

ASPS member leads separation of conjoined twins

BY KENDRA Y. MIMS

More than 50 medical staff from Maria Fareri Children's Hospital in Valhalla, N.Y., collaborated in January to perform the hospital's first separation of conjoined twins.

The complex, 21-hour procedure required a multidisciplinary team that included plastic surgeons, pediatric neurosurgeons, orthopedists, pediatric surgical nursing specialists, social workers, anesthesiologists and other health-care professionals.

The 11-month-old pygopagus twins, Ballenie and Bellanie Camacho, were connected at the sacrum, a triangular bone at the base of the spine. They had gastrointestinal connections and a shared branch of the hypogastric artery. The procedure required separating Ballenie's and Bellanie's gastrointestinal connections, hypogastric artery branch, bladders, lower portions of their spinal cords and the reproductive areas they shared with common tissues.

ASPS member Kaveh Alizadeh, MD, chief of the division of plastic and reconstructive surgery at Westchester Medical Center (WMC) and New York Medical College, led the reconstructive portion to prepare the girls for their surgery – which involved the expansion of skin surface over the course of several weeks prior to the separation procedure that occurred Jan. 17-18. Dr. Alizadeh performed the first placement of tissue expansion on the twins last November.

"I placed a total of six tissue expanders, and I was able to slowly expand the babies over time," Dr. Alizadeh says. "Finally, in January we proceeded with the operation to separate the twins. My plastic surgery team started by mapping out the flaps. We raised these large flaps; the pediatric orthopedic team disconnected the hip; the neurosurgery team separated the spinal cord; and the urologists were able to repair the posterior vagina. The pediatric surgeons were able to separate the deep pelvic vessels and the rectum by providing a colostomy. Then we switched the hospital beds to an L-formation for the operation."

Dr. Alizadeh was then joined by fellow ASPS member Frank Winski, MD, and the rest of the plastic surgery team at the end of the operation to close the wounds.

"The best way to picture the closing procedure is to imagine splitting a volleyball in half and then bringing the rest of the ball's surface around to close the separation," he says. "That was the defect we were dealing with. We had to get each baby covered. We performed a series of rotation advancement flaps to get the wounds fully closed."

A communal effort

The Camacho twins were born on Feb. 4, 2016, in Moca, Dominican Republic. Due to their medical condition, a family friend referred their parents to specialists at Maria Fareri Children's Hospital last spring for a medical evaluation. A team of surgeons per-



Ballenie and Bellanie Camacho (left) were born connected at the sacrum and were separated at 11 months of age by a surgical team led by ASPS member Kaveh Alizadeh, MD, who recently celebrated the twins' first birthday with the babies and their parents (top and bottom right).

formed an observation through WMC Health's telemedicine program in conjunction with an online video interview with the parents. The family arrived to the hospital at the end of last summer for further evaluation, and plans for the procedure developed.

"We performed a video consultation first, and we put a group of specialists together at the medical center," Dr. Alizadeh says. "Obviously, we wanted to examine the children first, but we felt the benefits would outweigh the risks and we could be successful in the separation, so we invited the parents to come. The core team of surgeons had regular meetings when we started planning for this operation. Based on our meetings, we obtained a substantial amount of radiographic studies, including MRIs and 3-D CT scans, to understand the complexity of the anomalies much better."

The surgical team prepared extensively for the separation procedure months in advance, including conducting research, performing simulation procedures and using 3-D models. Dr. Alizadeh says the procedure was a major communal effort between the industry, vendors, hospital administration, surgeons and others to assist the low-income family and improve the quality of life of the twins. The family never had to pay for anything.

"The parents are poor and young from the Dominican Republic," he says. "All the care was provided for free and was done *pro bono* as a communal effort. We even went to the U.S. Immigration and Naturalization Service and asked permission to provide free service. We are also grateful for the sponsors of this surgery. Allergan provided the tissue expanders as a free service for this operation.



Sientra provided a second set of expanders that allowed us to complete the procedure for the babies. 3-D Systems provided the 3-D printing of the anatomical parts and Acelity allowed us to use an incisional management dressing for completion of the operation. And of course, WMC Health took on the entire cost of the hospitalization for the twins, which included a two-month stay."

"The CT scan and MRI we were provided with gave us simulated models of the girls' surface and pelvic anatomy," Dr. Alizadeh says. "The company created a skin model that I used for the reconstruction, as well as a spine and vessel model for the other surgeons. Given what 3-D Systems created, we started planning and mapping-out how we were going to do the surgery. This allowed us precise mapping of the rotations and the surface area requirements for the flaps."

Navigating the unexpected

As the lead plastic surgeon in a separation surgery for the first time, Dr. Alizadeh describes the experience as "very exciting." He concedes the anticipation made it difficult to rest the night before the surgery.

"I was constantly mulling all the potential three-dimensional variations of how this could turn out depending on how the division would happen, the amount of tissue we would need and how we would have to move that tissue in three-dimensional space," he says. "We undertook a thorough review of the literature, which is very scant on conjoined twins, so I reached out to a few colleagues across the country who are a lot more experienced than I am, to get their perspective and opinions about this particular case. The three-dimensional models were

also very helpful."

Still, the unique case made it impossible for Dr. Alizadeh and his team to predict unforeseen complications. Due to the girls' condition and inability to move, their expanders became exposed as they traveled in a modified car seat.

"When the case is this unique, there are always nuances that happen that you don't expect," he says. "One of those nuances was this complication due to the placement into the car seat, which caused exposure of the tissue expander. I had to revise the expanders until we were able to get a satisfactory expansion of the tissues. As long as you're able to adhere to the principles of plastic surgery, you can always take care of the problems and get things back on track, which we were able to do."

Despite the expander exposure and procedural challenges (e.g., placing the girls in a unique sitting position during separation surgery, the rotation of teams and the safe, coordinated transfer of one twin to the O.R.), the operation was a complete success. Dr. Alizadeh happily reports that both girls are doing well and display no evidence of complications.

"They are moving their legs and are able to sit up, and we look forward to celebrating their birthday tomorrow," he adds. "They spent several weeks in recovery, and because they're babies, I think they'll be able to recover pretty quickly. At some point in the future, they'll need some other procedures done as they grow to help encompass their growth."

A promise fulfilled to do more

Dr. Alizadeh notes the request he made to the parents right before his team undertook the separation operation.

"One of our concerns after this operation was if the girls would be able to use their legs and walk because of the connection of the spine," he says. "I told their parents: 'If I'm successful, you have to promise me that I get to dance with both of them at their wedding.' The first thing their mom told me after the operation was, 'The wedding invitation is on its way.' We are very happy everything is working the way it should, and they are healing well postoperatively."

Dr. Alizadeh says he's thrilled to have been a part of Maria Fareri Children's Hospital's historic moment – and that he would consider undertaking another separation procedure in the future.

"The beauty of this case was that no one became engaged or involved because of a financial reward or any other reason other than to help this family by combining our skills, which would have been impossible in an isolated specialty or an isolated setting," he says. "The highlight of this experience for me was to be able to take on a highly complex case that's unique in its nature, bring together a group of experts at WMC Health, and really work together and become a family – because we all had a common goal to help these girls." [PSN](#)