Historically innovations in medicine have taken years to materialize from conception of an idea to life saving therapy. However at The Ohio State University Wexner Medical Center, based upon our history of innovation – from discovery of the Zollinger Ellison Syndrome to the first use of the DaVinci robot in clinical care to ground breaking cancer therapies – our OSU Wexner Medical Center faculty have been instrumental in converting novel ideas into impactful innovations every day.

In this DOSSIER, we outline the initiation of a new multidisciplinary team oriented to the care of patients with hepatobiliary and pancreatic problems, children with anorectal and colonic malformation, advanced minimally invasive procedures and the next generation of organ preservation techniques. Each of these extraordinary clinical innovations signals the advent of a new future in surgical care and the OSU Wexner Medical Center is proud to facilitate their adoption.

Given the rapid growth of surgical technology, we look forward to stimulating the next generation of surgeons as the “best and brightest minds” to take advantage of this technology explosion. Partnerships with educational organizations like Center of Science and Industry (COSI) allow OSUWMC to connect with and nurture the next generation of technologically advanced surgeons. “Our Dossier” provides a record of our progress in 2014.

Robert S. D. Higgins, MD, MSHA
Hepato-pancreato-biliary disorders: complex problems require multidisciplinary, integrated care – The Ohio State difference

“The difference at OSU is our unique working relationship. We’re all friends at work and also outside of the hospital,” explains Mark Bloomston, MD, referring to the Hepato-Pancreato-Biliary (HPB) Service at Ohio State’s Wexner Medical Center, one of OSU’s first multidisciplinary care programs. Patients with diseases of the liver, pancreas or biliary tract are able to receive care from all related specialties in one integrated service. “Treatment for these diseases is coordinated across multiple services. It just made sense to combine them,” said Dr. Bloomston.

The HPB service provides treatment for a specific set of diseases which allows for a personalized approach for each patient by combining the expertise of general and gastrointestinal surgery, surgical oncology, transplant surgery, gastroenterology, medical oncology, nutrition, radiology oncology, interventional radiology, and pathology. Surgical specialists include: Mark Bloomston, MD, Carl Schmidt, MD, and Mary Dillhoff, MD, Division of Surgical Oncology; and Christopher Ellison, MD and Peter Muscarella, II, MD, Division of General and Gastrointestinal Surgery. Renowned pancreas expert Darwin Conwell, MD, director, Division of Gastroenterology, Hepatology & Nutrition and Philip Hart, MD, medical director of pancreatic disorders, were recruited specifically to join and coordinate the HPB service.

The HPB service treats both benign and malignant diseases. Beginning in early 2014, all specialties are now located under one roof at the Martha Morehouse Medical Pavillion HPB outpatient clinic. Patients may be seen by several team members and can often complete all testing during one visit to develop a comprehensive treatment plan. Certified nurse practitioners assess and record patient needs, provide nutrition education, explain survivorship transitioning, and arrange financial assistance for those in need. An inpatient HPB surgery service has been formed to specifically care for these patients, and expansion to include non-surgical services is in development for all HPB inpatients. “We are at the genesis,” said Dr. Conwell.

An integrated clinical research program enables novel translational therapies targeted for each individual. All patients are entered into an IRB-approved database to track outcomes along with a comprehensive tissue, blood, and fluid banking process to foster clinical trials to investigate novel drug therapies. “Proper nutrition is critical and is frequently overlooked in these disorders,” according to Dr. Hart. Expertise in enteral and parenteral nutrition is provided by David Evans, MD, Division of Trauma, Critical Care and Burn, with pre- and postoperative nutrition enhancement protocols in development. Team members meet weekly to review cases at liver and pancreatic tumor boards. “The number of pancreatitis cases continues to increase in the U.S. and the associated costs are increasing as well,” explains Dr. Conwell. “Our goal is to enhance patient outcomes by decreasing readmissions and decreasing the costs of care.”

The HPB Service also plays an important role in resident and fellow education. It serves as a part of the core curriculum for medical students. Gaining exposure to a multi-disciplinary team is a major advantage for trainees.

“The HPB Service serves as a springboard for programmatic development of integrated services for other diseases and disorders,” said Jeffrey Hazey, MD, interim chief, Division of General and Gastrointestinal Surgery. “This is the model for the future of integrated patient care.”
Multidisciplinary approach to complex pediatric disorders: The Center for Colorectal and Pelvic Reconstruction

“I want a child with a problem to be able to come to one clinic and have all the specialists surround that child to solve his or her problem,” explains Marc Levitt, MD, (left) professor of surgery, Division of Pediatric Surgery and surgical director of the Center for Colorectal and Pelvic Reconstruction (CCPR) at Nationwide Children’s Hospital. Dr. Levitt and a team of specialists have established the CCPR as the first center in the world to formally integrate all specialties involved in providing complete care of pediatric colorectal and pelvic diseases and disorders. The center is a joint collaboration between Colorectal Surgery, Gastroenterology, Urology and Gynecology and is co-directed by Dr. Levitt and internationally-recognized expert in pediatric motility issues Carlo Di Lorenzo, MD, chief of Gastroenterology, Hepatology and Nutrition, and director of the Motility Center. Also leading the clinical team is Venkata R. Jayanthi, MD, Chief of Urology, and Geri Hewitt, MD, Chief of Pediatric and Adolescent Gynecology.

Dr. Levitt has performed more than 5,000 pediatric colorectal procedures covering the entire spectrum of problems involving the colon and rectum. He is a world-renowned expert in the care of children with imperforate anus, cloacal anomalies, Hirschsprung disease and other colorectal abnormalities. Dr. Levitt leads a multi-disciplinary team that treats all types of functional and surgical colorectal conditions and creates custom treatment plans for each patient that continue throughout all stages of their life. So far the center has received referrals from 27 U.S. states and 15 countries.

Dr. Levitt is also committed to educating the next generation of pediatric colorectal surgeons. Collaborating with the adult colorectal surgeons at Ohio State, Dr. Levitt’s mission is to teach the most advanced surgical techniques and best practices to surgery residents and fellows to improve quality of care and reduce the need for reoperation. He co-directs the annual Pediatric Colorectal Motility and Pelvic Reconstruction Conference, a three-day accredited course featuring interactive hands-on labs, live surgery, case discussions and presentations.

Dr. Levitt and pediatric surgeons Katherine Deans, MD, MHSc, and Peter Minneci, MD, MHSc are working with investigators to develop the world’s largest outcomes database for pediatric colorectal patients. Utilizing an advanced clinic notes system they are creating a linked, active, real-time registry that instantly updates each patient’s record concurrent with examinations and procedures.

For more information or to request an appointment, the Center for Colorectal and Pelvic Reconstruction at Nationwide Children’s can be contacted at CCPR@nationwidechildrens.org, http://www.nationwidechildrens.org/ccpr or call (614)722-4086.

(Photographs courtesy of Nationwide Children’s Hospital, ©2014)
The Center for Minimally Invasive Surgery (CMIS):
Discovering Novel Techniques / Teaching New Skills

A Department of Surgery “Point of Pride”, the Center for Minimally Invasive Surgery (CMIS), was founded in 1999 and was designed as a multidisciplinary group that promotes minimally invasive surgical techniques through innovation, education and clinical outcomes research. Utilizing a team approach, the center is led by medical director Bradley Needleman, MD, FACS and three associate directors, Kyle Perry, MD, FACS – research, Dean Mikami, MD, FACS – education, and Vimal Narula, MD, FACS – clinical affairs.

The Center is widely recognized as a leader in surgical innovation. We have nine minimally invasive fellowship-trained surgeons who have expertise in primary and revisional bariatric surgery, hernia repair, colorectal surgery, primary and revisional foregut surgery, solid organ surgery, and basic and advanced surgical endoscopy including ERCP, Barrett’s ablation and reflux treatment. OSU is a high volume surgical center in these minimally invasive procedures.

Our surgeons were the first in the United States to conduct an IRB-approved Natural Orifice Transluminal Endoscopy Surgery (NOTES) study in human subjects with no adverse effects, and were the first group to study Near Infrared Fluorescent Cholangiography (NIRF-C) for biliary imaging during laparoscopic cholecystectomy (funded by a grant awarded by the Society of American Gastrointestinal and Endoscopic Surgeons [SAGES] Foundation). In addition, over the years our surgeons have performed innovative procedures such as the first laparoscopic adjustable gastric band in Ohio in 2001, gastric plication procedures in 2007, transoral incisionless fundoplication, transvaginal cholecystectomy, and they currently perform peroral endoscopic myotomy (POEM), stenting for sleeve leaks, and anti-reflux surgery using the LINX device.

The Center provides advanced minimally invasive training for surgeons, fellows, residents, students and allied healthcare professionals. Each year we match three fellows who are given one-year faculty appointments: two advanced minimally invasive/bariatric surgery fellows and one advanced therapeutic endoscopy and gastrointestinal surgery fellow. We have trained 29 MIS/Bariatric fellows and 8 MIS/Endoscopy fellows who have gone on to become leaders in minimally invasive surgery. Our staff has coordinated hundreds of CME and non-CME educational courses and training programs. We have also coordinated multiple courses on abdominal wall reconstruction, flexible endoscopy for surgeons and advances in minimally invasive surgery. In addition, we have a well-established international visiting scholar program and have hosted over 15 visiting scholars from China, El Salvador, Egypt, Turkey and elsewhere.

Our surgeons work across disciplines with diverse care providers at OSU and other institutions. Current projects include investigation into left gastric artery embolization for weight loss, the GET LEAN study in which our bariatric surgeons are working with OSU interventional radiologists, and a SAGES Foundation award funded study to investigate a resident training curriculum for Fundamentals of Endoscopic Surgery (FES) lead by Jeffrey Hazey, MD.

CMIS continues to be dedicated to a multidisciplinary approach. We have established surgical subspecialty groups to work with the operating rooms and medical center to ensure the availability of the latest techniques and technologies for patient care and optimize cost savings. Our research and education teams also work across specialties to provide education, training and collaborative research opportunities.

Learn more about the Center for Minimally Invasive Surgery by calling (614) 293-7399 or by visiting our website at http://cmis.osu.edu.
Ex-vivo perfusion: Creating the future of organ transplantation

A multidisciplinary research team at Ohio State is conducting investigations that may transform the state-of-the-art of solid organ transplantation. The Collaboration for Organ Perfusion, Protection, Engineering and Regeneration (COPPER) Laboratory is a consortium of investigators of cardiothoracic and abdominal transplantation, biochemical engineering, biomedical engineering, mechanical engineering, molecular biology and physiology. Directed by transplant surgeon Sylvester M. Black, MD, PhD and cardiac surgeons Bryan A. Whitson, MD, PhD and Ahmet Kilic, MD, the COPPER Lab has the core mission to increase the number of donor organs available for transplantation. College of Engineering collaborators include Samir Ghadiali, PhD, MS, Blaine Lilly, PhD, and Andre Palmer, PhD.

The number of solid organ transplantations is limited by a lack of viable donor organs. Simply put, there are many more patients in need of a transplant than there are available donor organs. Drs. Black and Whitson’s teams are developing a perfusion circuit that will allow organs to survive outside the body for an extended period of time. “The body is the optimum support system,” said Dr. Black. “The goal is to create a synthetic perfusion media that mimics the human body allowing for organs to be assessed and repaired outside the body.” Marginal organs may be able to be repaired and in the long-term, these organs may even be engineered to increase the number of organs suitable for transplant.

Eventually normotensive ex-vivo perfusion circuits will lead to regional organ assessment and repair centers. This technological advance may allow organ transplantation to become a planned procedure rather than an emergent event. “This discovery could be as big to organ transplantation as immuno-suppression drugs,” said Dr. Black.

Ex-vivo perfusion may also expand our knowledge about damage to the heart. Heart failure is one of the leading causes of death and accounts for billions each year in medical costs. More than 70% of all heart failure occurrence is due to left ventricular remodeling as a result of an ischemic injury following a myocardial infarction (heart attack). “Currently there is not a good understanding of which heart attack patients will develop heart failure,” explained Dr. Kilic. Members of the COPPER lab are investigating cardiac remodeling at the molecular and cellular level, using serum micro-RNA as a biomarker to identify cellular changes. “The ability to predict cardiac remodeling will lead to advanced treatments to reverse it,” said Dr. Kilic.

The COPPER Laboratory at The Ohio State University is a unique environment, having many research disciplines within close proximity. “Ohio State has so many talented individuals,” said Dr. Black. “There are incredible opportunities to build relations and collaborative teams to attack complex problems. I’m excited to come to work each morning.”

http://surgery.osu.edu/copper/
Advancing patient care through an emphasis on patient safety and quality

Providing high quality surgical management of diseases while minimizing the risk of preventable complications is critically important in today’s healthcare environment. Thoracic surgeon Susan D. Moffatt-Bruce, MD, PhD is the Chief Quality and Patient Safety Officer and Associate Dean of Clinical Affairs for Quality and Patient Safety at the OSU Wexner Medical Center. The mission of this team is to improve the quality of care, decrease the number of re-admissions, lower costs and increase value, and to provide training on quality improvement and patient safety.

Patient Safety Indicators

The U.S. Department of Health and Human Services’ Agency for Healthcare Research and Quality establishes patient safety indicators (PSIs) based on administrative and billing data. Since 2012, OSU surgical teams have been working to identify the true incidence of these PSIs particularly as they relate to iatrogenic injuries, post-operative hematomas and surgical post-operative respiratory failure. To date, with the help of surgeons and residents, the team has improved over 40% of these indicators.

UHC Mortality (University HealthCare Systems Consortium)

Every year we compare and benchmark our success measured by lives improved and saved. The mortality index is a ratio of the number of patients we save over the number of patients that were expected to not survive. Since 2012, The Patient Safety and Quality team has worked with the surgeons and residents to improve documentation of how sick our patients are upon presentation to OSUWMC. Additionally, focused review of all mortalities across all medical center care teams have been invaluable to find opportunities to continuously improve. As a result of this constant vigilance, the mortality index has improved dramatically over the past 3 years so that currently we are ranked fourth in the nation and rescue 40% more patients than were predicted to not survive.

Crew Resource Management

In 2010, OSUWMC embraced Crew Resource Management (CRM) training and has trained over 5,000 faculty and staff in team training and using standardized checklists. This has been shown to improve patient safety, not only in the operating room, but also across the care continuum. In particular, the operating rooms, the endoscopy suites, the emergency departments and the invasive cardiology laboratories have embraced this approach and continue to excel in a culture of safety. The Safe Surgical Checklist is an example of a hard wired safety tool and has now been used in the operative and procedural areas since 2008. Currently, the Intensive Care Units are undergoing CRM training as well as the Ross Heart Hospital non-invasive laboratories.

Research in Clinical Outcomes

We engage faculty, residents and staff in research that measures the success of this Quality and Patient Safety Program. Particular areas of interest include the reduction of retained foreign bodies, using Google Glass® in crisis checklist simulations and attempting to measure the return on investment for culture change using Crew Resource Management.
Outreach: Partnering with COSI

The OSU Wexner Medical Center and the Comprehensive Transplant Center (CTC) are partnering with COSI (Center of Science and Industry) to educate high school students about organ donation and transplantation and create interest for future pursuit of careers in the healthcare industry.

As an academic medical center and central Ohio’s only adult transplant center, the Wexner Medical Center is uniquely positioned to facilitate In Depth: Kidney Transplant, a video conference program on the topic of kidney transplantation. Each videoconference program will connect up to five high school classrooms from across the country and one live student/adult audience at COSI. The project could potentially reach more than 25,000 students nationwide over the course of the five year partnership with COSI.

Ohio State has agreed to facilitate two presentations per day on two weekdays per month, between September and May, for a five year period (2013-2018). The videoconference program is approximately 90-minutes and includes:

- Introductory story of a living kidney donor and a transplant recipient
- Recorded transplant surgeries (both donor and recipient) narrated “live” by a physician from Ohio State’s Comprehensive Transplant Center. A physician also answers questions from students in real time during the broadcast
- Interviews with healthcare providers from Ohio State’s CTC and Lifeline of Ohio highlighting careers in transplantation and healthcare

Each classroom also receives a kit with pre- and post-program activities, student booklets and a teacher’s guide. The kit includes: a pre- and post-program survey testing transplant knowledge before and after the program; a blood typing activity for finding a correct match; activities to identify the recipient for a deceased donor kidney and to understand how chemical levels change pre- and post-kidney dialysis, and to practice surgical suturing. A student handbook guide includes topics on talking with family members about organ donation, myths and facts about organ donation, and healthcare career exploration.

This program allows Ohio State’s Wexner Medical Center to connect with high school students who are thinking about college and engage their interest in healthcare and perhaps pique interest in the range of medical career opportunities, while also educating them on the importance of organ donation.

http://www.cosi.org/educators/educator-ivc/item/kidney

(Photographs courtesy of COSI)
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