NeVa VS

Instructions for Use

Humanitarian Use Device

Authorized by Federal Law (USA) for use as an adjunct treatment for symptomatic cerebral vasospasm in the internal carotid artery (ICA), middle cerebral artery (MCA), anterior cerebral artery (ACA), posterior cerebral artery (PCA), or basilar artery caused by aneurysmal subarachnoid hemorrhage in adults 22 years of age or older who have exhausted maximal medical treatment and have had the intracranial aneurysm secured by either surgical or endovascular intervention. Symptomatic cerebral vasospasm is defined as more than 50% narrowing of the indicated cerebral vessels confirmed by angiographic imaging and a decreased level of consciousness or a focal neurological deficit.

The effectiveness of this device for this use has not been demonstrated.

It is important to thoroughly read the entire Instructions for Use prior to using this device

Sterile: This device is provided sterile. The device is sterilized using gamma radiation.
Single Use: This device is intended for SINGLE USE ONLY.
Caution: Federal law restricts this device to sale by or on the order of a physician.

Contents
One (1) NeVa VS vessel dilation device

As with any medical treatment, it is the responsibility of the surgeon/physician to use his or her judgment in utilizing the procedures best suited to the needs of the patient. Only physicians trained in neuro-interventional procedures should utilize the NeVa VS vessel dilation device.

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I. DEVICE DESCRIPTION

The NeVa VS is a temporary use, self-expanding, nitinol, stent-like, percutaneously introduced transluminal cerebral artery dilatation device, which is inserted with a nitinol push wire through a commercially available microcatheter with a minimum internal diameter of 0.021". When deployed at the target treatment area, the tip of the NeVa VS, which was compressed in the microcatheter, expands into its original shape in the artery and applies expansive radial forces to the wall of the artery to dilate the spastic vessel(s). The NeVa VS can be deployed in the ACA (anterior communicating artery), M1 and M2 branches of the MCA (middle cerebral artery), intracranial ICA (internal carotid artery), basilar artery, and the P1 PCA (posterior cerebral artery). The device is provided sterile and is intended for single-use only.

The following image has been provided to identify the location of radiopaque markers on the NeVa VS to assist in the visualization of the device under fluoroscopy:

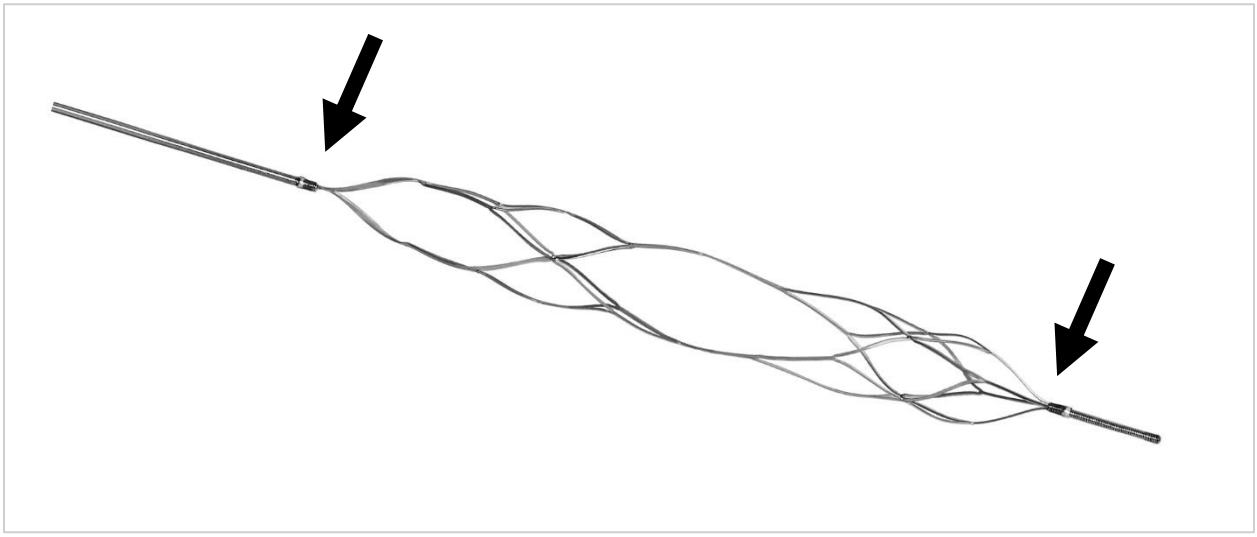


Figure 1. Location of Radiopaque Markers on NeVa

II. INDICATIONS FOR USE

The NeVa VS is indicated for use as an adjunct treatment for symptomatic cerebral vasospasm in the internal carotid artery (ICA), middle cerebral artery (MCA), anterior cerebral artery (ACA), posterior cerebral artery (PCA), or basilar artery caused by aneurysmal subarachnoid hemorrhage in adults 22 years of age or older who have exhausted maximal medical treatment and have had the intracranial aneurysm secured by either surgical or endovascular intervention. Symptomatic cerebral vasospasm is defined as more than 50% narrowing of the indicated cerebral vessels confirmed by angiographic imaging and a decreased level of consciousness or a focal neurological deficit.

III. CONTRAINDICATIONS

The NeVa VS is contraindicated for use in patients with:

- An unsecured, ruptured intracranial aneurysm.
- An allergy to the NeVa VS components (nickel).

- Suspected or known allergies to contrast media.
- Pregnancy.
- Excessive vessel tortuosity that prevents the placement of the device.
- Known hemorrhagic diathesis, coagulation factor deficiency or oral anticoagulant therapy with international normalized ratio (INR) > 1.7.
- Baseline platelets < 30,000.
- Evidence of rapidly improving neurological signs of stroke.
- Large territory completed cerebral infarction, edema with mass effect and intra-parenchymal hemorrhage in vascular territory to be treated.

IV. WARNINGS

- No more than a total of six (6) device interventions per vessel should be attempted in a single procedure; a single device or multiple devices may be used during the procedure.
- Successive, later interventions on the same vessel in multiple separate procedures with the NeVa VS is not recommended and is not supported by clinical data with the NeVa VS.
- The Vesalio NeVa VS, as noted in the Recommended Sizing Guideline Table, is designed for use in vessels with a pre-vasospasm diameter of ≥ 2.0 mm and ≤ 4.0 mm. Use of the device in vessels with diameters outside the recommended range may result in vessel injury.
- Tighten the Rotating Hemostasis Valves sufficiently to create an adequate hemostasis seal without crushing the introducer sheath and the Vesalio NeVa VS shaft. Inadequately tightening the Rotating Hemostasis Valves my lead to premature deployment of the device.
- If excessive resistance is encountered during the delivery of the Vesalio NeVa VS, discontinue the delivery, and identify the cause of the resistance. Advancement of the Vesalio NeVa VS against resistance may result in device damage and/or patient injury.
- If excessive resistance is encountered during microcatheter re-capture of the Vesalio NeVa VS, discontinue the re-capture and identify the cause of the resistance. If there is continued resistance, withdraw the microcatheter and Vesalio NeVa VS together and re-capture into the guide catheter. Do not perform more than six deployments and microcatheter re-sheathing attempts using a single Vesalio NeVa VS.
- The Vesalio NeVa VS has not been evaluated for safety in the magnetic resonance (MR) environment. Do not use the NeVa VS in the MR environment
- The device is provided STERILE for single patient use only. Reusing the device could result in compromised device performance, cross-infection and other safety related hazards.
- Do not re-sterilize. After use, dispose in accordance with hospital, administrative and/or local government policy.
- The safety and probable benefit of the NeVa VS in cerebral vessels with an endoluminal stent has not been evaluated and is not supported by the clinical data with the NeVa VS.

V. PRECAUTIONS

- The Vesalio NeVa VS should only be used by physicians who have received appropriate training in cerebral endovascular techniques.
- Limit the exposure to X-ray radiation doses to patients and physicians by using sufficient shielding, reducing fluoroscopy times, and modifying X-ray technical factors when possible.
- The NeVa VS should be used with the Trevo Pro 18 Microcatheter and a guide catheter compatible with the Trevo Pro 18 Microcatheter in accordance with its product labeling.
- Store in a cool, dry place.

- Use the device prior to the 'Use By Date' date printed on the package.
- Carefully inspect the sterile package and device prior to use to verify that neither has been damaged during shipment. Do not use kinked or damaged components.
- After deployment, the distal tip of the device may foreshorten.

VI. POTENTIAL COMPLICATIONS

Potential complications include but are not limited to:

- Vessel perforation or dissection
- Air embolism
- Subarachnoid or interventricular hemorrhage due to vessel perforation
- Vascular spasm or vascular occlusion
- Neurologic deterioration
- Distal embolization including to a previously uninvolved territory
- Pseudoaneurysm formation
- Device(s) deformation, collapse, fracture or malfunction
- Displacement of coils or clips used to secure an intracranial aneurysm
- Intraprocedural thrombotic events
- Cerebral ischemia
- Coagulopathy
- Confusion
- Death
- Embolic stroke
- Hematoma, pain, infection at access site
- Intracerebral/intracranial hemorrhage
- Post-procedure bleeding
- Renal failure
- Vessel thrombosis

Possible complications of exposure to X-ray radiation as part of the fluoroscopic guidance include but are not limited to:

- Alopecia
- Burns ranging in severity from skin reddening to ulcers
- Cataracts
- Delayed neoplasia

Please note these potential complications increase as the length and number of procedures increase.

VII. STORAGE & HANDLING

Handle with care. Packages should be stored at a controlled room temperature, in a dry place, in a manner that protects the integrity of the package.

VIII. PRODUCT NAME, NUMBER, AND SIZING GUIDELINES

Each Vesalio NeVa VS contains one device positioned in an introducer sheath. All are supplied sterile (Gamma) and **FOR SINGLE USE ONLY**. All components should be handled carefully to avoid damaging the device. Product name, number, and sizing guidelines are summarized in the table below.

Table 1. Vesalio NeVa VS

Product Number	Product Name	Labeled Device Diameter (mm)	Labeled Device Length (mm)	Self Expanded Device Diameter (mm)	Recommended Pre-vasospasm Vessel Diameter (mm)	Pusher Length	Introducer Microcatheter Minimum ID*	Max. Guidewire Diameter
VS-4022-F1RR	NeVa VS	4.0	22	4.0	≥ 2.0 and ≤ 4.0	180 cm	0.021"	N/A

*The NeVa VS is recommended to be used with the Trevo Pro 18 Microcatheter

IX. DEVICE USE

The Vesalio NeVa VS is delivered endovascularly under fluoroscopic guidance in a manner consistent with other neurovascular catheter-based devices. The antiplatelet and anticoagulation regimen used for the interventional intracranial procedure is to be performed at the discretion of the treating physician.

a. PROCEDURE STEPS

Angiographic Assessment of Vessel and Device Selection:

1. Using angiography, determine the location of the vasospastic vessel segment
2. Review the patient's pre-vasospasm digital subtraction angiogram or equivalent vascular study (CT angiogram) to confirm that the segment to be treated has a diameter of at least 2.0 mm prior to deployment. The recommended vessel diameter for the fully expanded portion of NeVa VS is a pre-vasospasm diameter of 2 to 4 mm. The distal tapered portion and marker coil extend 10 mm beyond the fully expanded segment. No more than a total of six (6) device interventions per vessel should be attempted; a single device or multiple devices may be used.

b. DEVICE PREPARATION

The NeVa VS should be prepared as follows:

1. Administer anti-coagulation and anti-platelet medications per standard institutional guidelines.
2. Aided by angiographic radiography, review the pre-vasospasm vascular imaging to determine the location and size of the area to be revascularized.
3. To achieve optimal performance of the Vesalio NeVa VS and to reduce the risk of thrombo-embolic complications, maintain continuous flushing between:

   a) the femoral arterial sheath and the guide catheter,
   b) the microcatheter and the guide catheter, and
   c) the microcatheter, the push wire and the Vesalio NeVa VS.

Check all connections to make sure that during the continuous flush, no air enters the guide catheter or the microcatheter.

4. Position a suitable guide catheter employing a standard method. The guide catheter should be appropriately sized to allow for angiography around the microcatheter. Connect a rotating hemostasis valve (RHV) to the fitting of the guide catheter, and then connect a tube to the continuous flush.
5. With the aid of Table 1, select a microcatheter suitable for advancing the Vesalio NeVa VS.
6. Connect a second RHV to the fitting of the microcatheter and then connect a tube to the continuous flush.
7. Set the flush rate per standard institutional guidelines.
8. With the aid of a suitable guide wire, advance the microcatheter until the end of the microcatheter is positioned as distal as possible within the treatable segment of the vasospastic vessel. The treatable segment is determined by reviewing the pre-vasospasm angiographic imaging to ensure that the segment is at least 2.0 mm in diameter. Remove the guidewire and perform a microcatheter angiogram to ensure proper intra-vascular positioning of the microcatheter prior to deployment.

c. DEVICE DELIVERY

9. Insert the distal end of the introducer sheath partially into the RHV connected to the microcatheter. Tighten the RHV and verify that fluid exits the proximal end of the introducer sheath.
10. Loosen the RHV and advance the introducer sheath until it is firmly seated in the hub of the microcatheter. Tighten the RHV around the introducer sheath to prevent back flow of blood, but not so tight as to damage the NeVa VS during its introduction into the microcatheter. Confirm that there are no air bubbles trapped anywhere in the system.
11. Transfer the NeVa VS into the microcatheter by advancing the push wire in a smooth, continuous manner. Once the flexible portion of the push wire has entered the microcatheter shaft, loosen the RHV and remove the introducer sheath over the proximal end of the push wire. Once completed, tighten the RHV around the push wire. Leaving the introducer sheath in place will interrupt normal infusion of flushing solution and allow back flow of blood into the microcatheter.
12. Visually verify that the flushing solution is infusing normally. Once confirmed, loosen the RHV to advance the push wire.
13. With the aid of fluoroscopic monitoring, carefully advance the NeVa VS until its distal marker lines up at the end of the microcatheter.

WARNING: IF EXCESSIVE RESISTANCE IS ENCOUNTERED DURING THE DELIVERY OF THE VESALIO NEVA VS, DISCONTINUE THE DELIVERY AND IDENTIFY THE CAUSE OF THE RESISTANCE. ADVANCEMENT OF THE VESALIO NEVA VS AGAINST RESISTANCE MAY RESULT IN DEVICE DAMAGE AND/OR PATIENT INJURY.

d. DEVICE DEPLOYMENT

14. Loosen the RHV around the microcatheter. To deploy the NeVa VS, fix the pusher wire to maintain the position of the device while carefully withdrawing the microcatheter in the proximal direction. Do not advance the NeVa VS beyond the distal tip of the microcatheter, doing so risks damage to the vessel and/or the device.

15. Retract the microcatheter until it is proximal to the proximal marker of the Vesalio NeVa VS. Tighten the RHV to prevent any movement of the push wire.
16. Allow the NeVa VS to remain in place for up to 10 minutes, frequent spot fluoroscopy and angiographic imaging is encouraged to evaluate device expansion and to evaluate for any complications such as thrombus formation.
17. Do not advance or withdraw the device against resistance or significant vasospasm because moving or torquing of the device against resistance or significant vasospasm may result in damage to the vessel or device.
18. After complete expansion or 10 minutes, re-capture the NeVa VS into the microcatheter using the following steps:
    a) Loosen the RHV around the microcatheter and around the push wire.
    b) With the aid of fluoroscopic monitoring, hold the push wire firmly in its position to prevent the Vesalio NeVa VS from moving.
    c) Carefully re-sheath the Vesalio NeVa VS by advancing the microcatheter over the Vesalio NeVa VS until the distal markers of the Vesalio NeVa VS line up at the end of the microcatheter.
19. Once re-captured in the microcatheter, the catheter can be withdrawn to a more proximal segment and the device re-deployed to treat proximal vasospasm following steps 15-17 above.

WARNING: IF EXCESSIVE RESISTANCE IS ENCOUNTERED DURING MICROCATHETER RE-CAPTURE OF THE VESALIO NEVA VS, DISCONTINUE THE RE-CAPTURE AND IDENTIFY THE CAUSE OF THE RESISTANCE. IF THERE IS CONTINUED RESISTANCE, WITHDRAW THE MICROCATHETER AND NEVA VS TOGETHER AND RE-CAPTURE INTO THE GUIDE CATHETER. DO NOT PERFORM MORE THAN SIX DEPLOYMENTS AND MICROCATHETER RE-SHEATHING ATTEMPTS USING A SINGLE VESALIO NEVA VS.

20. After the last deployment, re-capture the device into the microcatheter following the steps above and withdraw the microcatheter and NeVa VS through the guide catheter. Open the guide catheter RHV to allow the microcatheter and the Vesalio NeVa VS to exit without resistance. Use care to prevent air from entering the system.
21. If additional vessel dilation attempts are desired with:
    - **a new Vesalio NeVa VS,** then repeat the steps described above starting with the "Device Preparation" section.
    - **the same Vesalio NeVa VS**, then:
        a. Clean the device with saline solution. **Do not use solvents or autoclave.**
        b. Carefully inspect the device for damage. If there is any damage, do not use the device and use a new Vesalio NeVa VS for subsequent vasodilation attempts following the steps described above starting with the "Preparation" section. Use of a damaged device could result in additional device damage or patient injury.

WARNING: DO NOT USE THE VESALIO NEVA VS FOR MORE THAN A TOTAL OF SIX DEPLOYMENTS AND MICROCATHETER RETRIEVALS; A SINGLE OR MULTIPLE NEVA VS DEVICES MAY BE USED.

WARNING: SUCCESSIVE INTERVENTIONS ON THE SAME VESSEL IN MULTIPLE SEPARATE PROCEDURES WITH THE NEVA VS IS NOT SUPPORTED BY THE CLINICAL DATA ON THE NEVA VS.

X. CLINICAL INFORMATION

a. STUDY DESIGN

The safety and probable benefit of the NeVa VS is based on *The **V**esal**i**o NeVa VS for the **T**reatment of Symptomatic Cerebral Vasospasm Following **A**neurysma**l** Subarachnoid Hemorrhage (aSAH) Study* (**VITAL**) which was conducted in the United States (U.S.) at 10 sites between January 2019 and February 2021.

The VITAL study was an open-label, single-arm, multicenter study with 30-day follow-up designed to assess the safety and probable benefit of the NeVa VS device in adult patients (22 years of age or older) presenting with symptomatic cerebral vasospasm following aneurysmal subarachnoid hemorrhage (aSAH) that had exhausted maximal medical management and had the intracranial aneurysm secured either by surgical or endovascular intervention. There were 76 patients consented for the VITAL study and 46 of these patients (60.5%) were screen failures primarily because these patients were not considered to have symptomatic cerebral vasospasm that warranted intervention with the NeVa VS. The remaining 30 patients were treated with the NeVa VS at nine (9) institutions in the U.S. and all of these patients were included in the analysis population used to analyze the outcomes of the VITAL study. Twenty-seven (27) subjects were treated once, 2 subjects were treated twice, and a single subject was treated on three (3) separate occasions, for a total of 34 procedures in 30 study subjects. Twenty (20) of the subjects presented with symptomatic cerebral vasospasm (66.7%) and the remaining 10 subjects' cerebral vasospasm was identified on transcranial Doppler (33.3%) because most of these subjects had clinical presentations where assessment of symptomatic cerebral vasospasm may have been challenging, such as modified Rankin Scale (mRS) scores greater than 4.

On Day 0, eligible patients with confirmed cerebral vasospasm (> 50% stenosis in the target vessel, demonstrated by digital subtraction angiography (DSA) or computed tomography angiography (CTA) were treated with the NeVa VS device. National Institutes of Health Stroke Scale (NIHSS) scores were obtained at 24 hours and 21 days post-intervention, and mRS scores were obtained at 21 days and 30 days post-intervention. If cerebral vasospasm recurred in a previously treated or in a different vessel, re-treatment with the NeVa VS was allowed if the patient still met all study eligibility criteria.

The primary study outcomes were safety and procedural success, defined as the proportion of vessels with ≥ 50% vessel caliber on DSA compared to the baseline vessel diameter prior to the cerebral vasospasm. These data were assessed by an independent Core Lab.

Demographics, outcomes, and adverse events are presented for all 30 subjects treated.

b. INCLUSION CRITERIA

Patients had to satisfy all inclusion criteria to be included in the study:

1. Age ≥ 18 years.
2. Subarachnoid hemorrhage secondary to ruptured intracranial aneurysm.

3. Ruptured intracranial aneurysm secured with surgical clipping or endovascular intervention.
4. DSA or CT angiography at the time of aSAH clinical presentation or aSAH intervention with well-visualized intra-cerebral vessels available for review.
5. Vasospasm in one or more of the following: the internal carotid artery (ICA), basilar, middle cerebral artery (MCA), anterior cerebral artery (ACA), or posterior cerebral artery (PCA) territory on transcranial Doppler (TCD), and/or CT angiography, and/or clinical signs of symptomatic cerebral vasospasm (change in level of consciousness, focal neurological deficit) confirmed by > 50% narrowing in these territories on DSA.
6. Vasospasm despite maximized medical management defined as oral nimodipine (unless contraindicated), systemic hypertension with systolic blood pressure greater than 130 mmHg and euvolemia.
7. Target vessel pre-vasospasm diameter ≥ 2.0 mm and ≤ 4.0 mm.
8. Patient or legal representative able and willing to give informed consent.

c. EXCLUSION CRITERIA

Patients were not eligible for the study if any of the following exclusion criteria were present:

1. The presence of an unsecured ruptured intracranial aneurysm. *Note unsecured unruptured intracranial aneurysms remote to the site of treated aSAH were not exclusionary*.
2. Symptoms attributable to other causes (e.g., hydrocephalus, metabolic, infection).
3. Hunt and Hess Grade of 5.
4. Large infarct on CT scan defined as ASPECTS 0-5.
5. Intracranial hemorrhage not caused by intracranial aneurysm rupture.
6. History of bleeding disorders.
7. Baseline platelets < 30,000
8. International normalized ratio (INR) > 1.7.
9. Any known contraindications to mechanical dilation of vasospastic vessels including but not limited to:
    - Excessive vessel tortuosity preventing the placement of the device.
    - Evidence of rapidly improving neurological signs of stroke.
    - Large territory completed cerebral infarction, edema with mass effect and intra-parenchymal hemorrhage in vascular territory to be treated, or
    - any other vascular anatomic variants or anomalies.
10. Pre-existing neurological or psychiatric disease that would confound the neurological or functional evaluations, e.g., dementia with prescribed anti-cholinesterase inhibitor.
11. History of severe allergy to contrast medium.
12. Known allergy to NeVa VS materials (nitinol, stainless steel).
13. Suspected or confirmed septic embolus, or bacterial endocarditis.
14. Septic shock or central nervous system infection confirmed via cerebrospinal fluid sampling.
15. Known current or recent use of illicit drugs or alcohol abuse.
16. Females who were pregnant or breastfeeding.
17. Any other condition that, in the opinion of the investigator, precluded an endovascular procedure or posed a significant hazard to the patient if an endovascular procedure was performed.

d. PATIENT DEMOGRAPHICS AND BASELINE CHARACTERISTICS

Demographics of study subjects are summarized in the following table.

Table 2. Demographics

Parameter		N = 30
Age (Years)	N	30
	Mean	51.8
	Minimum	31
	Maximum	74
	< 60	22/30 (73.3%)
	≥ 60	8/30 (26.7%)
Gender	Male	4/30 (13.3%)
	Female	26/30 (86.7%)
Race	White	24/30 (80.0%)
	Black	2/30 (6.7%)
	Asian	1/30 (3.3%)
	Native Hawaiian or Pacific Islander	0/30 (0.0%)
	Other*	3/30 (10.0%)
Ethnicity	Hispanic or Latino	9/30 (30.0%)
	Not Hispanic and not Latino	20/30 (66.7%)
	Missing	1/30 (3.3%)

% = n/N × 100%.

* 1 Multiracial and 2 Unknown

Baseline characteristics for the 30 subjects treated are summarized in the following table.

Table 3. Baseline Characteristics (N=30)

Parameter		N = 30
Treatment of aSAH	Surgical Clipping	2/30 (6.7%)
	Endovascular intervention	28/30 (93.3%)
Presentation of Vasospasm	Transcranial Doppler (TCD)	10/30 (33.3%)
	Symptomatic	20/30 (66.7%)
Modified Fisher Scale Score (at aSAH)	Mean	3.2
	Standard Deviation	1.0
	Median	3.5
	Minimum	1
	Maximum	4
Modified Hunt-Hess Grading System Score (at aSAH)	Mean	3.1
	Standard Deviation	0.9
	Median	3.0
	Minimum	1
	Maximum	4
NIHSS at Screening	Mean	12.7
	Standard Deviation	12.8
	Median	7.5
	Minimum	0
	Maximum	40
mRS at Screening	Mean	3.5
	Standard Deviation	1.5
	Median	4.0

Parameter		N = 30
	Minimum	0
	Maximum	5
Pre-hospitalization mRS	Mean	0.0
	Standard Deviation	0.2
	Median	0.0
	Minimum	0
	Maximum	1
ASPECTS Score	Mean	8.5
	Standard Deviation	1.5
	Median	9.0
	Minimum	6
	Maximum	10

e. RESULTS

The VITAL study data were analyzed using descriptive statistics due to the small sample size (N=30). There is considerable uncertainty in the results of this trial because there was no concurrent control or blinding. The effects of concomitant treatment are possible significant confounders and evidence of the effects on subjects' survival and function is limited for this orphan product. The probable benefit outcome was procedural success, defined as the proportion of vessels with ≥ 50% vessel caliber on DSA compared to the baseline vessel diameter prior to the cerebral vasospasm. According to the Core Lab, procedural success was 86.5%, 64/74 vessels met the probable benefit outcome. These data are further summarized in the table below.

Table 4. Procedural Success: Proportion of Vessels with ≥ 50% Vessel Caliber on DSA Compared to Baseline as Determined by the Core Lab

Method	Estimation (95% CI)
Vessel-based Procedural Success (N = 74 vessels treated)	
Procedure Success Rate Based on All Vessels Treated	64/74 (86.5%)
95% CI per Binomial Distribution Assuming Treatment Independent	(76.5%, 93.3%)
Subject-based Procedural Success Rate* (N = 30 subjects)	
N	30
Mean*	92.2%
95% CI	(85.5%, 99.0%)
Median	100.0%
Min, Max	40.0%, 100.0%

* For each subject, the percentage of treated vessels with ≥ 50% vessel caliber on DSA compared to baseline was calculated. This resulted in 30 percentages (n=30 subjects). Then, these 30 percentages were used to generate descriptive statistics. The 95% CIs were calculated based on normal distribution.

The probable benefit outcome was also stratified by presentation of cerebral vasospasm – either by a symptomatic presentation or by transcranial Doppler. These data are presented in the table below.

Table 5. Procedural Success: Proportion of Vessels with ≥ 50% Vessel Caliber Compared to Baseline by Presentation of Cerebral Vasospasm as Determined by the Core Lab

Method	Estimation (95% CI)	
	TCD	Symptomatic Presentation
Vessel-based Procedural Success (N = 74 vessels treated)		
Procedure Success Rate Based on All Vessels Treated	16/18 (88.9%)	48/56 (85.7%)
95% CI per Binomial Distribution Assuming Treatment Independent	(65.3%, 98.6%)	(73.8%, 93.6%)
Subject-based Procedural Success Rate* (N = 30 subjects)		
N	10	20
Mean*	90.0%	93.3%
95% CI	(74.9%, 100.0%)	(85.4%, 100.0%)
Median	100.0%	100.0%
Min, Max	50.0%, 100.0%	40.0%, 100.0%

* For each subject, the percentage of treated vessels with ≥ 50% vessel caliber on DSA compared to baseline was calculated. This resulted in 30 percentages (n=30 subjects). Then, these 30 percentages were used to generate descriptive statistics. The 95% CIs were calculated based on normal distribution.

Table 6. Procedural Parameters

		N = 30 Subjects	
		Number	**Percent**
# of NeVa VS Interventions per subject (N = 30 subjects)	1	27/30	90.0%
	2	2/30	6.7%
	3	1/30	3.3%
# Vessels Treated per procedure (N = 34 interventions)	Mean	2.3	
	Standard Deviation	1.5	
	Median	2.0	
	Minimum	1	
	Maximum	7	
Vessels Treated (N = 74)	Basilar	4/74	5.4%
	Left ACA	5/74	6.8%
	Left ICA	6/74	8.1%
	Left MCA	17/74	23.0%
	Left Vertebral*	1/74	1.4%
	Right ACA	3/74	4.1%
	Right ICA	10/74	13.5%
	Right MCA	26/74	35.1%
	Right PCA	2/74	2.7%
Percent Stenosis at Baseline per Investigator's Assessment per vessel treated (N = 74)	Mean	65.59	
	Standard Deviation	9.77	
	Median	64.00	
	Minimum	51.0	
	Maximum	95.0	
# Deployments per Vessel per vessel treated (N = 74) (Total # of deployments = 95)	Mean	1.28	
	Standard Deviation	0.61	
	Median	1.00	
	Minimum	1.0	
	Maximum	3.0	
Duration of Total Deployment Time (min) per vessel treated (N = 74)	Mean	5.45	
	Standard Deviation	2.24	
	Median	5.00	
	Minimum	0.25	
	Maximum	11.00	
Concomitant Procedures and Treatments per procedure (N = 34)	Yes	34/34	100.0%
	No	0/34	0.0%
Device Performance – Performed as Intended per procedure (N = 34)	Yes	27/34	79.4%
	No	7/34	20.6%
Procedure had Complications per procedure (N = 34)	Yes	5/34	14.7%
	No	29/34	85.3%

*There was only one (1) vertebral artery treated that was a protocol violation because this was not a location specified in the inclusion criteria. Also, with a sample size of one, no statistical or clinical conclusions can be made. Therefore, this vessel was excluded from the final indications for use of the NeVa VS.

Seven (7) subjects [23.3%, 7/30] were discontinued due to death prior to Day 30. All remaining subjects completed the study, with a 76.7% survival rate at Day 30 (23/30). One additional subject died after the Day 30 visit, due to cerebral infarct. Of the seven subjects who died prior to Day 30, three subjects presented with cerebral infarct secondary to cerebral vasospasm, one subject presented with ruptured vessels related to balloon angioplasty, one subject presented with cerebral infarct, one subject presented with cerebral hemorrhage secondary to right ventriculostomy catheter removal, and one subject presented with worsening cardiomyopathy.

Seven procedures in six subjects included events where the device did not perform as intended. Two events in two subjects included thrombus formation; two events in one subject included difficulty to deploy and retrieve the NeVa VS and poor angiography vessel caliber improvement; two events in two subjects included failure to expand the vessel; and one event in one subject included difficulty to recapture the NeVa VS.

Five subjects experienced complications during the procedure, which included intraprocedural thrombotic event in three subjects; pseudoaneurysm of the contralateral femoral artery in one subject; worsening cardiomyopathy in one subject; and ruptured vessel due to balloon angioplasty in one subject. One of the five subjects experienced multiple complications (intraprocedural thrombotic event and vessel rupture due to balloon angioplasty).

f. ADVERSE EVENTS

Overall, 94 AEs were reported for 25 patients (83.3%, 25/30), 17 of these were within 24 hours of the NeVa VS procedure and 77 were > 24 hours post-procedure.

A total of three (3) NeVa VS device-related adverse events were reported in the trial (10%, 3/30), all of which were intraprocedural thrombotic events. All three (3) of these events were treated during the procedure and were considered resolved at the conclusion of the procedure.

All adverse events are summarized in the following table.

Table 7. Adverse Events

Adverse Events	34 Procedures in 30 Subjects	
	Number of Reports	Number (Percent) of Subjects with Event
Adverse Events ≤ 24 hours post NeVa VS intervention	**17**	**12 (40.0%)**
Intraprocedural thrombotic event	3	3 (10.0%)
Anemia	2	2 (6.7%)
Cerebral infarct	1	1 (3.3%)
Cerebral infarct secondary to vasospasm	1	1 (3.3%)
Desaturation	1	1 (3.3%)
Diarrhea	1	1 (3.3%)
Hypernatremia	1	1 (3.3%)
Hypotension	1	1 (3.3%)
Pseudoaneurysm of the contralateral femoral artery	1	1 (3.3%)
Retrocardiac atelectasis	1	1 (3.3%)
Ruptured vessel due to balloon angioplasty	1	1 (3.3%)
Syndrome of inappropriate ADH production	1	1 (3.3%)
Ventricular tachycardia	1	1 (3.3%)
Worsening cardiomyopathy	1	1 (3.3%)
Adverse Events > 24 hours post NeVa VS intervention	**77**	**22 (73.3%)**
Urinary tract infection	8	8 (26.7%)
Anemia	6	6 (20.0%)

Adverse Events	34 Procedures in 30 Subjects	
	Number of Reports	Number (Percent) of Subjects with Event
Deep vein thrombosis	6	5 (16.7%)
Cerebral salt wasting syndrome	5	5 (16.7%)
Pneumonia	5	5 (16.7%)
Diarrhea	4	4 (13.3%)
Cerebral infarct secondary to vasospasm	3	3 (10.0%)
Tachycardia	3	3 (10.0%)
Anxiety	2	2 (6.7%)
Hyponatremia	2	2 (6.7%)
Thrush	2	2 (6.7%)
Tooth abscess	2	2 (6.7%)
Amnesia	1	1 (3.3%)
Aspiration pneumonia	1	1 (3.3%)
Atrial fibrillation	1	1 (3.3%)
Bacteremia	1	1 (3.3%)
Cellulitis	1	1 (3.3%)
Cerebral hemorrhage secondary to right ventriculostomy catheter removal	1	1 (3.3%)
Cerebral infarct	1	1 (3.3%)
Cervical, thoracic, and lumbar pain	1	1 (3.3%)
Cranial tissue flap infection	1	1 (3.3%)
Decubitus ulcer	1	1 (3.3%)
Epistaxis	1	1 (3.3%)
Fall	1	1 (3.3%)
Glossitis	1	1 (3.3%)
Hepatitis	1	1 (3.3%)
Hypernatremia	1	1 (3.3%)
Hypokalemia	1	1 (3.3%)
Pneumoperitoneum	1	1 (3.3%)
Pseudoaneurysm of the brachial artery	1	1 (3.3%)
Recurrent SAH	1	1 (3.3%)
Renal failure	1	1 (3.3%)
Ruptured vessel due to balloon angioplasty	1	1 (3.3%)
Seizure	1	1 (3.3%)
Sepsis	1	1 (3.3%)
Thrombocytopenia	1	1 (3.3%)
Transient ischemia of finger tip	1	1 (3.3%)
Ventricular tachycardia	1	1 (3.3%)
Worsening ascites	1	1 (3.3%)
Worsening cerebral edema	1	1 (3.3%)
Worsening hydrocephalus	1	1 (3.3%)
Total	**94**	**25 (83.3%)**

Table 8. Serious Adverse Events

Adverse Events	34 Procedures in 30 Subjects	
	Number of Reports	Number (Percent) of Subjects with Event
Adverse Events ≤ 24 hours post NeVa VS intervention	**7**	**7 (23.3%)**
Intraprocedural thrombotic event	2	2 (6.7%)
Cerebral infarct	1	1 (3.3%)
Cerebral infarct secondary to vasospasm	1	1 (3.3%)
Pseudoaneurysm of the contralateral femoral artery	1	1 (3.3%)
Ruptured vessel due to balloon angioplasty	1	1 (3.3%)
Worsening cardiomyopathy	1	1 (3.3%)
Adverse Events > 24 hours post NeVa VS intervention	**20**	**11 (36.7%)**
Anemia	3	3 (10.0%)
Cerebral infarct secondary to vasospasm	3	3 (10.0%)
Aspiration pneumonia	1	1 (3.3%)
Atrial fibrillation	1	1 (3.3%)
Bacteremia	1	1 (3.3%)
Cerebral hemorrhage secondary to right ventriculostomy catheter removal	1	1 (3.3%)
Cerebral infarct	1	1 (3.3%)
Fall	1	1 (3.3%)
Pneumonia	1	1 (3.3%)
Pseudoaneurysm of the brachial artery	1	1 (3.3%)
Recurrent SAH	1	1 (3.3%)
Ruptured vessel due to balloon angioplasty	1	1 (3.3%)
Sepsis	1	1 (3.3%)
Ventricular tachycardia	1	1 (3.3%)
Worsening ascites	1	1 (3.3%)
Worsening hydrocephalus	1	1 (3.3%)
Total	**27**	**17 (56.7%)**

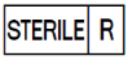
g. CONCLUSIONS

The subjects eligible to participate in the VITAL study had already received the maximal medical treatment for their condition and still experienced symptomatic cerebral vasospasm. In the study, the NeVa VS device improved blood flow in over 86% of vessels treated. Three (3) transient intraprocedural thrombotic adverse events were attributed to the use of the NeVa VS, all of which resolved prior to the end of the NeVa VS procedure. The high percentage of cerebral vasospasm resolution and patient survival data in this trial are indicative of probable benefit from the use of the NeVa VS.

XI. WARRANTY AND LIMITATION OF WARRANTY

Vesalio LLC warrants that reasonable care was used in the design and manufacture of this product. Because Vesalio LLC has no control over the conditions of use, patient selection or handling of the device after it leaves its possession, Vesalio LLC does not warrant either a good effect or against an ill effect following its use. Vesalio LLC. shall not be directly or indirectly responsible for any incidental or consequential loss, damage or expenses directly or indirectly arising from the use of this product. Vesalio LLC sole responsibility in the event Vesalio LLC determines the product was defective when shipped by Vesalio LLC, shall be the replacement of the product. This warranty is in lieu of and excludes all other warranties not expressly set forth herein, whether expressed or implied by operation of law or otherwise, including but not limited to any implied warranties of merchantability or fitness for use.

XII. SYMBOLS

Symbols Glossary			
	Lot number		Do not reuse
	Model number		Keep dry
	Sterile (Gamma Radiation)		Manufacturer
	Use-by date		Do Not use if package is damaged
	Warning		Read the documentation
21MC	For use only with Trevo Pro 18 microcatheter	**R**x Only	Prescription use only
	Do not re-sterilize		Magnetic Resonance (MR) Unsafe

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