Pediatric surgeon Erin Rowell, MD, right, is at the forefront of a national research effort to unravel the mechanisms of fertility preservation in children treated for cancer.
The choice between life-saving chemotherapy and preserving one’s fertility can be an agonizing dilemma, but for 16-year-old Sydney Small the decision was rather straightforward.

The Indiana teen knew she definitely wanted children one day. So when she was told that her non-Hodgkin’s lymphoma had evolved into a highly aggressive form despite cycle after cycle of chemotherapy and required a more potent drug regimen, Sydney refused. Her fear was that, along with the cancer, a more toxic chemo would wipe out her chances of conceiving one day.

That fear was well justified. The new chemotherapy — a four-drug cocktail used in refractory non-Hodgkin’s lymphoma — along with a stem cell transplant and previous chemotherapy rendered her high risk for infertility, says pediatric surgeon Erin Rowell, MD, who is at the forefront of salvaging the fertility of children undergoing treatment for cancer.

Sydney’s case posed a challenging clinical scenario, Rowell says. As a post-pubertal female, Sydney could undergo oocyte stimulation and harvesting, but that route was medically contraindicated in her case because she’d have to go off chemo for several weeks in order to receive hormone injections that stimulate follicle-production. Additionally, Rowell says, the procedure would require a transvaginal ultrasound and surgical oocyte retrieval.

Rowell, however, had something else in mind. Sydney was a prime candidate for another, more experimental approach — ovarian tissue cryopreservation, which Rowell and colleagues perform as part of an ongoing clinical trial at Ann & Robert H. Lurie Children’s Hospital of Chicago and Northwestern University Feinberg School of Medicine.

As part of the study, Rowell would laparoscopically remove one of Sydney’s ovaries and cryopreserve it for future use. Even though Sydney had already undergone six months of chemotherapy before her procedure, she was still a good candidate for ovarian cryopreservation, a point Rowell says she cannot emphasize enough.

“We know that even girls who have undergone cancer treatment can still have follicles in their ovaries,” Rowell says.

“Don’t just assume that because a female patient has had chemo or radiation all hope is lost,” says Marleta Reynolds, MD, the Lurie Children’s surgeon-in-chief who has seen her fair share of such cases. “Recurrent cancer generally requires more intense — and more toxic — chemotherapy, so salvaging reproductive tissue before such treatment becomes that much more critical.”

Case in point: Sydney Small. In February, Sydney underwent an outpatient oophorectomy. When Rowell received the pathology report, she was excited if not all that surprised. It read: Ovary with numerous follicles of varying degrees of maturation containing viable oocytes. No lymphoma seen.

“We’re so happy we could do that,” says Sydney’s mother, Judy Small. “We have to focus on Sydney’s immediate treatment, but we take comfort in knowing she can still have children when the time comes.”

As a referral center, Lurie Children’s also offers fertility preservation counseling and services to patients receiving their oncology care elsewhere.

Histologic analysis revealed multiple follicles in a female adolescent patient following treatment for non-Hodgkin’s lymphoma.
Lurie Children’s surgeons are part of the national Oncofertility Consortium, headquartered at neighboring Northwestern University — a multidisciplinary research effort aimed at unraveling the basic mechanisms as well as developing fertility-salvaging strategies in clinic for patients with cancer, autoimmune diseases and disorders of sexual differentiation. Led by Teresa Woodruff, PhD, in addition to surgeons the group also includes fertility experts, oncologists, urologists, endocrinologists, advanced practice nurses, medical ethicists and basic and translational scientists.

So far Lurie Children's surgeons have performed more than 30 ovarian tissue cryopreservation (OTC) procedures, more than half of them in prepubescent girls. The pre-pubertal subgroup constitutes one of the nation's largest case series to date, the team says. Northwestern is the lead repository site for ovarian tissue from pre-and post-adolescent girls, while the University of Pittsburgh is the main banking site for testicular tissue.

In a recent first, Erin Rowell, MD, obtained testicular tissue for cryopreservation on the youngest patient ever to have this procedure, a 5-month-old infant. The question of how much testicular tissue should be removed for banking in order to ensure optimal spermatogenesis down the road remains an open-ended one, Rowell says. In this particular case, she removed about one-third of the testicle, under the premise that removing less would allow the organ to heal and grow better, increasing the likelihood of normal physiologic function. Cosmetic considerations also play a role.

“Ensuring symmetry is important for patients and parents and less emotionally taxing on the family,” Rowell says.

Pre-pubertal gonadal tissue preservation has been around for a mere few years in the United States — far longer in Europe and parts of the Middle East — and the first generation of U.S. patients who had these fertility-rescue procedures has not yet reached an age to start families. “A successful pregnancy or fathering of a child by an adult cancer survivor who underwent fertility preservation before he or she reached puberty is the holy grail of our work,” Rowell says. “I hope we're on the cusp of seeing this happen.”

**A LAB-MADE OVARY**

In an effort to push science even farther, Rowell and colleagues have extended their efforts beyond the clinic. Rowell is collaborating with Northwestern scientist Monica Laronda, PhD, who is working to create an artificial ovary. Laronda has designed a 3-D printed bio-scaffold made of gelatin to be seeded with ovarian follicles and implanted in mice. The animals successfully conceived and gave birth following implantation of the follicle-seeded scaffold. Laronda and Rowell hope to repeat this success in a larger-animal model. The ultimate goal would be to create a biologically viable ovary for transplantation, to restore normal hormone function and fertility in human patients.

“Ensuring symmetry is important for patients and parents and less emotionally taxing on the family.”

– Erin Rowell, MD
A handheld, lightweight scanner — similar to the barcode reader at a store checkout — that uses white light instead of ionizing radiation can safely and reliably capture the upper body anatomy of children with chest wall deformities, according to pediatric surgeons from Ann & Robert H. Lurie Children’s Hospital of Chicago.

The approach, Lurie Children’s surgeons believe, offers a more convenient, inexpensive and safer alternative to traditional CT scans to measure and monitor the degree and severity of chest deformities. It may also provide a cheaper imaging option for patients in economically disadvantaged regions of the world, where sophisticated technology is unavailable or prohibitively expensive for most families.

Preliminary findings from research conducted at Lurie Children’s show that the radiation-free scanner can accurately and reliably capture abnormal chest shape in detailed, 3-D format among children with sunken chest, or pectus excavatum. Results of the pilot study — involving 53 patients and presented May 15 at the annual meeting of the American Pediatric Surgical Association — revealed that the white-light scanner accurately measures the severity of the condition, allowing clinicians to track changes in depth and volume over time as the child ages or as a result of surgery.

White-light scanning has been used in eye imaging for years, but the Lurie Children’s research team says this is — to their knowledge — the first time the technology has been adapted for visualizing chest malformations.

Children with chest-wall defects generally undergo repeated evaluations for their chest deformity to monitor how it changes over time as the child grows or following surgery. Many clinicians measure the chest depression with a ruler, an old-school technique that is not as precise as a CT scan, which provides excellent visualization but exposes patients to ionizing radiation.

“As physicians, our first obligation is to do no harm so we sought a new way to reliably and accurately capture the architecture of the chest wall without the use of radiation. This is a creative new twist on existing technology,” says Fizan Abdullah, MD, PhD, Division Chief of Pediatric Surgery at Lurie Children’s, an international authority on chest-wall deformities and Professor of Surgery at the Northwestern University Feinberg School of Medicine. “It underscores the notion that even technology that’s been around for years can be harnessed in novel ways to make the practice of pediatric surgery simpler, cheaper and safer.”

In addition to minimizing or eliminating the need for X-rays and CT scans, the white-light scanner is a more cost-conscious alternative in regions where sophisticated imaging is either lacking or inaccessible. A white light scanner costs around $35,000, compared with CT scanners, which can cost as much $275,000.

Another benefit of the white-light scanner is its size — it weighs less than two pounds — and can fit easily in a small carry-on suitcase, rendering it easy for moving and transport.

“The white-light scanning protocol is available to Lurie Children’s patients with chest defects as part of an ongoing clinical trial, although patient families can choose to receive traditional imaging instead. Bryan Malas, MHPE, was co-investigator on the study.”
Surgeons at Lurie Children's have started using radiation-free white-light scanning as an alternative to CT scans and X-rays for imaging of children with chest wall deformities.
Pediatric urologist Earl Cheng, MD, and pediatric surgeon Mary Beth Madonna, MD, discuss the transformation of the surgeon’s role in treating disorders of sexual differentiation and Lurie Children’s innovative Gender & Sex Development Program, which stands as a symbol of the medical and social evolution in that field.
To operate or not to operate? Pediatric surgeons are no strangers to thorny clinical dilemmas, but few are as intricate as the decision to perform gender-assignment surgery. As part of the Gender & Sex Development Program at Ann & Robert Lurie Children’s Hospital, urologist Earl Cheng, MD, and pediatric surgeon Mary Beth Madonna, MD, have seen their fair share of such conundrums.

Historically, these calls were straightforward, Cheng says. Babies born with ambiguous genitalia were treated as emergency cases and the need for prompt gender assignment deemed acute. But over the last 20 years, this sort of “magical thinking” has given way to a more nuanced approach, a shift fueled by new insights into the astounding complexity of sex differentiation and gender development.

“This new knowledge has sparked as many questions as it has answered,” says Madonna, who specializes in feminizing genitoplasty for the treatment of conditions such as congenital adrenal insufficiency, partial or complete androgen insensitivity, and Mayer-Rokitansky-Küster-Hauser syndrome, among others. In the process, Madonna says, it’s transformed the role of the pediatric surgeon in the treatment of children with disorders of sexual differentiation (DSDs).

“Surgeons used to drive much of the medical decision-making, probably because they often had the loudest voices in the room,” Cheng says. “Not so anymore. We function as part of a multidisciplinary team, take a backseat and let families make the call.”

The Lurie Children’s program, which Cheng co-directs with Robert Garofalo, MD, MPH, Division Chief of Adolescent Medicine at Lurie Children’s, has been ahead of the evolutionary curve on DSD care. Launched in 2013, the program brings together specialists from general surgery, urology, endocrinology, general pediatrics, genetics and psychology. In addition to Cheng and Madonna, the surgery team also includes Elizabeth Yerkes, MD, and Emilie Johnson, MD, MPH, from the Division of Urology, and Marleta Reynolds, MD, Surgeon-in-Chief for Lurie Children’s Department of Surgery.

But what makes the program unique are its two parallel clinical tracks, each focused on the diagnosis and treatment of two separate patient groups: Children with DSDs and children with gender non-conforming behaviors or gender dysphoria. The two populations represent distinct clinical entities, Cheng says, that nonetheless share some psycho-social and medical characteristics. Currently, the gender track offers clinic two to three times a week and sees more than 300 children followed by adolescent medicine, mental health and endocrinology specialists. The DSD arm has clinics twice a month and sees more than 100 patients followed by specialists from urology, surgery, endocrinology and psychology.

But the program’s vision goes beyond delivering optimal clinical care and the latest treatment approaches. Its ambition is to help define best practices through research. To stimulate scientific cross-pollination, the Lurie Children’s team holds quarterly conferences with specialists from all of the above disciplines along with medical ethics, fertility, radiology and pathology.

Research should help elucidate some lingering unknowns about the long-term effects of medical and surgical treatment in either patient group, as well as questions related to reproduction and fertility.

One of the most pressing questions remains optimal timing of gender-assignment surgery. Surgery timing is predicated on a constellation of factors, including the specific condition, the family’s comfort level with waiting, as well as fertility considerations. Conditions that put patients at high risk for gonadal cancer — such as Turner syndrome and certain androgen insensitivity syndromes — tend to warrant earlier intervention for gonad removal.

In the absence of scientific clarity, to operate or not, and if so, when, remains one of the most challenging conundrums of DSD care.

“We function as part of a multidisciplinary team, take a backseat and let families make the call.”

– Earl Cheng, MD

“As surgeons we have to be open and honest about what we know and what we don’t, yet confident and encouraging enough to help families navigate the uncertainty without paralyzing their decision-making,” Cheng says.

Generally, the best approach is to allow the child to grow into his or her gender and make his or her own decision, says Madonna. Some families are not comfortable waiting that long due to societal pressures. Children with DSD have to exist in a world of clearly defined sex and gender roles and social stigma, which although rapidly dissipating is still very real.
The Skinny on Pediatric Weight-loss Surgery

Lurie Children’s pediatric surgeon Ann O’Connor, MD, dissects fact from fiction and do’s and don’ts of bariatric surgery in teens

More than 4.4 million U.S. children and adolescents are deemed severely obese, a condition that puts them on a lifelong path to a range of cardio-metabolic diseases, drives up their cancer risk and shortens their life spans.

And while bariatric surgery has become a mainstay in the medical toolbox for the treatment of morbid obesity in adults, when it comes to treating adolescents, the procedure remains somewhat misunderstood.


MYTH 1: LATER IS BETTER

The belief that surgical intervention should be postponed until adulthood is well-intended but largely misguided, O’Connor says. Waiting too long to stem the toxic cascade fueled by obesity can have grave long-term consequences, as hypertension, diabetes and sleep apnea persist year after year.

“As physicians our first duty is to do no harm, but in this case, failure to intervene may pose a greater risk,” O’Connor says.

Some of the most convincing evidence for earlier intervention comes from a recent multicenter study published in The New England Journal of Medicine showing that nearly all adolescents with type 2 diabetes were in remission three years post-surgery. The same study found that 86 percent of those with abnormal kidney function before surgery experienced normalization of kidney function three years thereafter. Seventy-four percent of those with abnormal cholesterol experienced improvements in their dyslipidemia.

Obese patients also have higher lifetime risk of several cancers, including malignancies of the endometrium, gallbladder, pancreas and esophagus.

“Cancer risk is cumulative and proportionate to years of exposure, so the longer we wait, the higher the risk,” O’Connor says.

MYTH 2: IT’S STILL EXPERIMENTAL AND RISKY

That was true 20 years ago, O’Connor says. Since then, an influx of data has clarified efficacy, success rates and complications of bariatric surgery, while also informing best surgical approach depending on individual patient factors.

“Our understanding of technique, patient selection, complications and outcomes have all evolved over the past few decades,” O’Connor says. “But when it comes adolescents, attitudes toward the procedure have not caught up with that reality.”

O’Connor cautions that much of the success and safety of the procedure is predicated on a highly-selective screening process, careful pre-op assessment and rigorous post-op follow-up.

MYTH 3: IF THEY ONLY TRIED A LITTLE HARDER...

The belief that a child’s obesity is somehow the family’s fault and a result of cavalier parenting remains more pervasive among clinicians than it should be, O’Connor says — especially in light of all the science pointing to the contrary.

“We now have studies in twins showing that both genetic and epigenetic factors can fuel morbid obesity,” O’Connor says. “Lifestyle and family dynamic can be catalysts but underlying biologic mechanisms are the true drivers of this pathology.”

LURIE CHILDREN’S ADOLESCENT BARIATRIC SURGERY PROGRAM

Scorecard

Launched in October of 2014, the Lurie Children’s Bariatric Surgery Program remains the only program in Illinois dedicated specifically to the treatment of teens. So far, it has “graduated” 10 patients. Another 10 are undergoing evaluation. There have been no complications and all patients are losing weight at the expected rate — 60 percent of excess pounds are typically shed within the first two years.

Protocol

Careful patient selection

Bariatric surgery should be considered in teens with a BMI over 40, or for those with BMI between 35 and 40 and co-morbidities, such as sleep apnea, diabetes, hypertension, nonalcoholic steatohepatitis or pseudotumor cerebri.

Teens must be 13 years or older and mature enough to understand the implications of surgery. They must be able to commit to a lifestyle of diet, exercise and long-term medical follow-up after the procedure. Such commitment, O’Connor says, is the greatest predictor of success. Lack thereof, she says, is the most compelling reason to postpone or avoid surgery altogether.

“We never operate on kids who cannot assent or who appear not ready or mature enough to do so,” O’Connor says.

To rule out any underlying psychiatric or emotional problems, patients undergo screening sessions with a clinical psychologist. Any eating disorders or other mental issues must be addressed and treated before surgery.

“Our philosophy on operating is conservative: When in doubt, don’t.”

Nutritional screens

To avert or correct nutritional deficiencies, O’Connor’s team checks baseline levels for vitamin D, vitamin B, calcium and iron. Even subtle insufficiencies warrant proactive correction with supplements to avert full-blown deficiency post-surgery. O’Connor believes that preemptive treatment may also boost healing and reduce infection risk.

“Vitamin deficiencies — particularly in vitamin D — are known to exacerbate inflammation, delay wound healing and fuel infection risk,” O’Connor says. “Correcting them before surgery makes sense.”
Insulin instead of glucose
To capture those on the cusp of developing diabetes, O’Connor checks insulin levels instead of the more commonly recommended glucose levels.

“Kids with elevated insulin are likely to develop diabetes within two years,” she says. “Knowing who is at greatest risk can help inform decision making for patients and physicians alike.”

Cardiac check-up
Echocardiograms to detect left ventricular hypertrophy can inform treatment decisions that include blood pressure medication in addition to surgery. Hypertension and obesity can each drive cardiac muscle thickening, so being both obese and hypertensive delivers a one-two punch to the cardiac muscle.

“There’s emerging evidence that high levels of fat can alter signaling in the cardiomyocytes and cause aberrations in heart muscle tectonics,” O’Connor says. “The good news is that left ventricular hypertrophy can be reversed with weight loss and normalizing of blood pressure, with or without medication.”

Post-op contraception
The reproductive implications of weight-loss surgery are vastly under appreciated, O’Connor says. Many obese girls have irregular periods due to hormonal imbalances. As these imbalances get resolved by post-op weight loss, a girl’s pregnancy risk goes up dramatically. Contraception is a must-have conversation with any females undergoing the procedure, says O’Connor. She has informally teamed up with an adolescent gynecologist for consultations, a collaboration she’s hoping to formalize as a regular part of the program. O’Connor advises her sexually active patients to consider an IUD, which can be placed during the surgery itself.

No Smoking
Because smoking can delay tissue healing and increase the risk for post-operative stomach leakage, O’Connor refuses to operate on teens who are active smokers. She conducts periodic pre-op and post-op drug testing, including cotinine levels.

Rigorous follow-up
In an ideal world, patients would be followed for five years post-surgery, but in reality many drop out sooner. The minimum follow-up O’Connor demands of her patients is one year. Follow-up is most critical for psychological issues, which can in turn influence lifestyle and weight loss. This is because, O’Connor says, many patients with preexisting addictive behaviors may substitute binge eating with other addictions following surgery. It is also critical to ensure patients don’t starve themselves in a misguided attempt to accelerate weight loss.

“It’s important for them to understand that not eating enough can dampen their metabolism and they can plateau.”

Tailored surgical approach
The preferred surgery for most patients is sleeve gastrectomy, in which 80 percent of the stomach is removed. The approach has lower complication rates, compared to Roux-en-y gastric bypass, which has fallen out of favor.

However, O’Connor cautions, the gastric bypass remains a better choice for those with treatment-resistant GERD, so careful pre-op assessment for acid reflux is critical, O’Connor says. Patients who report recurrent symptoms despite medication should undergo endoscopy to assess the condition of their esophagus and rule out Barrett’s esophagus.

“The sleeve gastrectomy can create high pressure on the stomach and flare-up reflux, which can further damage the esophagus,” O’Connor says. “In this subpopulation, the gastric bypass makes more sense.”

Overall, post-operative complication risk varies widely, with reports ranging from 2 percent to 20 percent. A recent New England Journal of Medicine study found 13 percent of patients required a follow-up procedure within three years of treatment. Careful patient selection and surgical skill can minimize post-operative risk to 1–3 percent, O’Connor says. In experienced hands, the risk for post-operative complications is comparable to that of laparoscopic cholecystectomy, she says.

The most dreaded complication of bariatric surgery is stomach leakage, which usually develops within the first few months of operation. It is caused by high pressure along the surgical staple line. Smoking and uncontrolled diabetes both drive up that risk so getting diabetes under control and smoking cessation before operation can decrease the likelihood of stomach leaks.

THE ROAD AHEAD: BRIDGING THE GAP BETWEEN AN ALL-OR-NOTHING TREATMENT
O’Connor says the current medical approach to treating obesity in teens is a woeful exercise in extremes — nothing or surgery. As any multifactorial disease, however, obesity requires a cocktail of treatments ranging from diet and exercise to medication to surgery. There is a subpopulation of obese children who would be good candidates for pharmacologic, rather than surgical, management of obesity.

“This is a spectrum disease and our toolbox needs to reflect that,” O’Connor says. “We really ought to bridge that gap and precision-target treatment to reflect each patient’s physiologic and metabolic profile.”

Dr. O’Connor sees patients at Lurie Children’s at Northwestern Medicine Central DuPage Hospital Pediatric Outpatient Center.
Launched in matching camo pants and jacket, clutching a toy under one arm, Luigi Valentini sits quietly on his mother’s lap in one of Lurie Children’s phlebotomy labs. His big green eyes closely follow the nurse’s every move as she scrubs his forearm with rubbing alcohol, then pulls a tourniquet, a tube and a needle. As the needle plunges deep into his vein, Luigi, not quite 4 years old, is the embodiment of calm. The improbable stoicism is the likely result of Luigi’s repeated encounters with doctors and nurses since his diagnosis two-and-a-half years ago with portal vein thrombosis (PVT). Luigi was born a perfectly healthy baby, so when his pediatrician detected a slightly enlarged spleen during the 1-year check-up, his parents, Bernardo and Ana Paula, were not particularly alarmed. But an ultrasound a few days later brought an unsettling revelation: The portal vein, which feeds

“Restoring blood supply into the liver can reverse the metabolic and physiologic consequences of portal vein hypertension, including pulmonary hypertension,”

– Riccardo Superina, MD
blood and nutrients from the intestines into the liver, was clogged by a massive clot that caused it to swell and throb with high pressure.

In children, PVT can stem from blood-clotting disorders, intra-abdominal abscesses or as a complication from cardiopulmonary bypass. Most of the time, it is idiopathic. A pediatric gastroenterologist in Brazil told the Valentinis family a sit-and-wait approach was their best — indeed, their only — choice. But six months later, the boy developed esophageal varices, a common complication of PVT and the portal vein hypertension that it invariably causes. As the family sought second, third and fourth opinion, one esteemed physician after another told them nothing could be done. Then Luigi’s mother went online. One name kept popping up over and over again: Riccardo Superina, MD, a pediatric transplant surgeon at Lurie Children’s and a world-renowned authority on pediatric liver diseases. For nearly two decades now, Superina has performed the meso-Rex bypass, a procedure to rebuild hepatopetal blood flow. Done properly, in a carefully selected subset of children, the approach can be curative.

The Valentinis’ experience illustrates an all too common scenario, Superina says. Families are often told their only option is to follow the condition closely to reduce risk for complications. There’s also the misconception that kids may outgrow PVT. They don’t, Superina says. The sit-and-wait approach involves frequent blood draws, periodic endoscopies, variceal ligation and possible spleen removal. This strategy, Superina says, relegates a child to a medicalized existence and does nothing to avert the long-term metabolic and physiologic sequelae of liver disease. Without treatment, children with PVT progress to portal vein hypertension. The spleen continues to enlarge. The liver — starved of blood and nutrients — shrivels. Some patients develop pulmonary hypertension, which, in turn, stresses the cardiac muscle and can lead to ventricular hypertrophy. Some patients progress to hepatic encephalopathy, marked by learning and behavioral problems.

“Restoring blood supply into the liver can reverse the metabolic and physiologic consequences of portal vein hypertension, including pulmonary hypertension,” Superina says. But the meso-Rex bypass is not suitable for everyone. Its success depends on having well preserved veins in and around the liver, particularly a robust intrahepatic portal vein. Superina estimates that 80 percent of children with PVT are good candidates for the meso-Rex bypass. The rest can undergo a spleno-renal shunt, in which the splenic vein is detached from the portal vein and attached to the left renal vein. A venogram performed by a trained pediatric interventional radiologist can pick out the less than ideal candidates with nearly 100 percent predictive accuracy. On Feb. 29, 2016, Luigi underwent a six-hour operation. The procedure, Superina says, worked beautifully. He anticipates that Luigi’s spleen will shrink back to normal size and his liver will regain its function. “This is not a trivial disorder and kids don’t just outgrow it,” Superina says. “With good pre-op assessment and careful patient selection, surgery can be curative nearly 100 percent of the time.”

The Meso-Rex Bypass Procedure

The meso-Rex bypass, often called the Rex shunt, was developed in the late 1990s in Europe by Belgian surgeon Jean de Ville de Goyet, a colleague and friend of Riccardo Superina, MD. Captivated by the idea, Superina asked de Goyet to send him a sketch of the technique. Superina performed his first meso-Rex bypass following a hand-drawn diagram that de Goyet had emailed him. It worked and the Rex shunt made its debut in North America.

Since 1997, Superina has performed more than 200 such procedures at Lurie Children’s, making this the largest pediatric case series in the country and, possibly, the world.

It’s a delicate procedure, tricky to perform even for experienced adult surgeons who venture to operate on children.

“The liver is a temperamental organ, highly vascular, so the margin of error is even narrower in children than it is in adults,” Superina says.

This is also why only a handful of pediatric surgeons in the United States dare foray into it, he says.

To help spread his expertise beyond borders, Superina makes frequent visits abroad to perform cases in countries including Israel, China, Nepal and Uzbekistan.

Superina is also collaborating with fellow scientists from nearby Northwestern University Feinberg School of Medicine as part of a group working to create lab-grown veins using patients’ own stem cells. These “designer” veins, Superina says, could be used to reconstruct the vessels around the liver, eliminating the need to use portions of the jugular vein.

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Children with untreated portal vein thrombosis face bleak odds, but many families are told a sit-and-wait approach may be their sole choice. Lurie Children’s Chief Transplant Surgeon Riccardo Superina, MD, is on a mission to change that — in the United States and globally.
PRECISION seeks to enhance partnerships and stimulate exchange of ideas between our surgical faculty and fellow surgeons and referring pediatricians both locally and nationally. We welcome comments, questions and suggestions about topics you want to see covered.

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