

# Surgery Update

NEWS FROM THE MEDICAL COLLEGE OF WISCONSIN DEPARTMENT OF SURGERY

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## Message from the Chairman

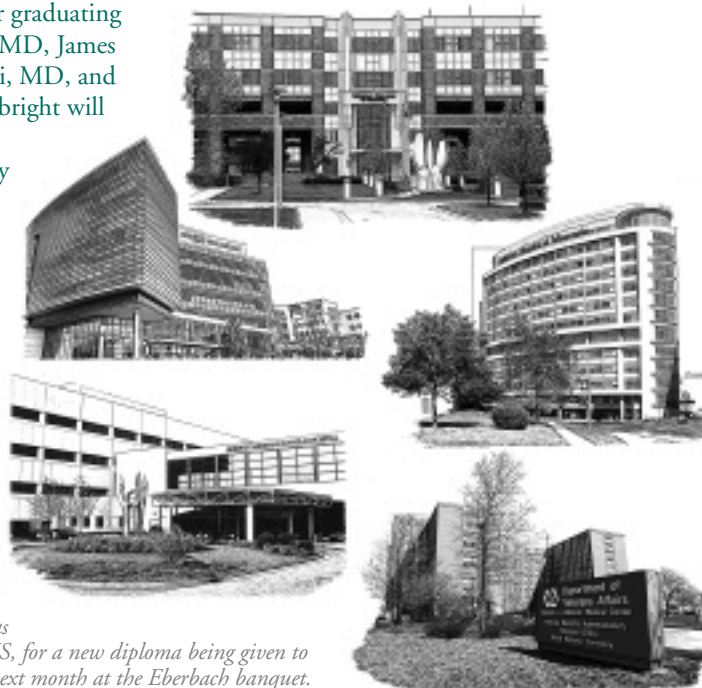
*This issue of Surgery Update marks one year of scientific content from faculty across departments.*

by Douglas B. Evans, MD

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

The scientific content of Surgery Update continues to expand and the current issue represents the largest body of articles to date. *Surgery Update* has become a Froedtert & The Medical College of Wisconsin publication with contributions by faculty from all departments. Of special note in this issue is the author of the first article: T. Clark Gamblin, MD, MS, who joins us in July as division chief of Surgical Oncology and the inaugural holder of the Stuart D. Wilson Chair in Surgery. Dr. Gamblin is an internationally known hepatobiliary surgeon. On page 9, we announce the creation of the Alonzo P. Walker, MD, Chair in Surgery and have opened this recruitment under the direction of James Wallace, MD, PhD. The Condon Hernia Institute will take shape over the next few months and represents a fitting tribute to Robert Condon, MD.

It is with great pride and admiration that we say goodbye to our graduating residents: Emily Albright, MD, James Kiely, MD, Jonathan Parisi, MD, and Aaron Perme, MD. Dr. Albright will start a minimally invasive fellowship at the University of Kentucky; Dr. Kiely will begin his colorectal surgery fellowship at the Cleveland Clinic; Dr. Parisi will join the Luther Midelfort private practice in Eau Claire and Dr. Perme will join Harrisonburg Surgical Associates in Virginia.



*The illustration on the right was created by Mary Bryson, MAMS, for a new diploma being given to our graduating chief residents next month at the Eberbach banquet.*

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# LAPAROSCOPIC MANAGEMENT OF COLORECTAL HEPATIC METASTASIS

*Since the first laparoscopic liver resection, reported in 1992, close to 3,000 cases of laparoscopic liver resections have been reported in literature.<sup>1</sup>*

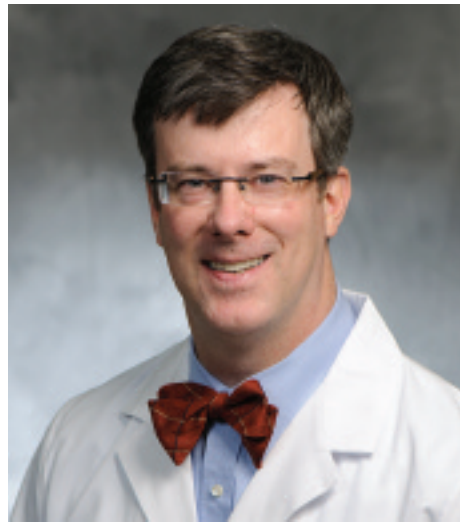
By **T. Clark Gamblin, MD, MS**

*Chief, Surgical Oncology Division, Associate Professor of Surgery and Stuart D. Wilson Chair in Surgery*

Initial experience began with small benign tumors managed with non-anatomical wedge resections. More recently, advancing technology and increasing experience has allowed malignant lesions located in challenging locations to be addressed with minimally invasive surgery. Published experience regarding laparoscopic surgery remains limited to a few series consisting of greater than 100 patients.<sup>2,3</sup> Our working group recently reported laparoscopic management of hepatic colorectal metastasis from five medical centers in the United States and/or Europe.<sup>4</sup>

Laparoscopic advantages compared to open surgery include reduced post-operative pain, less operative morbidity, shorter hospital stay and a shortened recovery period. The first published report of a laparoscopic liver resection for cancer was by Wayand et al.,<sup>5</sup> in a 63-year-old patient with colorectal metastasis to segment VI. Soon thereafter, additional reports on laparoscopic anatomical liver resection and laparoscopic liver resection for hepatocellular carcinoma and metastatic colorectal cancer were published.<sup>6,7</sup> The first laparoscopic anatomic liver resection was reported by Azagra et al., in 1996 for a left lateral sectionectomy for a hepatic adenoma,<sup>8</sup> and the first laparoscopic anatomic lobectomies were described by Hüscher et al., in 1997, who performed six left hepatectomies and five right hepatectomies.<sup>9</sup> Although many centers have published small series, no international report on laparoscopic management of metastatic colorectal cancer was previously published. A recent review summarized the outcomes of laparoscopic liver resection for cancer, but this included HCC patients and did not focus on CRC metastasis.<sup>10</sup> We compiled a series of centers in Europe and North America in an effort to describe the feasibility, safety and short-term outcomes of this evolving approach in colorectal metastasis management.

Randomized clinical trials evaluating laparoscopic liver surgery are the optimal approach to adopting this technology. However, this method may present challenges as acceptance of the minimally invasive



*T. Clark Gamblin, MD, MS*

approach becomes widespread: patients may refuse to consider a more invasive open procedure if a laparoscopic resection is feasible. It is imperative that reports of multi-institutional experience be published, as these provide valuable insight into this emerging approach. Selection biases clearly exist as cases are carefully evaluated for a possible laparoscopic approach.

The experience of 109 patients from the five medical centers were reported, including three centers in the United States (University of Louisville, University of Pittsburgh Medical Center and Methodist Dallas Medical Center) and two in Europe (Antoine Bécclère Hospital and Henri Mondor Hospital). The median age for all the patients was 63 years (range 32 – 88 years) with 51 percent female. The site of the primary colorectal cancer was rectosigmoid (50.5 percent), right colon (24.8 percent), left colon (12.8 percent), transverse colon/splenic flexure (2.8 percent) and unknown (9.2 percent). The majority of patients received pre-operative chemotherapy prior to liver resection (67.9 percent).

The majority of cases were performed totally laparoscopically (56 percent) and the remainder were performed with a hand-port (hand-assisted laparoscopic liver surgery). A hand-port was used more frequently in United States medical centers (85 percent) versus European medical centers (13 percent) ( $p=0.001$ ). Hand-assisted and totally laparoscopic approaches fall under the realm of minimally invasive liver surgery, because the more morbid subcostal or chevron incision is not required.

*Dr. Gamblin joins the Medical College of Wisconsin July 1 as chief of the Surgical Oncology Division, associate professor of Surgery and Stuart D. Wilson Chair in Surgery. He is currently on faculty at the University of Pittsburgh School of Medicine's Department of Surgery in the divisions of Surgical Oncology and Transplantation, where he is also director of the Neuroendocrine Cancer Treatment Center.*

Four cases (3.7 percent) in the series were converted to open. All reported reasons for conversion to open were due to bleeding: from a hepatic vein injury, from the middle hepatic vein, from the right portal vein and during parenchymal transection. Major resections (>3 segments) were performed in 45 percent of patients. Median blood loss was 200ml (range, 20 – 2500ml); 10 percent of patients received blood transfusions. Median OR time was 234 minutes (range, 60 – 555 minutes). Operative times at different locations were heterogeneous; however, there was no significant difference in operative times between the hand-assisted versus totally laparoscopic approaches (222 min vs. 235 min,  $p=0.131$ ). Complications occurred in 13 of 109 patients (12 percent; median Clavien classification grade 2; range, 1 – 3). There was no significant difference in the complication rate among the five sites ( $p=0.42$ ).

Median length of stay was four days (range, 1 – 22 days). The median length of stay was significantly longer in patients who were converted to open (six days), followed by patients who underwent the totally laparoscopic approach (five days). There was a significant difference in median length of stay after liver resection from medical centers in the United States (three days) versus those in Europe (six days) ( $p=0.001$ ).

Oncologic parameters including margins and survival were analyzed. Median tumor size was 36mm (range, 4 – 152mm). Negative margins were achieved in 94.5 percent of patients with median depth 10mm (0.5 – 60mm). After a median follow up of 20 months (range 0.1 – 90.8 months),

*continued on page 3*

73.4 percent of patients were still alive and 68.8 percent were free of recurrence. Actuarial overall survivals at one year, three years and five years were 88 percent, 69 percent and 50 percent respectively.

Overall, this multi-institutional series supports the premise that laparoscopic liver resection for colorectal metastasis is safe, feasible and oncologically comparable to open liver resection for minor and major liver resections in selected patients when performed by an experienced liver team. The laparoscopic approach in the multidisciplinary management of liver cancer is a focused mission of The Medical College of Wisconsin Division of Surgical Oncology. The division provides minimally invasive liver surgery to patients with metastatic colorectal cancer and other types of liver cancer and has seen advantages and results similar to those in recently published reports. If you would like further information, please contact The Medical College of Wisconsin Division of Surgical Oncology at 414-805-5495.

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**Operative and post-operative characteristics of patients undergoing laparoscopic liver resection for colorectal carcinoma metastasis ( n = 109 )**

|                                     |                              |
|-------------------------------------|------------------------------|
| <b>Operative approach</b>           |                              |
| Pure laparoscopic                   | 61 (56 percent)              |
| Hand-assisted laparoscopic          | 44 (40.4 percent)            |
| Converted to open                   | 4 (3.7 percent)              |
| <b>Type of resection</b>            |                              |
| Segmentectomy or wedge resection    | 37 (33.9 percent)            |
| Left lateral sectionectomy          | 29 (26.6 percent)            |
| Right lobectomy                     | 31 (28.4 percent)            |
| Left lobectomy                      | 10 (9.2 percent)             |
| Extended right hepatectomy          | 1 (.9 percent)               |
| Caudate lobectomy                   | 1 (.9 percent)               |
| <b>Tumor size (median)</b>          | 30mm (range, 4 – 152mm)      |
| <b>Margin (Percentage negative)</b> | 94.4 percent                 |
| Caudate lobectomy                   | 10 mm (range, 0.5 – 60)      |
| <b>OR time (median)</b>             | 234 min (range, 60 – 555min) |
| <b>Blood loss (median)</b>          | 200 ml (range, 20 – 2500ml)  |
| <b>Blood transfusion rate</b>       | 11 (10.1 percent)            |
| <b>Length of stay (median)</b>      | 4 days (range, 1 – 22 days)  |

**MESSAGE FROM DIRECTOR OF DEVELOPMENT MEG BILICKI**



Meg Bilicki

I am delighted to introduce myself as the director of Development for the Department of Surgery. I joined The Medical College of Wisconsin 16 years ago, and served for the last seven years as director of Development for the Digestive Disease Center.

As director of Development, my goals for the Department of Surgery are to help alumni and friends understand how their philanthropy can make a difference and advance our intertwined mission of education, discovery, patient care and community engagement through charitable giving. Our comprehensive giving program also provides a wide variety of opportunities to become meaningfully involved.

Philanthropy is an investment in the health of our communities, and the dividends it pays are priceless. Private financial support can accelerate our research goals and open doors of opportunity. Gifts of all sizes are important, as we work to treat injuries, cure disease and educate future surgeons.

To learn more about how you can support leading initiatives in the Department of Surgery and related programs, contact me at 414-805-5731 or [mbilicki@mcw.edu](mailto:mbilicki@mcw.edu). To view recent highlights of the Department of Surgery’s leadership in patient care, research and education, visit our website at [mcw.edu/surgery](http://mcw.edu/surgery).

# THORACIC EPIDURAL ANALGESIA

*Beyond superior pain control, local anesthetics in epidurals have been shown to inhibit diaphragmatic dysfunction, whereas sole narcotic epidural or intravenous infusions do not.*

By **Jeremy A. Scarlett, MD**

*Assistant Professor of Anesthesiology*

**Sylvia Y. Dolinski, MD, FCCP**

*Associate Professor of Anesthesiology*

*“Pain is inevitable. Suffering is optional.”*

ANONYMOUS

**E**pidural catheters are used for complete anesthesia, as an analgesic adjuvant to general anesthesia, or for post-operative analgesia in procedures involving the thorax, abdomen, pelvis, perineum and lower limbs.<sup>1</sup> Thoracic and upper abdominal surgeries lead to diaphragmatic dysfunction. Beyond superior pain control, local anesthetics in epidurals have been shown to inhibit diaphragmatic dysfunction, whereas sole narcotic epidural or intravenous infusions do not. A local anesthetic combination with an opioid allows for reductions in both solutions, avoids tachyphylaxis to the local anesthetic and optimizes post-operative pulmonary functional residual capacity. Improved diaphragmatic function minimizes splinting and atelectasis, and enables an adequate cough to mobilize secretions.<sup>2</sup> Additionally, patients are able to ambulate earlier, which reduces the risk of DVTs, allows better chest physiotherapy, prevents chest infections and allows for a faster return of gastric motility.<sup>2,3</sup>

Several meta-analyses of randomized, controlled trials that evaluated post-operative analgesic therapies on pulmonary outcome have concluded that pulmonary morbidity is reduced particularly after thoracic surgery.<sup>2,4</sup> Thoracic Epidural Analgesia (TEA) in mixed abdominal surgeries provides superior analgesia with faster recovery from postoperative ileus by 24 to 48 hours compared with systemic opioid analgesia.<sup>5</sup>

It is common practice to keep urinary catheters in place in patients with TEA, but there are no randomized clinical studies to rationally guide the duration of urinary catheterization. Only two small studies showed 9 percent to 11 percent of patients had post-operative urinary retention requiring one to two in-out catheterizations after the urinary catheter was removed while still receiving TEA. This re-catheterization is

still below the 26 percent reported in the literature.<sup>6</sup> Patients who are low risk for post-operative urinary retention can have the catheter removed within 48 hours and should be followed up with a bladder scan to analyze cause of non-voidance.

Risk factors for post-operative hypotension include pre-operative hypotension or SBP < 100 mm Hg or pre-operative orthostatic hypotension. Hypotension is seen in about 6 percent of patients with TEA. Plasma volume does not change despite a decrease in blood pressure. Plasma volume will increase with fluid administration and remain unchanged with vasopressor administration, while both treatments will increase blood pressure.<sup>8</sup> Since vasopressors and fluids have similar hemodynamic effects, treatment of hypotension should not reflexively result in fluid administration or turning off the epidural. Careful consideration of low dose vasopressor (phenylephrine < 30 mcg/min) in the patient with low diastolic blood pressures and adequate volume loading can improve hypotension, restore coronary perfusion and avoid fluid overload, particularly in hypoalbuminemic patients (albumin < 2.3 mg/dl). High volume peri-operative fluid therapy is known to cause systemic deleterious effects such as pulmonary edema, difficulty weaning from the ventilator, recovery of gastrointestinal motility, wound healing and coagulation.<sup>9</sup>

Addressing vasodilation and intervascular volume is paramount while ensuring there is no clinical suspicion for post-operative bleeding, sepsis or cardiogenic shock.<sup>8,10</sup> However, it defeats the purpose of the epidural when the only response is to turn off the epidural “because it was bad for the patient’s blood pressure” and take no corrective measures to increase intravascular volume or decrease vasodilatation. We recommend not starting pre-operative anti-hypertensives unless the blood pressure continues to be higher than pre-operative measurements.

Despite its benefits, contraindications exist to TEA. Absolute contraindications include patient refusal, superficial infection at the skin entry site, raised intracranial pressure, coagulopathy or therapeutic anticoagulation or hypovolemia.<sup>1</sup> National guidelines exist within the anesthesia literature to assist with decisions regarding risk with coagulopathy or therapeutic anti-

coagulation.<sup>7</sup> Twice daily administration of subcutaneous unfractionated heparin raises concern to the anesthesiologist considering placement of an epidural. Since at this time no difference in outcome is seen between twice daily dosing of UFH with concomitant use of compression devices and thrice daily subcutaneous UFH therapy, it is recommended that epidural patients not receive thrice daily heparin.<sup>7</sup>

Post-operative pain is one of the greatest concerns patients have prior to undergoing a major operation. Epidural analgesia is superior to intravenous narcotics for addressing this concern.<sup>6</sup> Optimal outcome with this modality requires excellent communication between different clinicians caring for the patient during the peri-operative and post-operative period. At Froedtert & The Medical College of Wisconsin, we have placed more than 300 epidurals for post-operative pain control during the past year. We have made great strides at our institution toward offering this therapy and look to improving upon and expanding its use in the future.

Dr. Scarlett can be reached at [jscarlett@mcw.edu](mailto:jscarlett@mcw.edu) and Dr. Dolinski can be reached at [sdolinsk@mcw.edu](mailto:sdolinsk@mcw.edu).

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# NEUROLYTIC CELIAC PLEXUS BLOCK FOR MANAGEMENT OF PAIN FROM UPPER ABDOMINAL MALIGNANCY

*Pancreatic cancer is associated with high mortality and occasionally, severe pain. Other malignancies that produce severe upper abdominal visceral pain include gastric and esophageal carcinomas and primary malignancies of the liver and gallbladder.*

By **Stephen E. Abram, MD**, Professor of Anesthesiology; **Jeremy A. Scarlett, MD**, Assistant Professor of Anesthesiology; **Donald Greco, MD**, Resident in Anesthesiology

**P**ancreatic cancer is associated with high mortality and occasionally, severe pain. Other malignancies that produce severe upper abdominal visceral pain include gastric and esophageal carcinomas and primary malignancies of the liver and gallbladder. While opioids are the mainstay of pain management for these conditions, many patients develop extreme tolerance and opioid-induced hyperalgesia, as well as significant opioid side effects such as nausea, constipation and cognitive dysfunction. Furthermore, opioids and uncontrolled pain may contribute to reduced immune function.

The sensory innervation of the abdominal viscera can be interrupted without affecting nerve function to the body wall, bladder or lower extremities. Many of the visceral afferent fibers that supply the upper abdomen are concentrated in the celiac plexus, a structure that lies on either side of the celiac artery. These sensory fibers then pass through the splanchnic nerves, which lie along the lateral aspect of the lower thoracic vertebrae. Injection of 6 percent phenol or 50 percent to 100 percent alcohol around the celiac ganglia or the splanchnic nerves blocks a significant amount of pain from the abdomen. Given the high concentration of sympathetic fibers in these nerve structures,

increased gastrointestinal motility and reduced blood pressure are relatively common, though generally transient side effects. Fortunately, pain relief can last up to six months.

Our department uses the classical approach to the splanchnic nerves, which involves advancing needles under fluoroscopic guidance from bilateral L-1 paravertebral sites to the anterolateral aspect of the T-12 vertebrae. After documenting appropriate spread of contrast, we inject 15 to 20 ml alcohol or phenol. The approach to the celiac plexus involves advancing the needles 2-2 ½ cm anterior to the upper third of the L-1 body. Fifteen to 20 ml phenol or alcohol is injected at each site. If there is extensive tumor infiltration around the plexus, the splanchnic approach is more likely to be successful. Celiac plexus blocks have also been placed under CT guidance, endoscopic ultrasound or under direct vision at the time of laparotomy with varying degrees of success at other institutions.

A review of the last 15 patients treated with neurolytic celiac plexus/splanchnic blocks by our pain service demonstrated no serious complications and good to excellent initial relief in 11 patients, 10 of whom were able to significantly reduce or discontinue opioids. Nine of 11 patients with pancreatic cancer and two of four patients with other primary malignancies responded well. Two patients whose pain recurred after four months experienced relief from a second block. Celiac plexus block is one of many techniques used by physicians who comprise

the multidisciplinary Liver, Pancreas and Bile Duct Cancer Program. Management of disease-related symptoms is integrated into a comprehensive program which also emphasizes clinical trials, innovative therapies and emerging surgical techniques – all in an effort to effectively combat this disease and maximize the length and quality of life of our patients.

For more information, Dr. Abram can be reached at [sabram@mcw.edu](mailto:sabram@mcw.edu) and Dr. Scarlett can be reached at [jscarlett@mcw.edu](mailto:jscarlett@mcw.edu).

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## THORACIC EPIDURAL ANALGESIA *continued from page 2*

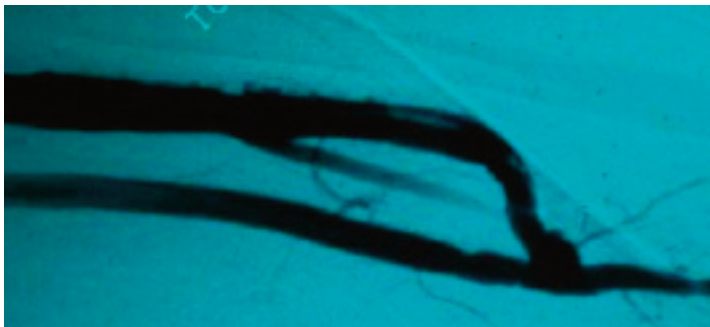
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# VASCULAR ACCESS FOR HEMODIALYSIS: A GROWING CHALLENGE

*The goal of vascular access is to provide successful, uninterrupted dialysis for the longest period of time.*

By **Allan M. Roza, MD**  
*Professor of Surgery*

A 26-year-old male with end stage renal disease (ESRD) from reflux nephropathy underwent a live donor transplant at age three. At age 23, he returned to hemodialysis because of chronic rejection. His dialysis access options are limited for a number of reasons. His body mass index is 48.3. Attempts at upper extremity fistulae and grafts failed. Catheter-based dialysis repeatedly failed due to infection and was ultimately precluded by SVC occlusion. A translumbar catheter has been replaced repeatedly due to infection. He now has a significant stenosis of his infrahepatic IVC. He is a poor candidate for a groin loop due to his obesity and central venous stenosis. In addition, he is highly sensitized to human leukocyte antigens; therefore, the likelihood of his receiving a kidney transplant is low.



The goal of vascular access is to provide successful uninterrupted dialysis for the longest period of time. In some cases, this can be a lifelong challenge. This case illustrates many of the issues faced by surgeons who provide dialysis access services. These challenges include significant co-morbidities such as obesity, recurrent access failure and in the most extreme cases, limited options.

Data from the United States Renal Data System (USRDS) reveal a number of trends, one of which is ESRD. The ESRD population is growing. In 2000, more than 382,000 patients were on dialysis in this country. By 2006, this had expanded to more than 506,000 patients and projections suggest that by 2020, there will be more than 785,000 patients receiving dialysis therapy. The ESRD patient population is now older. The median age of new patients beginning ESRD therapy is now 64.4.

Patients ages 65 to 74 and 75 years and older account for the greatest growth. More than 50 percent of patients with ESRD are diabetic. Patients with chronic kidney disease have accelerated atherosclerosis affecting the upper extremities, as well as the legs.

Many patients needing dialysis are also candidates for renal transplantation. Unless they receive a live donor kidney, waiting times for a deceased donor now range from three to six years in most cases. The challenge here is providing these patients with the best possible dialysis while they await receipt of an allograft. A key consideration is maximizing all possible dialysis options. Following transplantation, patients are living longer, and many will return to dialysis. Here too, a logical approach must be employed to maximize dialysis options.

In patients with ESRD, hospital admission for access failure is second only to cardiovascular disease. Access failure is costly in dollars and in resultant morbidity.

The need for emergent dialysis strains the operating room and interventional radiology schedules with patients often requiring central venous catheters for emergent dialysis and frequently missing dialysis treatments.

Transplant surgeons at Froedtert & The Medical College of Wisconsin are seeing increasing numbers of patients in need of vascular access. In response to these issues, we have created a vascular access team with the goal of facilitating vascular access care for patients and their caregivers.

We have identified key personnel to assume responsibility for vascular access management with the following goals:

- *Decrease hospitalization*
- *Decrease missed outpatient dialysis treatments*
- *Improve clinical outcomes*
- *Decrease costs of access-related complications*
- *Transition from inpatient to outpatient service*

- *Major efforts to increase AV fistula in preference to grafts*
- *Aggressive screening for access stenosis and appropriate intervention*

These personnel include:

- *Experienced access surgeons*
- *Full-time access coordinator (registered nurse) to schedule and track all procedures*
- *Interventional radiologists*

Interventional Radiology (IR) plays a key role in the pre-operative assessment of these complex patients, many of whom have underlying central venous stenosis or thrombosis resulting from previous catheter-based dialysis (Permcath™ or Mahurkar Catheter™) or arterial disease. For a thrombosed AV graft, percutaneous restoration of a flow has supplanted surgical thrombectomy as the preferred approach. Together with our IR and nephrology colleagues, vascular access surgeons meet for a monthly multidisciplinary review of problematic patients and to promote continuous quality improvement.

Upwards of 25 percent of patients undergoing hemodialysis will die annually. It is unknown how many of these deaths are due to failure to achieve and or maintain vascular access. Current estimates indicate 1 percent to 2 percent of deaths result from access failure. The case of the 26-year-old presented earlier clearly falls into this risk group. He is presently being dialysed through a translumbar Permcath™. His transplant candidacy is in doubt as he struggles with calciphylaxis, another life threatening complication of ESRD.

Referrals to the Froedtert & The Medical College of Wisconsin Vascular Access Team can be made by calling 414-805-9055. For further information, Dr. Roza can be reached at [arozam@mcw.edu](mailto:arozam@mcw.edu).

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# REPAIR OF PECTUS EXCAVATUM IN THE PEDIATRIC POPULATION

*Pectus excavatum is the most frequent congenital deformity of the anterior chest wall, affecting .08 percent to .14 percent of the population.*

By **John C. Densmore, MD**  
*Assistant Professor of Pediatric Surgery*

**D**ue to asymmetric cartilaginous growth, this condition results in a concavity of the precordium with a resultant restrictive pulmonary defect and decreased aerobic capacity when compared to age matched controls. Whether surgery can reverse these defects remains controversial; however, many patients perceive improvement post-operatively. Correction has been correlated with improvement of body image.

As demand for minimally invasive approaches has increased, repair of pectus excavatum has shifted away from the Ravitch repair. Recent innovations have included the use of substernal magnets, vacuum lifters and the Nuss procedure. The Nuss procedure is the most common minimally invasive repair of pectus excavatum and corrects the point of maximal concavity using a thoracoscopically placed transthoracic convex substernal bar. While patients undergoing the Nuss procedure enjoy a smaller scar, significant post-operative pain results from an instantaneous substernal correction.

Successful management of post-Nuss procedure pain is a priority. Pain management strategies have included systemic opioids via patient-controlled analgesia (PCA), non-steroidal anti-inflammatory

medications, hypnosis and regional anesthesia (opioid, local anesthetic and alpha-blockade). The optimal strategy has not yet been determined. Two small prospective randomized trials have been completed in children examining the efficacy of morphine or fentanyl PCA versus fentanyl/ local anesthetic epidural analgesia.

As adult thoracotomy pain studies have shown equivalent pain control with fentanyl treatment independent of administration site, the use of fentanyl as an epidural agent masks potential efficacy of a regional anesthetic approach.

The Nuss procedure has been performed at Children's Hospital of Wisconsin since 1999, and our experience now totals 118 patients. The mean surgical age was 12.9 years (SD = 4.8), and 75 percent of patients were male. Pre-operative pulmonary function tests were completed in 28 patients (24 percent) and were essentially normal. The average Haller index was 4.0 (SD = 1.5, n = 65). Three patients had previous chest surgery and four had connective tissue disorders. Most patients required a single bar (93 percent) and bilateral stabilizer placement (70 percent). Operating time was 118 (SD = 51) minutes with less than 10 mL blood loss in 93 percent of cases and hospital stay was 5.8 ( $\pm$  1.3) days. Bar removal was completed 2.19 years after placement (SD = 0.61, n + 114) and as a day surgery procedure in 85 percent of patients.

Early complications related to Lorenz bar placement were reported in nine patients (7 percent) and late complications in 29 patients (25 percent). Hospitalization was required in 21 patients (18 percent) and 19 (16 percent) required unplanned reoperation. The most common early complications were pneumothorax, requiring post-procedure tube thoracostomy (4) and diaphragm laceration (2). The most common late complications were stabilizer dislodgement/fracture (8), flipped Lorenz bar (6), and nonhealing/infected incisions (5). One case of recurrence was treated successfully via repeated Nuss procedure.

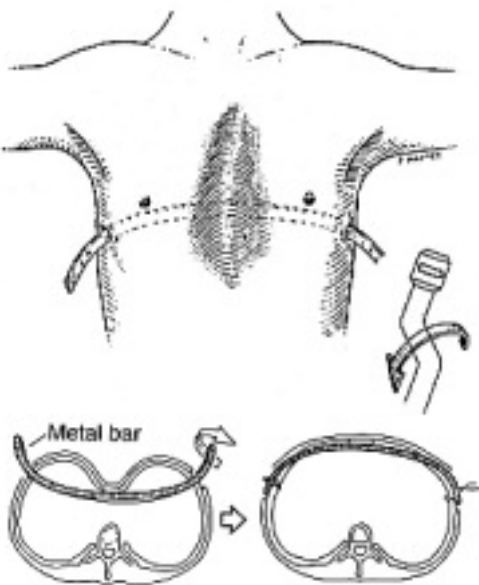
One hundred eight cases (91.5 percent) were completed using epidural analgesia and 10 (8.5 percent) using PCA. Six of the 10

PCA patients had contraindication to an epidural approach or decided against it. The remaining four patients comprised the epidural failure rate of 3.6 percent. Among cases completed with epidural analgesia, 80 percent were thoracic epidurals, which were constantly monitored and adjusted to maximize comfort. A mean of 1.8 (SD = 1.7, Mdn 1) adjustments were made per patient and included medication changes, rate changes and epidural boluses. Epidural catheter lifetime was 92.0 hours (SD = 22.0, n = 105) and 69 percent of epidural patients received intravenous ketorolac. Pain scores (0-10) were averaged within 12-hour time blocks. The highest pain scores occurred in the first post-operative shift. Scores decreased by 60 hours post-operatively (P = 0.06). Initial mean pain scores suggest most patients were not in significant pain upon awakening from surgery. Pain scores did not differ as a function of type of opioid used or location of epidural catheter (Ps > 0.05).

The Children's Hospital of Wisconsin experience shows no major variation from other large series with regard to patient cohort or surgical outcomes. Although the Nuss procedure is minimally invasive, the complication rate is high (7 percent early and 25 percent late in our series) and includes potential for high morbidity and even occasional mortality. The Children's Hospital of Wisconsin pain management experience for the Nuss procedure differs from others published. The use of a dedicated pain service with expertise in epidural analgesia resulted in 63 percent of patients experiencing excellent pain control (pain scores maintained below 4.0) with an epidural failure rate of only 3.6 percent. This compares extremely favorably with another large series that reported a tenfold higher failure rate for epidural analgesia. The use of the Nuss procedure provides a highly desired result, but with significant complication rates. The ideal approach would deliver this result with lower risk. Therefore, we are considering novel alternative approaches.

For more information, contact Dr. Densmore at [jdensmore@chw.org](mailto:jdensmore@chw.org).

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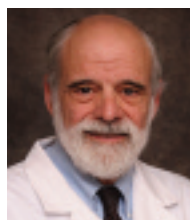
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## CONTRIBUTORS *Many thanks to the physicians and staff who contributed to this issue of Surgery Update.*



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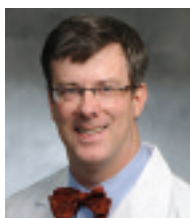
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## NEW CENTER OF EXCELLENCE: ROBERT E. CONDON, MD, HERNIA INSTITUTE

By **Matt Goldblatt, MD**, *Assistant Professor of Surgery* and **John LoGiudice, MD**, *Assistant Professor of Plastic Surgery (joint appointment in the Department of Surgery)*

The Department of Surgery is proud to announce the creation of the Robert E. Condon, MD, Hernia Institute. The mission of the institute will be threefold. Primarily, it will be a center of excellence for all abdominal wall hernias, ranging from inguinal hernias to those that may require complex abdominal wall reconstruction. The institute will facilitate convenient and easy referrals of patients from primary care providers, as well as from general and plastic surgeons throughout Wisconsin and northern Illinois. A second mission of the institute will be to advance the science of hernia repairs through basic, translational and clinical research. Finally, the institute will be involved in educating surgical residents and the medical community through interactive conferences, seminars and live laboratory demonstrations.

The Condon Hernia Institute will focus on a broad range of abdominal wall defects. We will use the latest techniques to treat inguinal hernias, including totally extraperitoneal (TEP) or transabdominal pre-peritoneal (TAPP) laparoscopic repairs for primary, bilateral and recurrent inguinal hernias. Ventral and incisional hernias will be treated with traditional and minimally invasive methods, including laparoscopic component separation and biologics. Complex abdominal wall reconstruction including surgical flaps is offered by our plastic surgeons in a multidisciplinary approach to the complex hernia. The best operation for each patient will be based on the latest evidence-based data.

The Robert E. Condon, MD, Hernia Institute is named after the former chair of the Department of Surgery at The Medical College of Wisconsin. Dr. Condon completed a residency in general surgery at the University of Washington after graduating from the University of Rochester School of Medicine and Dentistry. Dr. Condon came to the Medical College of Wisconsin in 1972 from the University of Iowa College of Medicine in Iowa City. He became chair of the Department of Surgery in 1979 and held this position until 1997.

Dr. Condon has published countless articles and book chapters on hernia repair; the name “Condon” is synonymous with hernia repair. Most notably, he was co-editor (with another champion of hernia repair, Lloyd M. Nyhus, MD) of the textbook titled *Hernia*. This text has been the definitive reference for hernia repair for more than 30 years. Dr. Condon’s illustrious career at The Medical College of Wisconsin made him one of the premier voices in the world of hernia repair.

We are proud that Dr. Condon’s name will launch the creation of this new center of excellence at Froedtert & The Medical College of Wisconsin. For more information regarding the center of excellence, please contact Dr. Goldblatt at [mgoldbla@mcw.edu](mailto:mgoldbla@mcw.edu).



*Robert E. Condon, MD*

## CREATION OF ALONZO P. WALKER, MD, CHAIR IN SURGERY

It is with great pleasure that the Department of Surgery at The Medical College of Wisconsin announces the creation of the Alonzo P. Walker, MD, Chair in Surgery. A search committee was formed under the direction of James Wallace, MD, PhD, to begin the search for the inaugural holder of the Walker Chair.

Dr. Walker has been an active member of the Department of Surgery at The Medical College of Wisconsin since he joined the faculty in 1983. At present, he holds the Ruth Teske Chair in Surgical Oncology, is director of the General Surgery Residency Program, director of the Breast Care Center at the Froedtert & The Medical College of Wisconsin

Clinical Cancer Center, interim senior associate dean for Faculty Affairs and Diversity and division chief of General Surgery.

The successful candidate chosen for the Walker Chair will assume the position of division chief of General Surgery, allowing Dr. Walker to dedicate more of his time to resident education and research, his new appointment as a senior associate dean, and treatment of breast cancer for which he is nationally known.

The creation of the endowed chair is the highest honor in the Department of Surgery. To learn more regarding the Alonzo P. Walker, MD, Chair in Surgery, please contact Dr. Wallace at [jwallace@mcw.edu](mailto:jwallace@mcw.edu).



*Alonzo P. Walker, MD*

# TARGETED THERAPIES FOR MEDULLARY THYROID CANCER

*Medullary thyroid cancer (MTC) is a malignancy of the calcitonin producing parafollicular C-cell and makes up 5 percent of all thyroid cancers.*

By **Gilbert Fareau, MD**  
*Assistant Professor of Medicine*

**T**hyroid cancer is an uncommon neoplasm that makes up 2 percent of all malignancies in the United States. In 2009, an estimated 37,200 Americans were newly diagnosed with thyroid cancer, and up to 1,630 died from complications of the disease.<sup>1</sup> Medullary thyroid cancer (MTC) is a malignancy of the calcitonin producing parafollicular C-cell and makes up 5 percent of all thyroid cancers. Approximately 75 percent of MTC occurs sporadically due to somatic mutation of the thyroid, while the remaining 25 percent is due to a germline mutation that leads to inherited disorders, such as multiple endocrine neoplasia (MEN) 2A, MEN-2B, and familial medullary thyroid cancer.<sup>2</sup> The biology of MTC is intimately associated with the RET proto-oncogene, which encodes for a transmembrane tyrosine kinase responsible for normal neuroendocrine cell growth and maintenance. Activating RET mutations promote mitogenesis and neoplastic transformation of the thyroid, and are identified in more than 95 percent of familial and up to 35 percent of sporadic

MTC.<sup>3</sup> The genotype-phenotype correlation is sufficiently strong that RET testing is now standard of care for newly diagnosed MTC, and initial operative management of the neck is frequently determined based on the presence or absence of a RET mutation, and the specific mutation found.<sup>4</sup>

At presentation, half of patients will have cervical lymphadenopathy, and 7 percent to 23 percent will have metastatic spread to the liver, lungs, or bone.<sup>5</sup> Disease limited to the thyroid is associated with a 96 percent 10 year survival rate, but survival drops to 40 percent in the presence of distant metastasis.<sup>6</sup> For the patient with progressive metastatic disease, treatment options have historically been limited: conventional cytotoxic chemotherapy is typically disappointing, with fewer than 25 percent of patients demonstrating temporary partial response, and little to no benefit seen in survival rates.<sup>7</sup> However, over the last several years, elucidation of the key steps in MTC oncogenesis, particularly the role of RET and other important intracellular tyrosine kinases, has led to the development of new targeted therapies that may offer the potential for improved outcomes.

As our understanding of the complex mechanisms that cause cancer continues to increase, we are witnessing a new era of targeted oncologic therapy slowly unfold. Froedtert & The Medical College of Wisconsin remain committed to leadership in the continued development of more effective treatment options for cancer patients.

For further information, Dr. Fareau can be reached at [gfareau@mcw.edu](mailto:gfareau@mcw.edu).

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2. Leboulleux S, Baudin E, Travagli JP, Schlumberger M. Medullary thyroid carcinoma. *Clinical Endocrinology* 2004;61:299-310
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As part of its ongoing mission to provide state-of-the-art care, the Froedtert & The Medical College of Wisconsin Clinical Cancer Center is currently enrolling patients in a phase II study of a novel chemotherapy for the treatment of metastatic MTC. The study drug (E7080) is an oral agent that targets tumor growth and spread by inhibition of the RET tyrosine kinase, vascular endothelial growth factor (VEGF) pathway, and fibroblast growth factor receptors (particularly FGFR-1), all of which are implicated in MTC. Patients 18 years or older with pathologically confirmed MTC that is not amenable to surgery, and who have evidence of disease progression within the last 12 months may be eligible for participation in the clinical trial. Patients must have at least one lesion ( $\geq 1.5$  cm in longest diameter for non-lymph nodes,  $\geq 2.0$  cm in longest diameter for lymph nodes) that is measurable on computed tomography scans or magnetic resonance imaging.

## REPAIR OF PECTUS EXCAVATUM *continued from page 7*

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# ETHICS CONSULTATION IN SURGERY

*An ethics committee is now a fairly common fixture in most hospitals. Nevertheless, despite their increasing presence, many physicians still view ethics committees with some degree of trepidation and mystery.*

By **Ciarán Bradley, MD**  
*General Surgery Resident*

This may be due to a misperception that committee members rove the hospital as the “ethics police,” seeking out examples of unethical behavior and chastising practitioners. It could also be due to a lack of understanding about how the committee functions and its purpose. The following is a brief introduction to the structure and role of ethics committees, using the following case for illustration.

## Case Study

Mrs. S. is an elderly woman with diabetes and peripheral vascular disease. She is transferred to the emergency room from her long-term care facility with a diabetic foot infection. She is admitted and placed on antibiotic therapy, but her infection worsens, such that she will require amputation. Unfortunately, due to sepsis and mental status changes, she no longer has decision-making ability. The surgical team is unable to obtain her informed consent for the procedure. Attempts to identify an appropriate surrogate decision-maker have been unsuccessful. The surgical team consults the hospital ethics committee for guidance on whether it is appropriate to proceed to the operating room without her permission.

## The Role of the Ethics Committee

Ethics committees generally have three main functions: education, policy formation and ethics consultation.<sup>1</sup> Regarding education, committees typically direct or assist in the ethics education of hospital staff, house staff trainees, attending physicians and the community at large through seminars, ethics grand rounds, or ethics modules during staff in-service training. In terms of policy formulation, the committee usually functions within the administrative hierarchy of the hospital to formulate and recommend hospital policies for approval. Issues often addressed by the ethics committee include: do not resuscitate orders, surrogate decision-making for patients lacking decision-making capacity, practitioner rights of conscience, and patient refusal of life-sustaining interventions.

Finally, ethics committees conduct clinical ethics consultations for hospital inpatient providers. In this capacity, the ethics committee can assist practitioners when they encounter ethically difficult patient care scenarios. The American Society of Bioethics and Humanities emphasizes that the committee should function in an advisory role when performing consultations, helping the practitioner, patient and family understand the essence of the ethical dilemma and facilitating the negotiation of an ethically acceptable solution. It does not mandate any particular course of action, since its role is advisory only, but it helps define the range of ethically appropriate options.

The above case illustrates a common ethical dilemma encountered in surgical practice. When a patient lacks decision-making ability, current ethical standards dictate that a systematic approach be used to adequately honor the patient’s wishes. Using the substituted judgment standard, practitioners are called to establish what the patient would have wanted if she were able to make her own decision. This is most easily achieved if the patient has completed an advance directive such as a durable power of attorney for health care. If the patient has not completed such a document, establishing the most appropriate person to achieve substituted judgment can be difficult. In some states, the law designates the automatic surrogate decision-maker via a predetermined hierarchy beginning with spouse, followed by adult children, then parents, and so on. In Wisconsin, no such law exists. Although we often seek the advice and input of immediate next of kin when making decisions for patients, if there are disputes or a legal guardian is needed, it becomes a matter for the courts to resolve via guardianship appointment.

When substituted judgment cannot be achieved, practitioners are called to act in the patient’s best interests. The best interests standard is typically interpreted to mean what a reasonable person would want or what the standard of care is for the given condition.<sup>2</sup> In settings of absolute emergency, practitioners are permitted to perform procedures in the absence of informed consent on the basis of the best interests standard. During situations of urgency, one

where death is not imminent, but continued clinical decline with eventual death is likely, practitioners ought to exhaust any possible means of identifying an appropriate surrogate. If there is no surrogate available, and if time and circumstances permit, it may be reasonable to seek a court appointed guardian, since Wisconsin law does not automatically designate legal guardianship. However, in most cases of surgical urgency, guardianship appointment is too cumbersome a process, and the surgeon would be ethically justified in proceeding with the operation on the basis of best interests. This process should be meticulously documented in the medical record.

Given the intricacies of laws in various jurisdictions, as well as the methodical approach to arriving at an ethically justified execution of surrogate decision-making, the case of Mrs. S. exemplifies an example of a clinical scenario specifically encountered by a surgeon where an ethics committee can be especially helpful. Practitioners should not hesitate to contact their local ethics committees for assistance. At Froedtert & The Medical College of Wisconsin, the Ethics Committee and one of its clinical ethics consultants is available for real-time consultation at any hour of the day.

Dr. Bradley is currently completing his PGY4 clinical year and plans to pursue fellowship training in surgical oncology. For more information, Dr. Bradley can be reached at [cbradley@mcw.edu](mailto:cbradley@mcw.edu).

## References:

1. Core Competencies for Health Care Ethics Consultation. American Society for Bioethics and Humanities: Glenview, IL. 1998.
2. Kopelman LM. The best interests’ standard for incompetent or incapacitated persons of all ages. *J Law Med Ethics* 2007; 35(1):187-196.



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## UPCOMING EVENTS

### Academic Festschrift Conference

The Academic Festschrift Conference honoring Stuart D. Wilson, MD, will be held on Friday, June 4 from 12:30 pm – 4:30 pm at Froedtert & The Medical College of Wisconsin's Helfaer Auditorium.

### Celebratory Festschrift Dinner

The celebratory festschrift dinner in honor of Stuart D. Wilson, MD, will be held on Friday, June 4 beginning at 6:30 pm in the Grand Ballroom at the Pfister Hotel, Milwaukee. The cost per ticket is \$125, with \$25 benefiting The Medical College of Wisconsin Surgical Oncology Research and Froedtert Hospital Foundation Pancreatic Cancer Research.

### Second Annual Medical College of Wisconsin and the University of Texas M. D. Anderson Cancer Center Endocrine Surgery Update Symposium

The second annual Medical College of Wisconsin and the University of Texas M. D. Anderson Cancer Center Endocrine Surgery Update Symposium will be held on Saturday, June 5 from 7:15 am – 4:30 pm with a reception to follow at The Medical College of Wisconsin Alumni Center.

For further details regarding any of the above mentioned events, please visit our Web site at [mcw.edu/surgery](http://mcw.edu/surgery) and follow the link *Endocrine Symposium – Dr. Wilson Festschrift*.

### The 50th Annual Carl W. Eberbach Lecturer – Samuel A. Wells, MD

The Department of Surgery is honored to welcome Samuel A. Wells, MD, as the 50th Annual Carl W. Eberbach lecturer on Friday, June 18, 2010 at 4:00 pm in the Helfaer Auditorium at Froedtert Hospital. Dr. Wells is an internationally known surgical oncologist/endocrine surgeon and his work in medullary thyroid cancer and multiple endocrine neoplasia is responsible for the use of targeted therapies in these diseases. Dr. Wells is perhaps best known for leading the Department of Surgery at Washington University in St. Louis and then initiating the American College of Surgeons Oncology Group, which has been responsible for multiple cooperative group trials in surgical oncology.

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

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**Clinical Cancer Center**  
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**Children's Hospital  
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