

**Title:** “Constant Site Hemodialysis in the Pediatric Population: Successful use of VWINGS in Three Patients”

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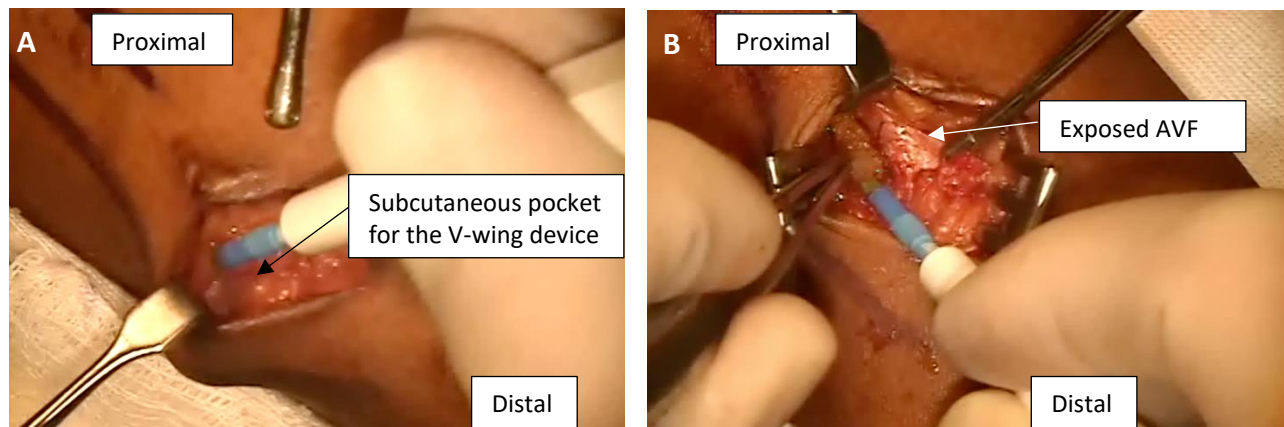
**Introduction:** Reliable vascular access for hemodialysis is challenging in the pediatric population. The Venous Window Needle Guide (VWING; Vital Access Corp, Salt Lake City, Utah) is an implanted surgical device that allows for constant site access but has not been reported in pediatric patients. The use of VWINGS has been studied in adults but there are no studies published looking at their use in the pediatric population. We hope that this case series highlights the possibility of VWINGS as an option to improve AVF access in pediatric dialysis patients.

**Case Description:** Three patients under 18 years of had a brachiobasilic fistula created with a minimum of 6 weeks for fistula maturation prior to VWING placement. This paper describes the management of constant site dialysis using VWING as well as strategies used for successful long-term management.

**Results:** Patients include a 15-year-old male with end-stage renal disease (ESDR) secondary to hemolytic uremic syndrome (HUS), a 14-year-old female with ESRD secondary to systemic lupus, and a 17-year-old female with ESRD secondary to rapidly progressive glomerulonephritis. All three patients had successful placement of VWING allowing for improved AVF access for dialysis for several years.

**Conclusion:** In our limited experience with VWINGS in the pediatric population, we have demonstrated a successful method of long-term constant-site dialysis using VWING as an adequate alternative to other interventions for difficult-to-access arteriovenous fistulas (AVFs).

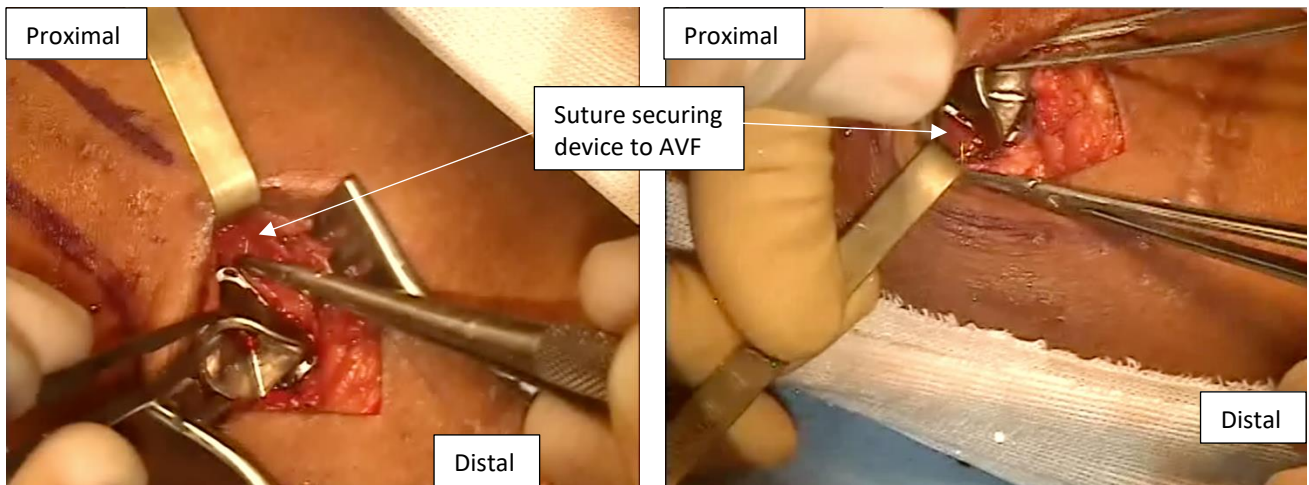
**Figures:**



**Figure 1.** (A) During dissection, the subcutaneous tissue is dissected to create a flap that will sit over the VWING. (B) Careful dissection of the fistula is then performed to create a landing zone for VWING placement.



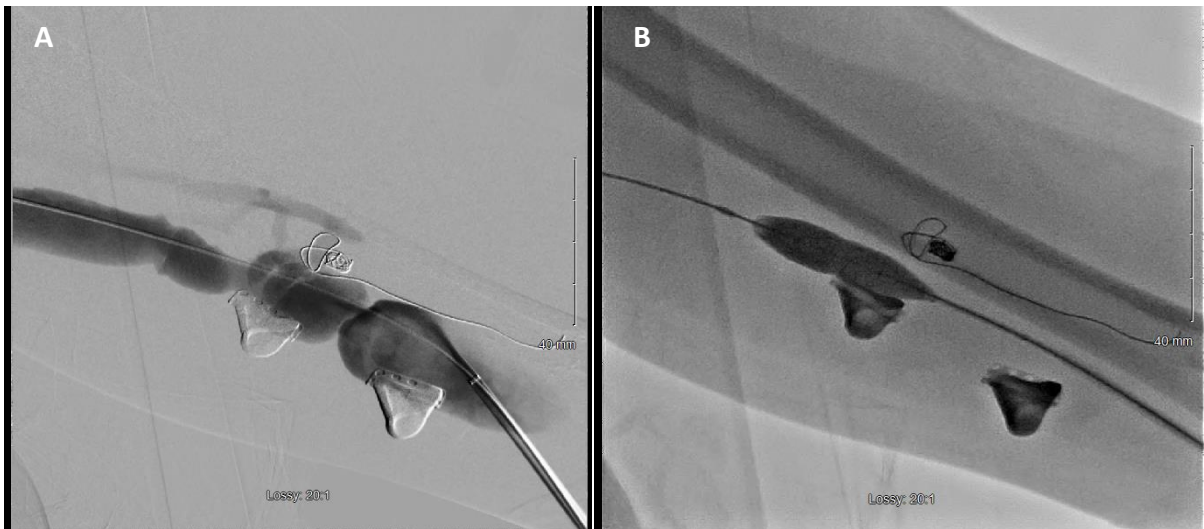
**Figure 2.** After dissection of the AVF is complete and a subcutaneous pocket is made, it is important to ensure the flap adequately covers the device with easy palpability.



**Figure 3.** The VWING is sutured circumferentially to the AVF using the device needle holes with 6-0 polypropylene.



**Figure 4.** Fistula catheterization for patient one demonstrating the placement of the VWINGs.



**Figure 5.** Fistula catheterization for patient three showing the areas of AVF stenosis (A), which was relieved by transcatheter ballooning (B).

**Table 1. Summary of patient information**

	Fistula	Age of VWING placement	Depth of #1 (Arterial site)	Depth of #2 (Venous site)	Disease	Outcome
Patient 1	Left internal jugular to right internal jugular vein	14 years	10x7 mm	10x7 mm	HUS	<ul style="list-style-type: none"> <li>• One-month initial insertion, patient was diagnosed with surgical cellulitis which required device removal</li> <li>• Six months later VWINGS were replaced</li> <li>• Used for HD 5 weeks after insertion</li> <li>• VWINGS remained in place for 6 years until the age of 21 when the patient received a kidney transplant</li> <li>• The VWINGS were removed shortly after transplanting due to lymphedema</li> <li>• Now 8 years post initial VWING placement and 2 years post-transplant and VWING removal, patient remains well with no further complications</li> </ul>
Patient 2	Right brachiobasilic	14 years	8x7 mm	10x8 mm	Lupus Nephritis	<ul style="list-style-type: none"> <li>• Used for HD 6 weeks after placement</li> <li>• During follow up, the patient had disrupted the VWING site during an act of self-harm and VWING was removed</li> <li>• AVF remained patent and was able to be used for hemodialysis for 7 years</li> <li>• At the age of 21 the patient received a kidney transplantation.</li> <li>• Following transplant, fistula site became infected and requires sleeves due to excessive swelling</li> <li>• Now 7 years after initial VWING placement and about 3 months post-transplant, the patient remains well without further need for hemodialysis</li> </ul>
Patient 3	Left internal jugular	17 years	10x7 mm	8x7 mm	Rapidly progressive glomerulonephritis	<ul style="list-style-type: none"> <li>• Used for HD 8 weeks after surgery</li> <li>• Developed late-onset left hand swelling and diagnostic catheterization revealed mild stenosis of the AVF which resolved with dilation using transcatheter ballooning</li> <li>• Continues to use AVF with VWING 5 years after placement (including after transplant rejection)</li> </ul>

**Table 2.** Unique Characteristics of the Pediatric Hemodialysis Population

<ul style="list-style-type: none"><li>• Pediatric patients are less tolerant of painful procedures, such as “rope-ladder” cannulation</li></ul>
<ul style="list-style-type: none"><li>• At-home hemodialysis is not an option</li></ul>
<ul style="list-style-type: none"><li>• Pediatric patients are more concerned with cosmesis and are resistant to surgeries that will result in a large scar (venous transposition, lipectomy, etc.)</li></ul>
<ul style="list-style-type: none"><li>• Smaller diameter vessels can make hemodialysis access consistently difficult and painful</li></ul>