

BELLYBUTTON BRAIN SURGERY

Saves Miracle Baby

Rosanna Martinez was thrilled to welcome her second child, Carolyn Rose, into the world last November.

Shown from left: Carolyn Rose, now 9 months, was diagnosed with a life-threatening brain malformation at birth, giving her a less than one percent chance of survival. Thanks to the high level expertise and coordinated medical and surgical pediatric care available at The Bristol-Myers Squibb Children's Hospital at Robert Wood Johnson University Hospital, a minimally invasive procedure done through Carolyn's bellybutton saved her life.



At 36 weeks, her pregnancy appeared to be progressing normally but following a routine ultrasound, her "nightmare" began.

The test performed on her unborn baby, Carolyn Rose, revealed a dilated vessel in her brain. Doctors ordered an MRI for Ms. Martinez and Carolyn Rose, to get a better view of the vessel which confirmed her worst fear: there was an Arteriovenous Malformation (AVM) present. AVMs are abnormal, tangled blood vessels that can severely disrupt connections and blood flow between the arteries and veins.

"I was devastated and couldn't stop crying," Ms. Martinez said. "But I just knew that she was going to be okay."

Carolyn had a rare type of AVM known as a Vein of Galen Malformation (VOGM). VOGMs often develop before birth and are sometimes diagnosed in the womb or soon after birth. This malformation involves the arteries (blood vessels that carry blood into the body) and the veins (blood vessels that return blood to the heart). Normally, arteries and veins are connected by capillaries that monitor and slow the pace of blood flow through the brain. VOGMs have no capillaries causing blood flow to become too fast, making the baby's tiny and still developing heart work too hard, leading to heart failure and death.

"Less than one percent of the infants diagnosed with this condition survive," stated **David Sorrentino, MD**, Assistant Professor of Pediatrics and Chief of the Division of Neonatology at Rutgers Robert Wood

Johnson Medical School and Medical Director of the Level III Neonatal Intensive Care Unit at The Bristol-Myers Squibb Children's Hospital (BMSCH) at Robert Wood Johnson University Hospital (RWJ) New Brunswick. Dr. Sorrentino worked very closely with **Arun Kashyap, MD**, Assistant Professor of Pediatrics at Rutgers Robert Wood Johnson Medical School, who is also an attending neonatologist in the NICU at BMSCH, to manage baby Carolyn's daily care.

Carolyn needed a complex, yet delicate type of noninvasive, brain surgery, also known as a neurointerventional procedure, to survive. Once the diagnosis was confirmed, Ms. Martinez was transferred to BMSCH, where a highly skilled multidisciplinary team that included neurosurgeons, neurointerventional radiologists, neonatologists, high-risk maternal-fetal specialists, pediatric cardiologists and neonatal nurses had been collaborating to develop the care plan that would save Carolyn's life.

The plan was to have Ms. Martinez deliver the baby, then perform a series of tests to assess the severity of the VOGM and the condition of the baby's heart. Carolyn was born on November 13, 2015. Three days later, **Sudipta Roychowdhury, MD**, Clinical Associate Professor of Radiology at Rutgers Robert Wood Johnson Medical School and Director of Interventional Neuroradiology at RWJ, and **Gaurav Gupta, MD**, Assistant Professor of Surgery at Rutgers Robert Wood Johnson Medical School and Director of Cerebrovascular and Endovascular Neurosurgery at RWJ, inserted a catheter in Carolyn's bellybutton and

threaded it up to her brain, giving them access to the VOMG. Doctors then used a cannula, or tube, less than the width of a spaghetti strand, to inject a glue-like substance into the tangled vessels shutting down blood flow to the VOGM. Starving the mass of blood flow eventually shrinks or destroys it, allowing the baby's blood to flow normally through the brain and the heart to pump blood at a normal pace. They repeated this procedure four times, entering through Carolyn's legs and arms, to shrink the VOGM and maintain adequate blood flow.

"No known open cranial surgery has worked in these cases, so this was our best and only option," Dr. Gupta said.

Dr. Roychowdhury added, "We are the only multidisciplinary neurosurgery center in New Jersey with the capability to perform such a delicate surgery."

It's often said that it takes a village to raise a child; in this case it took a village to save one, with a large multidisciplinary team working around the clock to save Carolyn, who is recovering well.

"BMSCH gives you what no other place in the state gives you," Dr. Sorrentino said.

"The doctors and nurses were amazing," Ms. Martinez said. "They are great people who have a special place in our hearts. We thank God every day for Carolyn Rose and we know that we've been blessed with such a wonderful little girl. Miracles do happen!"

Visit www.bmsch.org/nicu or call 1-888-MD-RWJUH



Shown from left: Gaurav Gupta, MD, Assistant Professor of Surgery at Rutgers Robert Wood Johnson Medical School and Director of Cerebrovascular and Endovascular Neurosurgery at Robert Wood Johnson University Hospital (RWJ) New Brunswick; Arun Kashyap, MD, Assistant Professor of Pediatrics at Rutgers Robert Wood Johnson Medical School and an attending neonatologist at The Bristol-Myers Squibb Children's Hospital (BMSCH) New Brunswick; Sudipta (Sid) Roychowdhury, MD, Clinical Associate Professor of Radiology at Rutgers Robert Wood Johnson Medical School and Director of Interventional Neuroradiology at RWJ New Brunswick; and David Sorrentino, MD, Assistant Professor of Pediatrics and Chief of Neonatology at Rutgers Robert Wood Johnson Medical School and Medical Director of the Level III Neonatal Intensive Care Unit at BMSCH, led the development and coordination of the medical and surgical treatment plan that saved Carolyn's life.

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RWJBarnabas Health celebrates a special milestone in pediatrics: The Bristol-Myers Squibb Children's Hospital at Robert Wood Johnson University Hospital was recently named one of America's "Best Children's Hospitals" by U.S. News & World Report.