

Title: Modalities of Vascular Access in Pediatric Hemodialysis

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"In 2019, the U.S. Renal Data System reported the point prevalence of ESRD as 98.7 children and adolescents per million population. Kidney transplantation is preferred over hemodialysis in younger patients with ESRD due to better outcomes. However, hemodialysis is begun as a bridging therapy until a kidney becomes available, and long-term vascular access is essential. There are three main modalities of vascular access used in children: central venous catheters (CVC), arteriovenous fistulas (AVF), and arteriovenous grafts (AVG).

CVC are ideal for emergent hemodialysis, as they do not require maturation. According to the 2019 National Kidney Foundation Kidney Disease Outcomes Quality Initiative guidelines, CVC placement in the right or left jugular veins has the lowest complication rate. Compared to AVF, the incidence of infection is higher in CVC (0.25/100 vs. 3.2/100 patient-months, respectively, in one study). Additionally, almost half of CVC fail within one year of placement, and 66% of failures arise from thrombus formation.

In contrast, studies have shown that AVF and AVG have much higher patency rates. The Midwest Pediatric Nephrology Consortium study showed that of 103 AVF and 14 AVG placed, only 16/117 (13.6%) developed primary failure, while 14/117 (12.2%) developed secondary failure. Location of the vascular access was predictive of secondary failure; radial sites had the lowest risk. Like CVC, thrombosis is a common cause of AVF and AVG dysfunction, but regular physical examinations can detect alarming signs accurately.

Each vascular access mode has a place in hemodialysis. It is the clinician's responsibility to endorse the best option for patients.

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