recently, our group demonstrated the feasibility of performing a laparoscopic-assisted gastric transposition at an earlier age than previously described in the literature (eight-week-old premature infant weighing 3.7 kg). The advantage of performing this operation at an earlier age is the quicker ability to initiate oral feeding, which has been shown to decrease the incidence of oral aversion and loss of swallowing function common in those who undergo delayed repair.

Complications and Sequela of Esophageal Repair

Early complications after surgical repair of esophageal atresias include anastomotic leak, anastomotic stricture and recurrent fistula. Gastroesophageal reflux (GER) is common after esophageal repair and reported in as many as 51 percent of patients in one study.[2] Incompetent lower esophageal sphincter, alteration of the angle of His, and poor esophageal motility all contribute to GER.

The overall prognosis after surgical repair of EA and TEF depends on the type of anatomic abnormality and the presence of other anomalies. In general, survival is greater than 90 percent and most patients have normal life expectancy.

For additional information on this topic, visit *mcw.edu/surgery* or contact the author: *dlal@chw.org*.

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Figure 3: Cosmetic results after the laparoscopic technique.

STATE-OF-THE-ART TREATMENT FOR VARICOSE VEINS

Varicose veins are an extremely common condition.

By **Kellie R. Brown, MD**
Associate Professor, Department of Surgery, Division of Vascular Surgery

Virtually all practitioners have patients who suffer from varicose veins. This malady of the lower extremities is associated with venous insufficiency involving some or all of the components of the superficial venous system and their tributaries: the great saphenous vein (GSV), the small saphenous vein and perforating veins. Varicose veins in the GSV distribution are the most common manifestations of chronic venous disease and are present in up to 20 percent to 25 percent of women and 10 percent to 15 percent of men.[1,2] Patients with varicose veins can suffer from leg pain, swelling, aching or itching, and longstanding superficial venous insufficiency can result in ulceration. Many of the patients being treated for venous stasis ulcers have only superficial venous insufficiency as a cause. Indications for treatment of superficial venous insufficiency include patient symptoms, superficial thrombophlebitis, bleeding or ulceration.

The treatment of superficial venous insufficiency has evolved significantly over the past decade, moving from an inpatient procedure most often requiring general or regional anesthesia and weeks of recovery to an office-based procedure performed under local anesthetic with minimal recovery time. This is primarily due to the development of endovenous thermal ablation, along with the FDA approval of two sclerotherapy agents, sodium tetradecyl sulfate and polydocanol, both of which are quite safe and effective. Traditional surgical therapy for GSV reflux has consisted of high ligation and stripping with or without interruption or removal of any contributing perforators or major tributaries.[3] Minimally invasive thermal ablation techniques have largely replaced high ligation and stripping. These procedures are safe, effective ways of eliminating reflux with less morbidity, faster recovery and improved cosmetic results.

Endovenous thermal ablation involves the percutaneous placement of a catheter into a vein using ultrasound guidance, and generating enough heat energy within the vein to denature the proteins in the endothelial wall, so the vein will occlude and eventually become fibrotic. Heat can be generated by a laser, or by a radiofrequency generator, both of which are safe and effective. The efficacy of thermal ablation techniques has been widely reported. In one of the largest published studies, Min, et. al. reported three year follow up of 499 veins treated with laser ablation. He was able to achieve a 93 percent occlusion rate in this series.[4] The success with radiofrequency ablation (RFA) is similar. Merchant, et. al. reported five-year follow up of RFA in 1,222 venous segments treated.[5] Of these segments, 117 had long-term data available for analysis. The reflux free and vein occlusion rates were 83.8 percent and 87.2 percent, respectively.[5]

In many patients, thermal ablation alone is all that is necessary for symptom relief. In some, adjunctive techniques are needed to completely relieve symptoms. These techniques include microphlebectomy and sclerotherapy. Microphlebectomy is an old technique, but new emphasis has been placed on cosmesis, utilizing incisions between 2 and 5 mm. Most patients can undergo this procedure under local anesthesia in the office. The local anesthetic provides adequate pain control during the procedure, and actually makes it easier to remove the veins, thereby decreasing postoperative discomfort as well. Sclerotherapy involves the injection of a sclerosing agent that will cause irreversible damage to the venous endothelium resulting in vasospasm, denudation of the endothelium, and eventually, fibrosis. This technique does not require anesthetic, nor does it involve significant recovery time.

In 2005, the Comprehensive Vein Clinic was established as a cooperative endeavor between Vascular Surgery and Interventional Radiology at The Medical College of Wisconsin with the goal of offering evidence-based treatment of all types of venous conditions. We offer thermal ablation, phlebectomy and sclerotherapy in a calm, professional environment, and have been successful in treating conditions ranging from the cosmetic treatment of spider veins to the treatment of chronic venous ulceration due to superficial venous insufficiency.

For more information on this topic, visit *mcw.edu/surgery* or *froedtert.com*, call the Comprehensive Vein Clinic at 414-805-VEIN (8346), or contact the author: *krbrown@mcw.edu*.

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MONSTERS OF THE RETROPERITONEUM RETROPERITONEAL SARCOMAS STRATEGIES

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COMPETENCY-BASED SURGICAL TRAINING AT THE MEDICAL COLLEGE OF WISCONSIN

William Halsted, MD, is credited with establishing formal graduate surgical education.

By **Jill S. Whitehouse, MD**
Resident, Department of Surgery

In 1904, William Halsted, MD, proclaimed, "We need a system, and we shall surely have it, which will produce not only surgeons, but also surgeons of the highest type."[1] More than 60 years later, following the addition of numerous surgical residency programs, Allen Oldfather Whipple, MD, stated, "A well-rounded education is essential for an able surgeon. Here, let me emphasize that surgery is a very great deal more than cutting and sewing."[2] Fifty years later, these sentiments echo loudly amidst contemporary changes to graduate medical education. The rapid development of sophisticated technology and minimally invasive procedures combined with the trend toward specialized fellowship training and restraints on resident work hours have created tremendous challenges in providing the robust, well-rounded educational system Drs. Halsted and Whipple envisioned. As a result, efforts to standardize surgical curriculum on a national level have escalated over the last decade. In 2004, The Medical College of Wisconsin instituted a Division of Surgical Education, which not only embraced these changes, but diligently set the standard for providing a protected block surgical curriculum for our residents.[3]

The national product is being guided by the Surgical Council on Resident Education (SCORE).[4] Prior to the formation of SCORE, a committed group of Medical College of Wisconsin surgeons, educational leaders and senior-level residents spent three years developing and rolling out an innovative curriculum, which debuted in 2005.[5] The similarities between our educational program and the proposed national curriculum are numerous. They both stress the six ACGME competencies (patient care, medical knowledge, professionalism, communication, practice-based learning and systems-based practice). They both acknowledge that surgical competency includes technical skills and therefore, incorporate skill labs, which allow residents to practice procedural techniques in a safe environment. A major difference in our curriculum is our on-campus locale and teachers who are educational faculty. Residents and faculty interact directly in a classroom atmosphere during time periods when the residents are protected from the distractions of clinical duties. SCORE curriculum encompasses 40 modules and utilizes internet-directed learning, which relies upon residents to achieve the expected educational milestones on their own time, at their own pace, from reading and viewing online text and videos.

Benefits of surgical education programs such as protected block curriculum or SCORE curriculum include improved acquisition and retention of knowledge and surgical skills, improved American Board of Surgery in-training exam (ABSITE) scores, improved communication and presentation skills, and providing a focused, standardized set of objectives for which every graduating resident is held accountable.[4,5] Our goal is to produce a surgeon who is competent in the core aspects of general surgery. We believe the Medical College of Wisconsin approach fulfills this goal and our block curriculum continues to be a strong recruitment tool for medical students interested in a general surgery residency.

I am proud to be a member of the pilot curriculum class and strongly feel the protected block PGY I-II curriculum combined with subsequent yearly skills labs and monthly PGY III-V system-based interactive sessions have greatly enhanced our educational experience. Nearly six years ago, I entered this program inspired by the incredible dedication to education our faculty displayed. I will leave next year knowing my peers and I received a solid framework of surgical education at The Medical College of Wisconsin. It is unlikely that Dr. Halsted could have predicted residents logging work hours on a smart phone while preparing for cases by watching an advanced laparoscopic surgical procedure on the internet or practicing on a computerized simulator. However, it is certain that he expected surgical educators to continue to be innovators and leaders, which is precisely the example The Medical College of Wisconsin Department of Surgery is setting.

For more information on this topic, contact the author: *jwhiteho@mcw.edu.*

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PAULA M. TERMUHLEN, MD, JOINS FACULTY

Paula M. Termuhlen, MD

The Medical College of Wisconsin Department of Surgery is excited to announce the successful recruitment of Paula M. Termuhlen, MD. Dr. Termuhlen will join us as director of the Surgery Residency Program and professor of Surgery in the Division of Surgical Oncology on June 1, 2011. She will assume leadership of the Residency Program from Alonzo Walker, MD, recently appointed interim senior associate dean for Faculty Affairs and Diversity. To have senior, experienced program directors such as Drs. Walker and Termuhlen lead the Residency Program is a true privilege for the Department of Surgery and The Medical College of Wisconsin.

For more information on this topic, visit *mcw.edu/surgery.*

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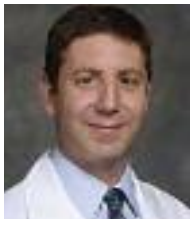
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Surgical house staff of the early Ellison era (1963) in front of Milwaukee County Hospital.

*History*Corner

CHALLENGE

By **Stuart D. Wilson, MD**
Professor, Department of Surgery, Division of Endocrine Surgery

In this newsletter's History Corner, we provide a little challenge: the first person to correctly identify the surgical house staff members pictured above (in left to right order) – or has the closest answer – will receive a $100 gift card. Pictured are surgical residents standing in front of the duck ponds near what is now the front door of the Froedtert & The Medical College of Wisconsin Clinical Cancer Center. Note the crisp, white, starched uniforms (nurses also wore white hats at that time). Some well known Milwaukee surgeons are in this picture: John Riesch, MD, Jack Foley, MD, John Just, MD, Dudley Johnson, MD, Loren Yount, MD, and William Schulte, MD. Also pictured: Robert Dawes, MD, William Evans, MD, John McAnlis, MD, George Cooper, MD, John Denby, MD, Joe Williams, MD, Cliff Starr, MD, Dave Trump, MD, Gene Snyder, MD, and Joe Gutierrez, MD. Absent from this picture is Stuart Wilson, MD, who was in the lab and Peter Parker, MD, who was off playing golf. One of these Ellison residents went on to become the Zollinger Professor and chair of the Department of Surgery, Ohio State University Medical School.

Please email your answers to Tracy Milkowski at *tmilkows@mcw.edu*. The winner and the names of residents in this picture will be announced in the next *Surgery Update*.

WISCONSIN SURGICAL SOCIETY UPDATES

The Wisconsin Surgical Society selected Dean E. Klinger, MD, as president elect effective November 2011. Dr. Klinger completed his surgical training at The Medical College of Wisconsin, including a rotation at the John Radcliffe Hospital, Oxford, England. He has been active in the Milwaukee Surgical Society and the Milwaukee Academy of Surgery, serving as president in 2000. Dr. Klinger joined The Medical College Department of Surgery in 2009.

Rebecca M. Rentea, MD

Rebecca M. Rentea, MD, a third-year resident in the laboratory of David M. Gourlay, MD, Department of Pediatric Surgery, Children's Research Institute, was honored with "Best Basic Science Presentation" at the Wisconsin Surgical Society's annual conference. She gave a presentation titled "Hypoxic Inhibition of Intestinal Alkaline Phosphatase Predisposes Neonates to Necrotizing Enterolitis" on Nov. 5 in Kohler, Wis.

MARCH COMMUNITY EDUCATION EVENT – COLORECTAL CANCER

The Medical College of Wisconsin Colorectal Cancer Program will host a community education event on Wednesday, March 23 at 4:00 p.m. in the Froedtert & The Medical College of Wisconsin Clinical Cancer Center. Experts in the field will make presentations to increase public understanding of the disease, including its prevalence, approaches to screening and prevention, treatment options and resources that offer updated colorectal cancer information. Clinicians will also be available to answer patients' questions.

Please visit *mcw.edu/surgery* for future details about this event and encourage your patients to attend.

March is designated as National Colorectal Cancer Awareness Month. The designation was made with the goal of raising awareness and highlighting the importance of research on prevention, early detection, and innovative therapies. Colorectal cancer is the second leading cause of cancer-related deaths in men and women in the United States. For 2010, deaths due to colorectal cancer were expected to reach 51,370. (CA: A Cancer Journal for Clinicians. Cancer Statistics, 2010).

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MARK YOUR CALENDARS

The 8th Biennial Breast Cancer Symposium

The 8th Biennial Medical College of Wisconsin Breast Cancer Symposium will be held on Friday, April 8, 2011 at the Crowne Plaza Hotel in Wauwatosa, Wis.

Fourth Annual Jonathan B. Towne Visiting Professor

The Towne Visiting Professor for 2011 has been named: Dennis Bandyk, MD, chief, Division of Vascular and Endovascular Surgery. Dr. Bandyk is a professor of Surgery at the University of South Florida. He will be on campus May 10 and 11.

The 3rd Annual Endocrine Surgery Update Symposium

The Third Annual Medical College of Wisconsin and The University of Texas M. D. Anderson Cancer Center Endocrine Surgery Update Symposium will be held on Friday, May 13 and Saturday, May 14, 2011 at The Medical College of Wisconsin.

Vascular Access Symposium

The Vascular Access Symposium will be held on Friday, May 20, 2011 at the Froedtert & The Medical College of Wisconsin Clinical Cancer Center.

The 51st Annual Carl B. Eberbach, MD, Lectureship Welcomes Visiting Professor Kurt Newman, MD

The 51st Eberbach lectureship will be held on June 17, 2011. The lectureship welcomes Kurt D. Newman, MD, senior vice president and surgeon-in-chief, Children's National Medical Center, Joseph E. Roberts, Jr., Center for Surgical Care. Dr. Newman is a professor of Surgery and Pediatrics at The George Washington University Medical Center.

For further details regarding these events, please visit our website at *mcw.edu/surgery* or contact Tracy Milkowski at *tmilkows@mcw.edu* or 414-805-5602.

To refer a patient or request a transfer/consultation, please use these numbers:

Froedtert & The Medical College of Wisconsin
Referrals: **800-272-3666**
Transfers/Consultations:
877-804-4700
mcw.edu/surgery

Clinical Cancer Center
Referrals: **866-680-0505**
Transfers/Consultations:
877-804-4700

Children's Hospital of Wisconsin
Referrals/Transfers/
Consultations: **800-266-0366**
Acute Care Surgery:
414-266-7858