Three-year-old Casey Lopez and the surgeons who operated on her lung, Dr. Sandra Tomita and Dr. Keith Kuenzler.
IN PEDIATRIC SURGERY, LESS IS MORE

by JANE BOSVELD

MINIMALLY INVASIVE SURGERY ALLOWS SURGEONS TO REPAIR CONGENITAL DEFECTS THROUGH TINY INCISIONS.

photographs by ELIZABETH WEINBERG
A PRE-OP ROOM AT TISCH HOSPITAL. CASEY LOPEZ, THREE, IS PERCHED RESTLESSLY ON A LARGE BROWN CHAIR, TUGGING ON HER PIGTAILS AND TALKING A BLUE STREAK TO HER MOTHER, GEOVANNE.

Suddenly, she wound down. “I wanna go to bed,” she announced, and crawled onto her mother’s lap. “She’s getting tired,” Geovanne said softly. The sedative Casey had received a few minutes earlier had taken effect. Soon after, she was wheeled into the operating room.

Casey is one of 3 million children who have surgery in the U.S. each year to fix a birth defect. Unlike many, however, Casey was set to undergo minimally invasive surgery, the approach of choice at NYU Langone Medical Center’s Division of Pediatric Surgery. Once reserved for adults, the technique has, with the design of miniaturized equipment, recently become possible for infants and children, allowing safer operations at earlier ages and with less trauma, pain, and scarring.

Even before Casey was born, doctors knew that she had a large abnormality in her left lung that might have to be removed. “My gynecologist saw it on a sonogram,” says Geovanne. Further testing revealed that it was a congenital cystic adenomatoid malformation, a rare condition in which embryonic tissue fails to develop as part of the tracheobronchial tree and occupies a lobe of the lung as a nonfunctioning mass of tissue. In some people the tissue causes no symptoms and lies dormant. In others it can lead to fatigue, breathing difficulties, dangerous infections, and rarely malignancy. Either way, the mass must be removed.

Casey’s development did not go smoothly. She was hospitalized with pneumonia at four months, and subsequently developed three other serious lung infections that required her to be hospitalized over the following 26 months. She also tired easily and had developed asthma by age two. Casey’s pulmonologist referred her to pediatric surgeon Sandra Tomita, MD, FACS, FAAP, who evaluated her for the operation. Casey’s youth was a plus. “The younger the patient, the easier it is to remove the abnormal lung tissue,” explains Dr. Tomita, assistant professor of pediatric surgery. “And it frees space in the lung cavity for the normal lung to expand.”

THE QUESTION FOR DR. TOMITA WAS HOW TO DO THE SURGERY. The standard technique for removing a mass of cystic lung tissue is to make a large cut through the chest cavity to get to the abnormal tissue, an approach that can cause long recovery and severe pain, as well as permanent musculoskeletal deformities and disfiguring marks. To reduce the likelihood of these effects, Dr. Tomita says, “We wanted to use minimally invasive techniques and remove the tissue through small thoracoscopic [minimally invasive surgery in the chest or thorax] incisions.” But she worried that Casey’s infections might have created scarring in the lungs, inhibiting this approach.

So Dr. Tomita consulted with her colleague Keith A. Kuenzler, MD, FACS, FAAP, a leading expert in pediatric minimally invasive surgery. They agreed that the best approach would be to make three small incisions of about five millimeters each. If scar tissue hindered extracting tissue, they would then resort to the standard, larger cut to open Casey’s chest. “But I was fairly certain we’d be able to do it with minimally invasive techniques,” recalls Dr. Kuenzler, assistant professor of pediatric surgery, who joined NYU Langone Medical Center in 2009.

“Care for children has changed in general,” observes Howard B. Ginsburg, MD, director of the Division of Pediatric Surgery. “Many more kids who are born at, say, 30 weeks’ gestation survive today.” And with the advent of new techniques, “We’re able to repair general anomalies surgically at much younger ages on much smaller babies,” says Dr. Ginsburg, who founded the pediatric surgery division in 1980 and has seen the field evolve over the past three decades.

Unlike surgeons with adult patients who tend to specialize in one organ system, pediatric surgeons are truly general surgeons adept at handling a range of operations, from correcting birth defects to repairing hernias and removing appendixes and gallbladders “We’re like old-fashioned doctors,” Dr. Ginsburg says, “like the adult surgeons who used to do everything.” The array of challenging problems is what draws physicians to the field. “If you go into any other field of general surgery, you really don’t get to work in the chest anymore,” notes Dr. Kuenzler. “In pediatric surgery, we operate on the esophagus, lungs, chest wall, and diaphragm, and all of these operations can be done with minimally invasive surgery.”

Another attraction is the deep connection with their scared small patients and worried families. “Most pediatric surgeons like being around children,” says Dr. Ginsburg. “When you make them better, you may become part of the family, and it can be a lifelong affiliation. I have been fortunate to see many of my patients grow up to be wonderful productive adults,” he says. “In
fact, the emotional rewards are extraordinary.”

Dr. Tomita felt the same pulls. She began her career in the military and spent seven months in Iraq in 2004. “I was in Fallujah when the insurgency started,” she says. “We took care of multiply injured marines, soldiers, and Iraqis including some children, with limited equipment and often under indirect fire.” When she left the military, Dr. Tomita joined NYU Langone Medical Center. She is among the growing number of women in the field. Today 19 percent of all pediatric surgeons are women, according to the American Pediatric Surgical Association. There are approximately 800 practicing pediatric surgeons in the United States.

Before 2000 the tools used in minimally invasive operations were too large for children and infants; they became child-friendly-sized only in the last decade. The advance has enabled pediatric surgeons to operate on children more safely and earlier. “A lot of parents are afraid to send their children in for major surgery to remove a lung mass that hasn’t caused any symptoms yet,” notes Dr. Kuenzler. “They figure, ‘let’s wait until there’s a problem.’ But the trouble with that strategy is that the operations can be much more difficult and invasive when the children are older and have already suffered infections.”

Dr. Kuenzler tells the story of a seven-year-old girl who had the same birth defect as Casey. The girl had had at least two bouts of pneumonia every year of her life before her parents brought her in for surgery. “We hoped we’d be able to remove the abnormal lung mass thoracoscopically,” he says, “but there was so much inflammation, it wasn’t safe to do it that way.” He was forced to open her chest with a much larger incision to reach the tissue by hand. The operation was successful, but the girl suffered much more pain and took much longer to recover than if the operation had been performed earlier with minimally invasive techniques.

Fortunately for three-year-old Casey, Drs. Tomita and Kuenzler were able to operate using minimally invasive surgery. They made two tiny cuts, one of which was used to insert a camera and other tools, another for the incision, and a third, slightly larger cut through which to extract the tissue. Pediatric anesthesiologist Inca Chui, MD, assistant professor of anesthesiology, deflated Casey’s left lung and Drs. Tomita and Kuenzler detached the airway and blood vessels to the lobe of the lung they wanted to remove. When the entire lower lobe was separated, it was cut into smaller pieces to be removed through the tiny incision.

Two days later, Casey was back home, a bit tired but with pain so minor that all she needed was acetaminophen. When she plays with her toys, she sometimes starts breathing heavily. But, her mother says, “After I set her down and we practice the really deep inhaling, she calms down and is good. She has only these three tiny incision cuts.”