

The Drivewire24 steerable guidewire in neurovascular procedures: initial multicenter clinical experience, literature review, and novel applications (25-A-1235-SVIN)

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INTRODUCTION

Conventional Guidewires:

- Guidewires deliver diagnostic and therapeutic devices in endovascular procedures. Wire materials, size, length, shape, and stiffness influences performance factors such as steerability, torqueability and trackability.
- Conventional guidewires have several challenges, such as tip misshape, deformation with use, and tip control within the vessel, which could result in access failure, complications, and procedure abandonment.

Steerable guidewires:

- Several techniques have been described, including electromagnetic¹, hydraulic², and mechanical³ steering mechanisms.
- The first in-human steerable guidewire used in neurointerventions was the *Drivewire*, or *Columbus Guidewire*, featuring a mechanically deflectable tip controlled by the operator through a central micro core wire attached to an adjustable handle^{3,4}.

PURPOSE

- To evaluate the first in-human multicenter clinical experience with the Drivewire24 (DW24)—a novel mechanically-adjustable steerable guidewire—in neurovascular interventions, review the current state of literature, and explore potential future applications
- This 0.024 inch, 204 centimeter second-generation steerable guidewire allows the operator to precisely select vessels by deflecting and shaping the tip in situ using a torque-like rotational handle.

METHODS

Methods:

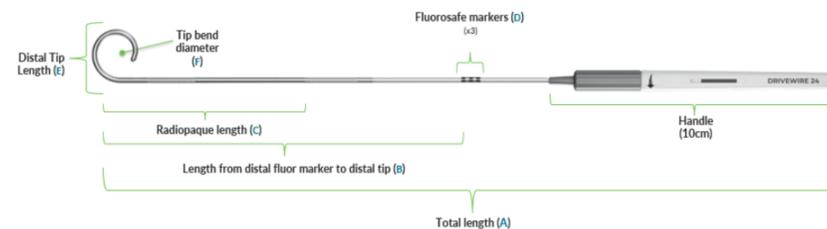
- A series of 176 patients who underwent neurovascular procedures involving DW24 use at four North American academic institutions between April 2024-August 2025 was retrospectively analyzed. Patient selection for DW24 use was determined preoperatively or intraoperatively at the discretion of the performing interventionalists based upon technical suitability, anatomic, and procedural considerations.

Subjects:

- Mean patient age was 62.8 years (range 19-98, SD=14.8), with 74 males (42.0%) and 102 females (58.0%). Treatment indications included ischemic stroke (n=71, 40.3%), aneurysm (n=57, 32.4%), diagnostic cerebral angiogram (n=16, 9.1%), middle meningeal artery embolization (n=7, 12.3%), and other (n=25, 14.2%). Vascular access was via femoral artery (n=86, 48.9%), radial artery (n=74, 42.0%), both femoral and radial artery (n=6, 3.4%), femoral vein (n=5, 2.8%), and other sites (n=5, 2.8%). The DW24 was used as the sole access wire in 48.9% of cases (86/174), or in conjunction with one (38.1%; 67/174) or more (11.9%; 21/174) wires. Outcomes assessed included procedural access success, device malfunctions or failures, and procedural complications.

RESULTS

DRIVEWIRE 24



Drivewire24 Guidewire Specifications

Wire Diameter	0.024"
Microcatheter Compatibility	0.027"
Handle Diameter	0.032"
Distal Tip Length	15.7mm
Tip Bend Diameter	10mm
Radiopaque Length	400mm
Radiopaque Coating	420mm
Total Length	1920mm

STEERING TECHNIQUE

- The *Drivewire24* can be controlled by twisting the handle knob, which deflects the tip and shapes the tip curvature in situ.
- From a neutral straight tip configuration, twisting the proximal knob counterclockwise curls the tip by decreasing the curvature radius, while twisting clockwise increases the curvature radius to straighten and then oppositely bend the tip. The degree of tip deflection is controlled dynamically by the operator.
- The *Drivewire24* may be rotated, however its rotational control, torqueability and stiffness is inferior to a conventional guidewire.

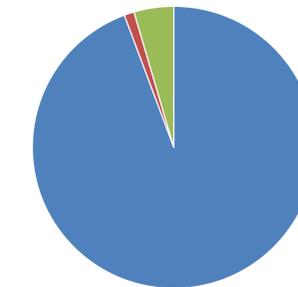
RESULTS

The Drivewire24 successfully reached the target vessel(s) in 166/176 patients (94.3%), with partial success in 2 cases (1.1%), but was unsuccessful in 8 cases (4.5%). In cases where DW24 failed, another wire successfully achieved vessel access in 6 of 8 instances (75%). Overall, vessel access was achieved with any wire in 98.3% (173/176) of cases, and operators rated the DW24 wire as easy to use in 96.0% (169/176) of cases. Interestingly, in 20 cases (11.4%), operators deemed the DW24 as essential for successful vessel access, even though other wires were trialed in only 15 of these 20 cases.

Intraoperative complications occurred in 5.1% of cases (9/176), including subarachnoid hemorrhage (1.1%; 2/176), microperforation (0.6%; 1/176), thromboembolism (0.6%; 1/176), dissection (0.6%; 1/176), and coil extrusion (0.6%; 1/176). However, no complications were directly related to DW24 use, and there were no DW24-associated vessel perforations or hardware issues.

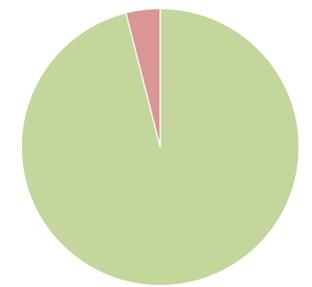
RESULTS

Target Vessel Access



■ Successful ■ Partial Success ■ Unsuccessful

Ease of Drivewire Use



■ Yes ■ No

DISCUSSION & CONCLUSIONS

- The Drivewire24 is a safe and effective mechanical steerable neurovascular access wire with several advantages over conventional guidewires, including adaptive tip conformation for accurate and efficient vessel selection, as well as excellent catheter anchoring and support.
- Beyond improving access in complex cases with difficult anatomy, promising novel uses of the DW24 for microcatheter deflection and in situ device manipulation remain to be explored in further clinical applications.

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