81. Boudjemline Y. The new Occlutech((R)) patent ductus arteriosus occluder: single centre experience. Arch Cardiovasc Dis 2016;109:384-9.
82. Wang-Giuffre EW, Breinholt JP. Novel use of the medtronic micro vascular plug for PDA closure in preterm infants. Catheter Cardiovasc Interv 2017;89:1059-65.
83. Kang SL, Jivanji S, Mehta C, Tometzki AJ, Derrick G, Yates R, et al. Outcome after transcatheter occlusion of patent ductus arteriosus in infants less than 6 kg: a national study from United Kingdom and Ireland. Catheter Cardiovasc Interv 2017;90:1135-44.
84. Santoro G, Giordano M, Gaio G, Palladino MT, Capozzi G, Iacono C, et al. Transcatheter closure of arterial duct in infants < 6 kg: amplatzer duct occluder type I vs amplatzer duct occluder II additional sizes. Pediatr Cardiol 2018;39:627-32.
85. Castaldi B, Santoro G, Gaio G, Palladino MT, Iacono C, Russo MG. Transcatheter closure of symptomatic arterial duct in infants younger than 1 year old. Pediatr Cardiol 2012;33:1397-401.
86. Mahmoud HT, Santoro G, Gaio G, D'Aiello FA, Capogrosso C, Palladino MT, et al. Single-center experience in percutaneous closure of arterial duct with Amplatzer duct Occluder II additional sizes. Catheter Cardiovasc Interv 2017;89:1045-50.
87. Choi GJ, Song J, Kim YS, Lee H, Huh J, Kang IS. Outcomes of transcatheter closure of ductus arteriosus in infants less than 6 months of age: a single-center experience. Korean J Pediatr 2018;61:397-402.
88. Regan W, Benbrik N, Sharma SR, Auriau J, Bouvaist H, Bautista-Rodriguez C, et al. Improved ventilation in premature babies after transcatheter versus surgical closure of patent ductus arteriosus. Int J Cardiol 2020;311:22-7.
89. Abu Hazeem AA, Gillespie MJ, Thun H, Munson D, Schwartz MC, Dori Y, et al. Percutaneous closure of patent ductus arteriosus in small infants with significant lung disease may offer faster recovery of respiratory function when compared to surgical ligation. Catheter Cardiovasc Interv 2013;82:526-33.
90. Jain SM, Pradhan PM, Sen S, Dalvi BV. Transcatheter closure of elongated and pulmonary hypertensive patent arterial duct in infants using Amplatzer vascular plug II. Cardiol Young 2020;30:1-6.

50 Years Ago in *THE JOURNAL OF PEDIATRICS*

Treatment of Renal Vein Thrombosis in Infancy: Fewer Surgical Interventions, More Survivors

Mauer SM, Fraley EE, Fish AJ, Najarian JS. Bilateral renal vein thrombosis in infancy: report of a survivor following surgical intervention. J Pediatr 1971;78:266-72.

Renal vein thrombosis (RVT) in infancy is a rare but life-threatening condition with long-term complications. The incidence of symptomatic RVT is 2.2 per 100 000 live births, and bilateral RVT is 25%-30%.[1,2] Risk factors include prematurity, sepsis, dehydration, congenital thrombophilia, central venous catheters, and at least 1 prothrombotic risk factor (found in 53% of cases). At the time "Bilateral Renal Vein Thrombosis in Infancy: Report of a Survivor Following Surgical Intervention" was published, bilateral thrombosis was almost always fatal. Although great progress has been achieved in understanding risk factors and pathophysiology, its diagnosis requires a high index of suspicion; the classical triad of a palpable flank mass, macroscopic hematuria, or thrombocytopenia is only present in 22% of cases, with most displaying only 1 of the signs: macroscopic hematuria (56%), thrombocytopenia (47.5%), or palpable flank mass (45%). Most cases of RVT occur within 3 days of birth (67%), 26% occur later, and only 7% in utero.[1] Contrast angiography was the only diagnostic modality available for this entity 50 years ago. It remains the gold standard but is rarely used, as safer and equally effective modalities, such as renal ultrasonography with Doppler, have emerged. Management includes thrombolysis and anticoagulation for 1-3 months.[3] Surgical intervention is rarely required. Mortality is 3% in all cases of RVT (unilateral or bilateral) and relates to underlying medical conditions that also cause RVT.[1] Long-term complications include hypertension (20%), kidney atrophy (70%), and chronic kidney disease requiring renal-replacement therapy in 3% (only in bilateral RVT).[2] An important key factor to today's successful management of RVT is a multidisciplinary team of neonatologists, radiologists, hematologists, and nephrologists.

Alexandra Mazo, MD
Beatrice Goilav, MD
Pediatric Nephrology
The Children's Hospital at Montefiore
Albert Einstein College of Medicine
Bronx, New York

References

1. Lau KK, Stoffman JM, Williams S, McCusker P, Brandao L, Patel S, et al. Neonatal renal vein thrombosis: review of the English-language literature between 1992 and 2006. Pediatrics 2007;120:e1278-84.
2. Resontoc LP, Yap HK. Renal vascular thrombosis in the newborn. Pediatr Nephrol 2016;31:907-15.
3. Monagle P, Cuello CA, Augustine C, Bonduel M, Brandão LR, Capman T, et al. American Society of Hematology 2018 Guidelines for management of venous thromboembolism: treatment of pediatric venous thromboembolism. Blood Adv 2018;2:3292-316.