



*Without Missing  
a Beat*

## LANKENAU PHYSICIANS PERFORM THE WORLD'S FIRST ROBOTIC CORONARY ARTERY BYPASS GRAFTING SURGERY ON A PREGNANT PATIENT.

**N**ausea and heartburn are common during pregnancy, so when Laura Yohe awoke at 2:30 a.m. on Dec. 16, 2021, with severe cases of both, she didn't think too much of it. Within a few hours the discomfort had eased, and later that morning she was able to get her almost-4-year-old son, Ellis, off to daycare without a hitch.

But soon the pain returned so intensely that Laura, who was 20 weeks pregnant, curled into a ball on the floor. She called her obstetrics practice, Women for Women OB/GYN—whose providers are affiliated with Lankenau—and was instructed to go to the nearest emergency room.

“Luckily, I listened,” Laura says.

She's right—she is lucky. Although nobody knew it yet, Laura didn't have heartburn. She'd had a heart attack. The event set her on a scary but fortuitous path, starting at her community hospital and ending at home with a healthy baby boy named Rhys. In between, she was at Lankenau, where clinicians spanning more than half a dozen specialties collaborated to devise and execute a care plan that would repair her heart without compromising her pregnancy. They succeeded, shepherding Laura through what they believe was the first robotic coronary artery bypass grafting (CABG) surgery ever performed on a pregnant patient.

“This wasn't done cavalierly; no decisions were made in isolation,” says Katie Hawthorne, MD, Laura's cardiologist and an expert in cardio-obstetrics. “Laura's case exemplifies teamwork. As soon as she came in, we were involving cardiology, interventional cardiology, cardiac surgery, anesthesia, OB, maternal-fetal medicine, our pharmacist, and a million nurses—an army of people who would get her healthy and through the rest of her pregnancy. Our ability to put this team together is a major strength of Lankenau. Everyone we needed was right here, ready to put their heads together.”

### UNEXPECTED CHALLENGES

Laura and her husband, Erick, always wanted to have children. In 2008, a year after they married, they bought a house in Springfield, PA—a cozy three-bedroom that backed up to a park with a playground they envisioned their future children enjoying.

Difficulties conceiving left them crestfallen, and a decade passed before they finally welcomed Ellis. They returned to their fertility specialist in early 2021 and were relieved when Laura got pregnant again. After falling ill halfway through her second trimester, she exhaled when the staff at her local hospital, which was only partly operational due to COVID-related staffing issues, transferred her to Lankenau.

“This pregnancy was very hard to achieve and very important to me,” she says. “We still didn't know what was wrong at that point, and I needed to feel confident that all the right people were considering both me and my baby at every step.”

Lankenau cardiologist Eric Gnall, DO, took Laura to the cardiac catheterization lab, where testing revealed two blockages in her coronary arteries—the vessels that carry oxygen-rich blood to the heart to keep it functioning. He admitted her to the intensive care unit immediately.

Heart disease has been on the rise in younger women. According to research published in the journal *Circulation*, over the past two decades, the percentage of women age 35 to 54 hospitalized for heart attacks rose from 21 to 31 percent—likely due to increased risk factors like obesity, sedentary behavior, hypertension, diabetes, and stress. Even though Laura has a family history of heart problems, coronary artery disease—caused when fat, cholesterol, calcium, and other substances build up and block blood's path to the heart—is an unusual diagnosis in women of childbearing age.

“When she first arrived, we were not even thinking she'd had a heart attack, because it is so rare for a 40-year-old to develop



L to R: Katie Hawthorne, MD, Cardiology-Obstetrics; Grace Levine, MD, Obstetrics-Gynecology, and Gianluca Torregrossa, MD, Cardiac Surgeon

coronary artery disease. We generally see that in patients in their 60s or older,” says Gianluca Torregrossa, MD, Director of Robotic Coronary Surgery and Coronary Revascularization and the surgeon who ultimately performed Laura’s procedure. “This is not a patient we would generally treat for this type of disease, and it was complicated. We didn’t want to place stents, because while they can be a good solution, to deploy them you need to give radiation and medications that are not safe in pregnancy.”

Says Hawthorne, “So, after about 27 phone calls and meetings where we played out every possible scenario and its risks, we decided that what was best for Laura long-term was cardiac bypass. There is no way she could have waited until after delivery. It could have ended in disaster for her and then, of course, for her pregnancy.”

Surgery was scheduled for Dec. 22, and Laura prepared herself to spend Christmas in the hospital.

### A FIRST FOR ALL

During CABG, blood vessels taken from other parts of the body are connected above and below a narrowed or blocked artery to reroute blood so it reaches the heart. In conventional open-heart surgery, a patient’s sternum, or breastbone, is cut in half so the surgeon can access the organ, which is stopped temporarily while an external heart-lung bypass machine pumps blood throughout the body.

Such an extensive procedure is not ideal during pregnancy, so Laura’s team broached the idea of doing it robotically. Robotic surgery, a minimally invasive alternative in which a surgeon views the operative field three-dimensionally on a monitor while controlling a set of robotic arms that precisely replicate his or her hand movements, brings clear advantages: smaller incisions, a reduced infection risk, less bleeding and postoperative pain, and shorter inpatient stays and recovery times. In the case of CABG, it eliminates the need to stop the heart.

The Lankenau Heart Institute is one of few institutions worldwide that offer robotic coronary surgery, and Lankenau performs the highest volume of robotic coronary surgery anywhere. Even so, the leaders of the robotic coronary revascularization program—Torregrossa and Chief of Cardiac Surgery Francis Sutter, DO—had never operated on a pregnant patient. To their knowledge, neither had any other robotic CABG surgeons around the world.

“Women have surgery during pregnancy all the time, just not this kind,” says Grace Levine, MD, one of Laura’s obstetricians, referring to procedures for conditions like appendicitis, gallbladder disease, intestinal obstructions, and ovarian cysts. “People can get nervous about treating pregnant patients, but we needed to put Laura first, because she was not just a vessel. She was our primary patient. And without her, her baby would have nothing.”

The morning of Laura’s surgery, Torregrossa queued up his standard surgery playlist (which starts with Pearl Jam and

ends with Pink Floyd), took a quiet moment to breathe deeply and clear his mind while scrubbing in, then joined a large supportive team for the nearly five-hour procedure, during which her fetus's heartbeat was continuously monitored. Using Laura's left internal mammary artery as a graft to bypass her blockage, he succeeded in restoring blood flow to her heart.

"I do robotic bypass surgery and open-heart surgery every day, but that day was unique," Torregrossa recalls. "This is the first time we were able to minimize the risk for a mother and her pregnancy by not opening the chest and stopping the heart. The beauty of this, it is difficult to explain. I do not have the words."

Three days later, Laura went home, thrilled to see her son Ellis for the first time in two weeks—on Christmas afternoon.

## A FOREVER PATIENT

On May 2, after pushing for only eight minutes, Laura delivered baby Rhys at Lankenau.

"I'd felt so bogged down during my pregnancy, just fatigued, and getting through surgery, recovery, cardiac rehab, and all the nerves. Once he was in my arms, he was so perfect—I knew we were both going to be OK," she says.

Everything that happened is "still sinking in," remarks Laura, who will need to manage her risk factors and take medications for the rest of her life. She continues to do well, though, and is back to work as a program director with an economic education-focused nonprofit organization. She credits her family, who rallied to help Erick care for Ellis throughout her ordeal, with making her recovery possible. And, of course, Erick himself "is a total rock star, too."

When asked to describe how she feels about her experience at Lankenau, Laura immediately replies with "full of profound gratitude."

"Everyone took a lot of time to communicate with each other and to explain everything to me," she says, recalling some of the moments she remembers most vividly—like the time Sutter drew a picture of the heart and showed exactly where her blocks were and how they would be fixed.

And how every morning, maternal-fetal medicine resident Shana Dalal, MD, came to do a Doppler on the baby's heart—then pushed an ultrasound machine to the Heart Pavilion just before surgery, and even did another ultrasound as soon as it was over "to reassure me and give me a boost."

And Hawthorne's daily visits to her in the ICU.

And the many check-ins from anesthesiologist Mark Berguson, MD, both before and after surgery.

And the day staff from the Cardiac Rehab Center surprised her with baby gifts.

And, finally, the moment Torregrossa got to meet two-day-old Rhys, just as he and Laura were being discharged.

"It was such a team approach from beginning to end. I can't even name them all," she smiles. "Just the fact that I landed at Lankenau—that the top people in this kind of surgery were there—it feels like it was meant to be." ■



## DONORS POWER ROBOTICS PROGRAM

Francis Sutter, DO, Lankenau's Chief of Cardiac Surgery, is a pioneer in minimally invasive surgery who has performed more robotic coronary bypass procedures than any surgeon in the country—a milestone he could not have reached without support from generous donors.

Thanks to philanthropy, Lankenau obtained its first da Vinci robotic surgery system in 2005; its fleet now numbers six devices that are used across surgical specialties. The institution's renowned robotics program helped draw Gianluca Torregrossa, MD, to Lankenau in 2021.

"It is one of the most rewarding experiences to work for an enterprise that has such incredible people making this type of donation—a donation that has direct impact on human life," he says. "Lankenau has the most successful robotic coronary program in the country—not on the Main Line, not in the Philadelphia area, but the whole country—thanks to the donations of individuals. I just want to say thank you to all of them."

Lankenau also stands out for its cardio-obstetrics program, which provides comprehensive cardiovascular care to pregnant patients, guiding those with underlying cardiac conditions safely through their pregnancies and managing pregnancy-related complications such as hypertension and preeclampsia. These complications increase the risk of future cardiovascular events, so cardio-obstetricians like Katie Hawthorne, MD, at Lankenau ensure that patients' prevention efforts start early and strive to cover gaps in care for underserved populations.

Gifts to Lankenau's robotic surgery and cardio-obstetrics programs make a very real difference for patients and attract world-class surgeons and clinicians to the institution. In 2023 we are launching a campaign to honor Dr. Scott Goldman and Dr. Fran Sutter—two pioneers in bringing cardiac robotic surgery to Lankenau. To learn more or make a gift, contact Lankenau's development office at 484-476-8101.