

Pediatric minimally invasive surgery is a logical and integral part of

Baystate's Minimally Invasive Surgery Program of Distinction.



Kevin Moriarty, MD, a pediatric surgeon on staff at Baystate, shows the difference between the adult sized instrumentation and the infant-sized.



MINIMALLY INVASIVE SURGERIES

Available for Baystate's Smallest Patients

By Jonathan Kranz

Over the last eight months, Baystate Medical Center Children's Hospital has aggressively applied the latest advances in minimally invasive surgery (MIS) to its smallest patients: newborn infants.

According to Richard Wait, MD, PhD, chairman of the Department of Surgery, "Pediatric minimally invasive surgery is a logical and integral part of Baystate's Minimally Invasive Surgery Program of Distinction. This approach requires both special equipment and expertise, but results in significantly less postoperative pain, shorter recovery time, and less physiological and psychological stress for patients and their families."

Bhavesh Shah, MD, director of the Newborn Intensive Care Unit, points to another advantage of great comfort to families, "Parents love it because there are no major surgical scars. Families are very appreciative of anything that minimizes the trauma to their child and allows for earlier discharge from the hospital."

Instrumentation and Training

Surgeons have long hoped to apply MIS techniques to babies, but the application of the procedures was delayed by the large size of the available instruments. In recent years, however, medical device manufacturers have created surgical instruments as small as 3mm or even 2mm wide.

"As a result," says Kevin Moriarty, MD, a pediatric surgeon on staff at Baystate, "we're able to use laparoscopic techniques on neonates as small as 2kg in weight." Today, about 30 to 50 percent of all pediatric surgeries at Baystate Medical Center Children's Hospital are performed laparoscopically. Dr. Moriarty, with pediatric surgeons Richard Courtney, MD; Barry Sachs, MD; and Stanley Konefal, MD, is responsible for MIS procedures on infants.

Special Challenges

Neonates present two special challenges for surgeons. The first is a small working space and a limited tolerance for increased air pressure. To create more space, surgeons administer air pressure within the abdomen; but since infant lungs are small and not fully developed, surgeons can only apply half the pressure that can be used with older children and adults. The second challenge is the infant's inefficient thermal regulation—neonates lose heat quickly, requiring fast work on the part of the surgical team.

Both challenges demand expert surgical support. At Baystate, Donald Schwartz, MD, chief of Pediatric Anesthesia, is responsible for the precise management of anesthesia during infant MIS. "Because we have to work fast," says Dr. Moriarty, "it is extremely important that the nurses and surgical technicians anticipate the surgeon's needs. Fortunately, our nurses and surgical



Making the Hospital Experience Easier for Children & Families

Maureen McCarthy, an OR Child Life Specialist at Baystate Medical Center Children's Hospital, treats an aspect of surgery that remains the same whether the procedure is open or laparoscopic: patient and family anxiety. As the Child Life Specialist assigned to pediatric surgery, her job, Ms. McCarthy says, "is to make the hospital experience for children and families easier."

Ms. McCarthy's work has three dimensions: play, education, and preparation. She makes the playroom "an environment that's normal for kids, with Nintendo, TV and toys," and prepares families by explaining what's going to happen at every step. "Surprises aren't good," she says. "Information is reassuring." Once a week, she guides families on a tour of the facilities so that when it comes time for the surgery, "it's familiar and less threatening."

Most importantly, she keeps the parents and children together as much as possible. She finds space for nursing mothers and their babies. To reduce fear, she accompanies a parent with the child into the operating room during induction. "I coach and support," Ms. McCarthy says. "We give the child something to focus on. We do anything it takes to make everything okay!"

technologists, including Laura Harnois, RN, and Lori Rowe, CST, are exceptionally well-trained." Lead nurse Patricia Tinervia supports the team beforehand by identifying companies that can provide the unique supplies, such as small instruments, for infant MIS.

Common MIS Procedures

In the fall of 2002, Dr. Moriarty performed a number of complex colon surgeries, including at least three operations on patients with Hirschsprung's disease. Infants with this disorder lack ganglion cells in a portion of the large intestine, thus preventing gut peristalsis and the passage of stool. For healthy bowel function, the aganglionic tissue must be removed. Before MIS was available, surgery was delayed until the patient was old enough to tolerate the open surgery required to pull the bowel down; in the interim, these infants were given colostomies. Now, the minimally invasive endorectal pull through can be performed on neonates, eliminating the need for the colostomy. The procedure requires just three or four 3-5 mm incisions, and recovery time in the hospital is just two to three days, as opposed to five to seven days for the open surgery.

Another common colon surgery is repair of the imperforate anus. In the traditional approach, surgeons had to cut through the sphincter to find its center; after connecting the sphincter to the bowel, the sphincter had to be reconstructed. The laparoscopic technique, however, enables the surgeon to find the center without unnecessary incisions, eliminating the reconstruction. Again, expert surgical support is crucial to the procedure's success. "Anesthesia for the laparoscopic anoplasty is particularly tricky," notes Dr. Moriarty. To find the sphincter, the surgeon must apply electrical stimulation to detect muscle movement; the infant, therefore, cannot be paralyzed, but is still asleep.

The two other most common infant MIS procedures are Nissen fundoplication—the surgical formation of a virtual "valve" in the lower esophagus—for infants failing to thrive due to extreme gastro-esophageal reflux, and evaluation for non-palpable testes.

In older children, minimally invasive techniques are also used at Baystate for evaluation of contra-lateral hernias, bowel resections, nephrectomies, splenectomies, cholecystectomies, appendectomies, lung decortications and bleb resections, plus rare procedures such as the Heller myotomy and the intra-operative cholangiogram to rule out biliary atresia in jaundiced neonates.

Patient Selection

Technological advances have made MIS a more viable alternative to open surgery for more infants. Greater control of abdominal air pressure, for example, allows surgeons to work laparoscopically on infants with heart disease who would previously have been disqualified for MIS. Today, disqualification is limited to premature infants with severe bronchopulmonary dysplasia who cannot tolerate increased abdominal pressure, and patients with accumulated scar tissue from multiple previous abdominal surgeries.

Baystate surgeons agree that MIS will play an integral role at Baystate Medical Center Children's Hospital. "We are delighted with the inroads made in pediatric minimally invasive surgery at Baystate," says Dr. Wait, "and as we recruit more surgeons with special expertise in this area, I expect an ever-increasing shift away from the traditional open-surgery approaches in favor of the minimally invasive approach."

Edward Reiter, MD, chairman of the Department of Pediatrics, agrees. "The minimally invasive approach is another example of how Baystate Medical Center Children's Hospital offers state-of-the-art care and expertise to the children and families in our region."

For more information about infant minimally invasive surgery, call the Department of Pediatric Surgery at (413) 734-3222.



MIS Brings Baby Home, Fast

Just days after the birth of their first child, Kelly and Edward King of North Adams heard the words no parents want to hear: their newborn needed surgery.

Their baby, Janine, hadn't been able to have a bowel movement. A biopsy revealed that the blockage was caused by Hirschsprung's disease. "I had never heard of it before," says Kelly. "All I heard was 'surgery' and being a new mother, I panicked."

Edward met with Dr. Moriarty who explained the open and MIS surgical options. Since the intestinal damage was modest, Janine was a candidate for the laparoscopic approach, which, Kelly says, was a "big relief, but we were afraid of the anesthesia."

The surgery took only two and a half hours. Within just 30 minutes of the operation, Janine was out of anesthesia and fully conscious. In two days, she went home with her parents.

"She's doing great," Kelly says. Before the operation, Kelly and Edward had to give Janine enemas four to six times a day. Now, Janine passes stool on her own, without straining. Best of all, Kelly says, "She's up to eight pounds, five ounces, and she's healing nicely."