Contego Medical
INTEGRATED EMBOLIC PROTECTION™

Neuroguard IEP® 3 in 1 Carotid Stent and Post-Dilation Balloon System with Integrated Embolic Protection
Instructions for Use

Caution: ysician.

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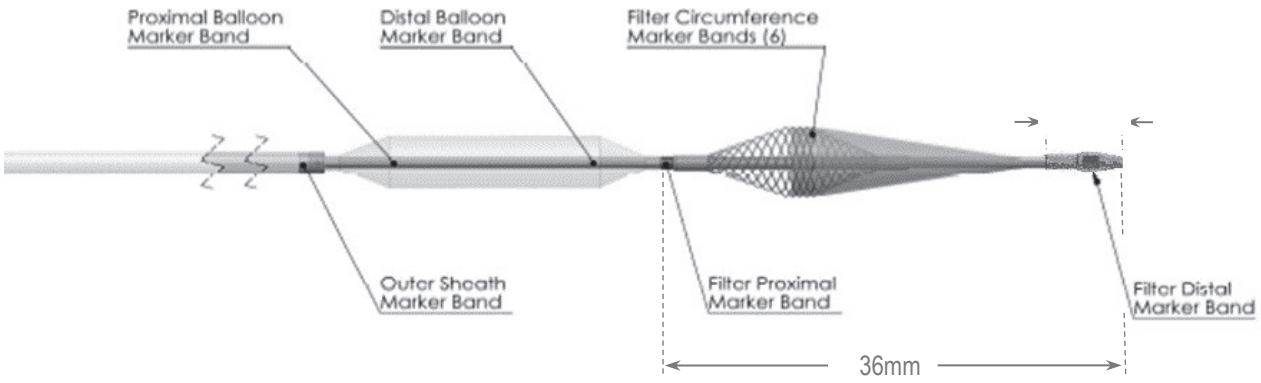
1. DEVICE DESCRIPTION

The Neuroguard IEP 3 in 1 Carotid Stent and Post-Dilation Balloon System with Integrated Embolic Protection (Neuroguard IEP System) is a combination self-expanding carotid artery stent, nitinol embolic protection filter, and post-dilation balloon. The system is rapid exchange and is compatible with commercially available primary distal embolic protection devices with a 0.014" diameter guide wire. It consists of a multi-lumen shaft with an inflatable semi-compliant angioplasty balloon at the distal end and a handle on the proximal end. Distal to the angioplasty balloon is an integrated filter in the baseline-collapsed state. A nitinol self-expanding stent is preloaded on top of the angioplasty balloon. Both the stent and filter are covered by an outer sheath. The system includes multiple radiopaque marker bands as shown in Figure 1 below.

Figure 1: Neuroguard IEP Schematic with Marker Band Locations



2. PRODUCT MATRIX

Table 1: Neuroguard IEP System Models / Size Matrix

Model #	Balloon OD (mm)	Available Catheter Length (cm)	Stent Diameter (mm)			Stent Length (mm)	Balloon Length (mm)	Filter Length (mm)	Filter Diameter (mm)
			Proximal Tapered Diameter	Nominal Diameter	Distal Tapered Diameter				
NG-0630-140-2	5	140	8	6	7	30	24	18	Adjustable up to 7 mm
NG-0640-140-2	5	140	8	6	7	40	34		
NG-0730-140-2	5	140	9	7	8	30	24		
NG-0740-140-2	5	140	9	7	8	40	34		

3. HOW SUPPLIED

The Neuroguard IEP System is supplied sterile (sterilized by ethylene oxide) in a tray that is sealed in a single barrier protective Tyvek pouch. The device is single use only.

Contents

One (1) Neuroguard IEP 3-in-1 Carotid Stent and Post-Dilation Balloon System with Integrated Embolic Protection.

One (1) Preparation syringe with filter flushing tip - Flushing Syringe A

One (1) Preparation syringe with catheter flushing tip - Flushing Syringe B

4. STORAGE AND HANDLING

Store in dry place at room temperature. See the product label for the device shelf life. Do not use the device beyond the labeled Use by Date.

5. INDICATIONS FOR USE

The Neuroguard IEP 3-in-1 Carotid Stent and Post-Dilatation Balloon System with Integrated Embolic Protection is indicated for improving the carotid luminal diameter in subjects at high risk for adverse events from carotid endarterectomy who require carotid revascularization and meet the criteria outlined below:

- Patients with symptomatic stenosis of the common or internal carotid artery with ≥ 50% as determined by angiography using NASCET methodology, OR Patients with asymptomatic stenosis of the common or internal carotid artery with ≥ 80% as determined by angiography using NASCET methodology.
- Patients with reference vessel diameters 4.0 – 8.0 mm.

This device is also indicated for post-dilation of the stent component with simultaneous capture and removal of embolic material. The Neuroguard IEP System should always be used in conjunction with an available primary distal embolic protection device as described in the IFU.

6. CONTRAINDICATIONS

The Neuroguard IEP® 3-in-1 Carotid Stent and Post-Dilation Balloon System with Integrated Embolic Protection is contraindicated for use in:

- Patients in whom anticoagulant and/or antiplatelet therapy is contraindicated.
- Patients with a known hypersensitivity to nickel-titanium.
- Patients with severe vascular tortuosity or anatomy that would preclude the safe introduction of a guidewire, catheter, introducer sheath, delivery system or embolic protection device.

- Patients with uncorrected bleeding disorders
- Patients with known hypersensitivity to heparin, including those patients who have had a previous incident of Heparin-Induced Thrombocytopenia (HIT) type II.

7. WARNINGS

Only physicians who have received appropriate training and are familiar with the principles, clinical applications, complications, side effects and hazards commonly associated with carotid artery interventional procedures should use this device.

The Neuroguard IEP System is intended for single use only. Do not re-sterilize or reuse, as this can result in compromised device performance.

If it is suspected that the sterile barrier seal has been opened or comprised, do not use the Neuroguard IEP System. Please return to the manufacturer.

The appropriate antiplatelet, anticoagulant and if necessary, vasodilator therapy, must be used during the pre- and post-procedure to minimize the risk of embolism and thrombus.

Maintain continuous flush while inserting and removing the Neuroguard IEP System over the guidewire. Perform all exchanges slowly to prevent air embolism or trauma to the artery.

Never withdraw or move an intravascular device against any resistance until the cause is determined. Applying excessive force during delivery or retrieval of the Neuroguard IEP System can potentially result in loss or damage to the device or components or injury (perforation/dissection) to the vessel.

Multiple stents should not be used in an overlapping configuration.

A partially deployed stent cannot be repositioned or retracted into the outer sheath. Retraction, or repositioning of a stent by force, could cause deformation of the stent, damage to the blood vessel and/or to the delivery catheter. The stent cannot be removed after implantation.

Balloon inflation pressure should not exceed the labeled rated burst pressure (RBP). Exceeding the rated burst pressure (RBP) may result in balloon rupture, which can traumatize the artery.

The stent may cause thrombus, distal embolization or may migrate from the site of implant down the arterial lumen. Appropriate sizing of the stent to the vessel is required to reduce the possibility of stent migration. In the event of thrombosis of the expanded stent, thrombolysis and PTA should be attempted.

This device contains nitinol, an alloy of nickel and titanium. Persons with allergic reactions to these metals may suffer an allergic reaction to this implant. Prior to implantation, patients should be counseled on the materials.

The Neuroguard IEP System should always be used with a primary distal embolic filter. The device was studied with the FilterWire™ EZ, Emboshield® NAV6, and SpiderFX™ filters. The safety and effectiveness has not been evaluated with other embolic protection systems.

8. PRECAUTIONS

8.1. General Precautions

The Neuroguard IEP System should be manipulated in the arteries only under high-quality fluoroscopy.

Carefully inspect the Neuroguard IEP System to verify that the device has not been damaged in shipment. Do not use if the device is damaged. The delivery system has an internal hypotube. Take care to avoid unnecessary handling, which may kink or damage the delivery system. Do not use or attempt to straighten a proximal shaft that is kinked. Prepare a new catheter.

Before the procedure, the catheter should be examined to verify functionality and ensure that its labeled size and shape are suitable for the procedure for which it is to be used.

Do not use the product after the Use by Date specified on the label.

Special care must be taken not to disrupt the stent or the filter on the delivery system.

Avoid over-tightening the hemostasis valve as this may affect balloon inflation / deflation times as well as movement of the guidewire.

If resistance is met during delivery system introduction, the system should be withdrawn and another system used.

Only prepare and flush the Neuroguard IEP System with the supplied flushing syringes and flushing tips.

Venous access should be available during carotid stenting to manage bradycardia and/or hypotension by either pharmaceutical intervention or placement of a temporary pacemaker, if needed.

Use only recommended balloon inflation solution. Do not use air or other gaseous medium to inflate the balloon. Nonionic contrast medium has different viscosity and precipitation levels than does the ionic type, which may prolong inflation/deflation times.

The delivery system is not designed for use with power injection. Use of power injection may adversely affect device performance.

Caution should be used if pre-dilating the lesion without embolic protection as this may increase the risk of an adverse outcome.

Do not advance or retract the Neuroguard IEP System unless the balloon is fully deflated under vacuum and the filter is fully collapsed. If resistance is met during manipulation, determine the cause of the resistance before proceeding.

After use, dispose of product and packaging in accordance with hospital, administrative and/or local government policy.

8.2. Filter Precautions

Over-expanding the filter frame can cause damage to the filter frame and to the vessel. The filter will automatically stop expanding at 7 mm, and the knob on the handle will stop turning beyond this point. If resistance is met, the knob on the handle should not be forced.

Do not force the knob if it is not turning freely. Take care not to oversize the filter to minimize vessel trauma.

8.3. Stent Precautions

Ensure the stent system is fully flushed with heparinized saline prior to use. See delivery system preparation instructions below.

Overstretching of the artery may result in rupture and life-threatening bleeding.

8.4. Stent Post-Implant Precautions

Care must be exercised when crossing a newly deployed stent with other interventional devices to avoid disrupting the stent geometry and placement of the stent.

In the event of thrombosis of the expanded stent, thrombolysis and PTA should be attempted.

After stent implantation, the patient should be followed up by their physician at regular intervals to ensure that the stent performance has not changed over time.

For patients, if a serious incident related to the device occurs, immediately report the incident to a healthcare professional. For healthcare professionals, immediately report a serious incident to Contego.

9. MRI COMPATIBILITY

MRI Safety Information

A patient with the Neuroguard Carotid Stent implant may be safely scanned under the following conditions. Failure to follow these conditions may result in injury to the patient.

Name/Identification of the Device	Neuroguard Carotid Stent
Nominal Value(s) of Static Magnetic Field [T]	1.5T or 3.0T
Maximum Spatial Field Gradient [T/m and gauss/cm]	40 T/m (4000 gauss/cm)
RF Excitation	Circularly Polarized (CP)
RF Transmit Coil Type	Whole body transmit coil
Maximum Whole Body SAR (W/kg]	2W/kg
Maximum Head SAR [W/kg]	3.2W/kg
Maximum Scan Duration	60 minutes of continuous scanning in Normal Operating Mode without a cooling period
MR Image Artifact	The presence of this implant may produce an image artifact that obscures the device lumen. Some manipulation of scan parameters may be needed to compensate for the artifact.

10. POTENTIAL ADVERSE EFFECTS

Complications may occur at any time during or after the procedure. Possible complications include, but are not limited to the following:

- Angina
- Allergic reactions (including to antiplatelet agents, contrast medium or stent materials)
- Aneurysm
- Arrhythmias
- Arterial occlusion/thrombosis at puncture site
- Bleeding from anticoagulant or antiplatelet medications Bradycardia
- Carotid artery spasm
- Cerebral edema
- Cerebral hemorrhage
- Cerebral ischemia/transient ischemia attack (TIA)
- Cardiac tamponade
- Cardiogenic shock
- Death
- Detachment and/or implantation of a component
- Embolism
- Fever
- Filter thrombosis/occlusion
- Groin hematoma, with or without surgical repair
- Heart failure
- Hematoma
- Hemorrhage
- Hypotension/hypertension
- Infection
- Ischemia/infarction of tissue/organ
- Myocardial infarction
- Pain and tenderness
- Pericardial effusion
- Pulmonary edema
- Pseudoaneurysm at the vascular access site
- Renal failure/insufficiency
- Respiratory failure
- Restenosis of the stented segment
- Seizure
- Severe unilateral headache
- Stent embolization
- Stent / filter entanglement / damage
- Stent malapposition
- Stent migration
- Stent misplacement
- Stent thrombosis/occlusion
- Stroke / cerebrovascular accident (CVA)
- Total occlusion of carotid artery
- Vessel dissection, perforation, spasm or recoil
- Vessel trauma requiring surgical repair or re-intervention

11. SUMMARY OF PRIMARY CLINICAL STUDY

A clinical study was performed to establish a reasonable assurance of safety and effectiveness of the Neuroguard IEP System in human subjects for the treatment of carotid artery stenosis at elevated risk for adverse events following carotid endarterectomy (CEA).

11.1. Study Design

Subjects were treated between June 12, 2020 and November 10, 2022. The database reflects data collected through the last follow up visit on October 31, 2023 and included 305 subjects enrolled at 32 sites. Two hundred thirty-nine (239) subjects (78.36%) enrolled at 23 US sites and 66 subjects (21.64%) enrolled at 9 OUS sites.

The study was a prospective, multi-center single-arm study designed to evaluate the safety and effectiveness of the Neuroguard IEP System for the treatment of carotid artery stenosis in subjects at elevated risk for adverse events following CEA.

The evaluation of safety and effectiveness was performed through a primary endpoint of Major Adverse Event (MAE), defined as death, all stroke and myocardial infarction (MI) within 30 days of the index carotid stenting procedure plus ipsilateral stroke through 12 months of the procedure compared to a pre-specified weighted performance goal (PG). The PG was set at 13.8% and was established based on data from four prior non-randomized carotid stent pivotal Investigational Device Exemption (IDE) studies that had a similar primary composite endpoint and applying weights for anatomic (30%) and co-morbid (70%) high-risk CEA conditions.

Secondary endpoints included procedural success, technical success, clinically-driven target lesion revascularization (CD-TLR), in-stent restenosis (ISR), major stroke, minor stroke, and neurological death. which Procedural success was defined as a successful Neuroguard stent implantation with, ≤ 50% residual angiographic stenosis of the target lesion as determined by the angiographic core lab. Technical success was defined as successful deployment of the Neuroguard stent in the targeted treatment location with a residual diameter stenosis ≤ 50% immediately after post-dilation as determined by the angiographic core lab, and successful delivery and deployment of the Neuroguard IEP System filter beyond the target lesion and retrieval after completion of the stent placement, and successful post-dilation of the Neuroguard stent with the integrated angioplasty balloon, and lastly, successful removal of the delivery system.

Clinically-driven target lesion revascularization (CD-TLR) was defined as any revascularization procedure of the original treatment site associated with narrowing of > 80% as determined by the angiographic core lab within 12 months of the index procedure. In-stent restenosis (ISR) was defined as > 70% narrowing observed within the Neuroguard stent as per core lab ultrasound analysis through 12 months, 24 months, and 36 months. Major stroke at 30 days, minor stroke at 30 days and neurological death through 12 months were also evaluated as secondary endpoints.

The primary endpoint was assessed based on 90% power to test the primary hypothesis at a one-sided 5% alpha level using a weighted Z-test. Secondary endpoints were descriptive only, with no formal statistical hypotheses tested. However, proportions and confidence intervals were produced for technical success, procedure success, CD-TLR through 12 months, ISR through 12 months, major stroke through 30 days, minor stroke through 30 days and neurological death through 12 months.

Clinical Inclusion and Exclusion Criteria

Enrollment in the PERFORMANCE II Clinical study was limited to subjects who met the following inclusion and none of the exclusion criteria:

General Inclusion Criteria:

- Male and non-pregnant, non-breastfeeding female subjects whose age is ≥ 20 and ≤ 80 years.
- Patient is willing and capable of complying with all study protocol requirements, including the specified follow-up visits and could be contacted by telephone.
- Patient or his/her authorized legal representative must sign a written informed consent form that has been approved by the local governing Institutional Review Board (IRB)/Ethics Committee (EC) of the respective clinical site.
- Patient is diagnosed with carotid artery stenosis treatable with carotid artery stenting and is considered a high operative risk for CEA.
- Patient is diagnosed with either:
    a. Symptomatic carotid artery stenosis ≥ 50% as determined by angiography using NASCET methodology. Symptomatic subjects are defined as having stroke, transient ischemic attack (TIA) ipsilateral in the hemisphere supplied by the target vessel carotid lesions or ipsilateral transient monocular blindness (amaurosis fugax) within 180 days of the procedure; or
    b. Asymptomatic carotid artery stenosis ³ 80% as determined by angiography using NASCET methodology.
- Patient has a modified Rankin Score of ≤ 2 at the time of informed consent.
- Females of child-bearing potential must have a negative pregnancy test within 24 hours of the index procedure.
- Patient is willing and able to take dual antiplatelet therapy for a minimum of 30 days following the index procedure.

Angiographic Inclusion Criteria:

- Target lesion located at the carotid bifurcation and/or proximal internal carotid artery (ICA).
- Single *de novo* or restenotic (post carotid endarterectomy (CEA) target lesion or severe tandem lesions that can be covered by a single Neuroguard stent.
- Target lesion length is ≤ 20 mm (for 30 mm stents) or is ≤ 30 mm (for 40 mm stents).
- Index vessel diameter (segment covered by the mid-portion of the stent) is between 4.0 mm and 6.0 mm at the site of target lesion.
- Distal vessel diameter at the site of the Neuroguard IEP System filter deployment is between 4.0 mm and 7.0 mm.
- Distal common carotid artery diameter (segment covered by the proximal portion of the stent) is between 4.0 mm and 8.0 mm.
- Sufficient landing zone exists in the cervical internal carotid artery distal to the target lesion to allow for the safe and successful deployment of both the primary embolic protection filter and the Neuroguard IEP System filter.

In addition, patients had to meet at least one of the significant anatomic or comorbid high-risk conditions listed below for inclusion in the study. Patients at high risk for CEA were defined as having significant physiological comorbidities and/or anatomic risk factors and would be poor candidates for CEA in the opinion of a physician.

High Anatomic Risk for CEA Conditions:

- Target lesion is located at or above C2 (level of the jaw) or below the clavicle.
- Inability to extend the head due to cervical arthritic or other cervical disorders.
- History of radiation treatment to the neck or radical neck dissection.
- Prior head and neck surgery in the region of the carotid artery.
- Spinal immobility of the neck.
- Tracheostomy or tracheostoma.
- Hostile neck or surgical inaccessible lesion.
- Laryngeal palsy or laryngectomy.
- Severe tandem lesions (total length must be ≤ 30 mm and must be covered with one stent).
- Occlusion of contralateral CCA or ICA.

High Co-Morbid Risk Conditions for CEA:

- Patient is ≥ 70 years of age (maximum 80 years) at the time of enrollment.
- NYHA Class III or IV congestive heart failure (CHF).
- Chronic obstructive pulmonary disease (COPD) with FEV1 < 50 or on intermittent or chronic oxygen therapy.
- Left ventricular ejection fraction (LVEF) ≤ 35%.
- Unstable angina.
- History of recent myocardial infarction (MI) (between 14 days and 6 weeks prior to the index procedure).
- Coronary artery disease with two or more vessels with ≥ 70% stenosis.
- Planned coronary artery bypass grafting (CABG) or valve replacement surgery between 31- and 60 days following CAS procedure.
- Peripheral vascular surgery or abdominal aortic aneurysm repair is required and planned between 31- and 60 days following CAS procedure.
- Contralateral laryngeal nerve paralysis.
- Restenosis following prior carotid endarterectomy (CEA).

General Exclusion Criteria:

- Life expectancy of less than 1 year, cancer with metastatic spread, undergoing active chemotherapy treatment, or currently requiring an organ transplantation.
- An evolving, acute stroke.
- Anticipated or potential sources of emboli including left ventricular aneurysm, severe cardiomyopathy, aortic or mitral mechanical heart valve, severe calcific aortic stenosis (valve area < 1.0 cm^2), endocarditis, moderate to severe mitral stenosis, known previously symptomatic PFO, left atrial thrombus, any intracardiac mass or DVT or PE treated within the past 12 months.
- History of paroxysmal atrial flutter or atrial fibrillation requiring chronic anticoagulation.
- History of atrial flutter or chronic atrial fibrillation.
- Anticoagulation with Phenprocoumon (Marcumar®), warfarin, direct thrombin inhibitor, or anti-Xa agents within 14 days of the index procedure.
- Acute febrile illness (temperature ≥ 100.4 °F or 38° C) or active infection.
- Subjects with presumptive or confirmed SARS-CoV2/COVID-19 infection.
    - A SARS-CoV2/COVID-19 exposure and symptomology screening must be conducted for all subjects. If one or more of the screening questions is yes, a COVID-19 test must be performed with a negative result in order for the patient to be eligible.
    - Note: If a subject has confirmed SARS-CoV-2/COVID-19 infection (SARS-CoV2/COVID-

19+), eligibility may be re-established 21 days following diagnosis if infection is asymptomatic and 21 days following resolution of symptoms if infection is symptomatic.

- Acute myocardial infarction (MI) < 14 days prior to index procedure.
- Any major surgical procedure (i.e., intraabdominal or intrathoracic surgery or any surgery / interventional procedure involving cardiac or vascular system) within 30 days prior to or following the index procedure.
- History of major disabling stroke with substantial residual disability (modified Rankin score ≥ 3).
- Other neurological deficit not due to stroke that may confound the neurological assessments.
- Dementia considered other than mild.
- Known severe carotid stenosis or complete occlusion contralateral to the target lesion requiring treatment within 30 days of the index procedure.
- Known hypersensitivity to nitinol or its components (e.g., nickel, titanium).
- History of intracranial hemorrhage within 90 days prior to the index procedure.
- History of GI bleed within 30 days prior to the index procedure
- Chronic renal insufficiency (serum creatinine ≥ 2.5 ml/dL or estimated GFR < 30 cc/min) or end stage renal disease on hemodialysis.
- Any condition that precludes proper angiographic assessment or makes percutaneous arterial access unsafe (e.g., severe hepatic impairment, malignant hypertension, morbid obesity).
- Known hypersensitivity to contrast media that cannot be adequately premedicated.
- Hemoglobin (Hgb) < 8 gm/dL, platelet count < 100,000, INR > 1.5 (irreversible), or heparin-induced thrombocytopenia.
- History or current indication of bleeding diathesis or coagulopathy including thrombocytopenia or an inability to receive heparin in amounts sufficient to maintain an activated clot time (ACT) at ≥ 250 seconds.
- Contraindication to standard of care study medications, including antiplatelet therapy or aspirin.
- Previously enrolled in this study or currently enrolled in another interventional device or drug study that has not yet reached the primary endpoint.
- Potential for subject non-compliance with protocol-required follow up or antiplatelet medication.

Angiographic Exclusion Criteria:

- Total occlusion of the target carotid artery.
- Previously placed stent in the ipsilateral carotid artery.
- Severe calcification or vascular tortuosity of the target vessel that may preclude or make difficult the safe introduction of the sheath, guiding catheter, distal filter, Neuroguard stent, or integrated filter. Excessive circumferential calcification of the target lesion is defined as > 3 mm of thickness of calcification seen in orthogonal views on fluoroscopy. Severe vascular tortuosity is defined as 2 or more bends of 90 degrees or more within 4 cm of the target lesion.
- Qualitative characteristics of stenosis and stenosis-length of carotid bifurcation (common carotid) and/or ipsilateral external carotid artery, that preclude or make difficult the safe introduction of the sheath.
- Angulation or tortuosity (≥ 90 degree) of the innominate and common carotid artery (CCA) that precludes safe, expeditious sheath placement or that will transmit a severe loop to the internal carotid after sheath placement.
- Angiographic evidence of a mobile filling defect or fresh thrombus in the target carotid artery.
- Presence of “string sign” of the target lesion (a sub-totally occluded, long segment of the true lumen of the artery with markedly reduced contrast flow).
- Non-atherosclerotic carotid stenosis (e.g., dissection, fibromuscular dysplasia).
- Proximal/ostial CCA, innominate artery stenosis, or intracranial artery stenosis located distal to the target stenosis that is more severe than the target stenosis.
- Patient in whom percutaneous vascular access is not possible, including severe tortuosity or stenosis that requires additional endovascular procedures or that prevents safe and expeditious access.

- Patient with intracranial pathology, that in the opinion of the investigator, makes the patient inappropriate for study participation (e.g., arteriovenous malformation, brain tumor, microangiopathy or large vessel cerebral vascular disease, etc.) or that would confound the neurological evaluation.
- Known mobile plaque or thrombus in the aortic arch.
- Type III aortic arch.
- Angiographic, CT, MR or ultrasound evidence of severe atherosclerosis, tortuosity or angulation of the aortic arch or origin of the innominate or common carotid arteries that would preclude or make difficult safe passage of the sheath and other endovascular devices to the target artery as needed for carotid stenting.

Follow-up Schedule

All patients were scheduled to return for follow-up examinations at 30 days, 6 months, and 12 months, with annual follow-up continuing at 24 and 36 months post-procedure. Adverse events and complications were recorded at all visits through 12 months post-procedure. The key timepoints are shown below in Table 2 summarizing safety and effectiveness.

Table 2. PERFORMANCE II Study Subject Follow-up

Assessment	Follow Up					
	30 Days (± 7 d)	6 months (± 30 d)	12 months (± 30 d)	24 months (± 45 d)	36 months (± 45 d)	Unscheduled Visit
Informed Consent						
Medical History, Demographics						
Physical exam						
Modified Rankin Scale (mRS)	X	X	X	X	X	X[2]
National Institutes of Health Stroke Scale (NIHSS)	X	X	X	X	X	X[2]
Head CT or Brain MRI						X[2]
Carotid duplex ultrasound		X	X	X	X	X[2]
Catheter based angiography, 3D CTA or 3D MRA showing the internal, common carotid arteries and aortic arch						X[3]
Index Procedure						
12-lead ECG	X					X[1]
Cardiac Biomarkers (troponin or CK Total, CK-MB)						X[1]
Pregnancy test						
CBC, Serum creatinine (Cr), BUN, potassium						
Dual antiplatelet therapy assessment	X	X	X	X	X	X
Concomitant medications	X	X	X	X	X	X
SARS-CoV-2/COVID-19 test						X[4]
AE assessment	X	X	X	X	X	X

. Performed only if clinically indicated.
. Neurological examination, modified Rankin Scale (mRS), and National Institutes of Health Stroke Scale (NIHSS) was performed if an unscheduled visit was due to a neurological event.
. Performed if carotid re-intervention / revascularization was required.
. A SARS-CoV-2/COVID-19 test was conducted for all serious adverse events.

Clinical Endpoints

The primary safety and effectiveness endpoint was defined as a composite of 30-day rate of Major Adverse

Event (MAE), defined as death, all stroke and myocardial infarction (MI) within 30 days of the index carotid stenting procedure plus ipsilateral stroke through 12 months of the procedure.

Secondary endpoints included the following:

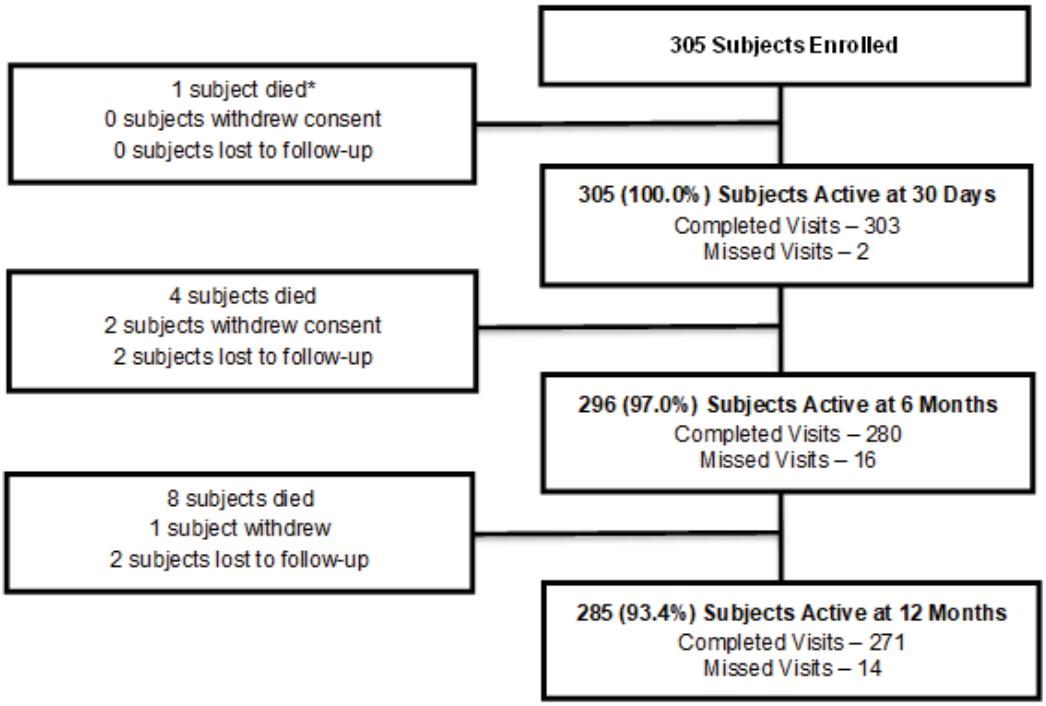
- Procedural success, defined as successful Neuroguard stent implantation with ≤ 50% residual angiographic stenosis of the target lesion as determined by the angiographic core lab;
- Technical Success, defined as successful deployment of the Neuroguard stent in the targeted treatment location with ≤ 50% residual angiographic restenosis immediately after post-dilation as determined by the angiographic core lab, successful delivery and deployment of the Neuroguard IEP System filter beyond the target lesion with retrieval after completion of the stent placement, successful post-dilation of the Neuroguard stent with the integrated angioplasty balloon, and successful removal of the delivery system;
- Clinically-Driven Target Lesion Revascularization (CD-TLR), defined as any revascularization procedure of the original treatment site associated with narrowing of > 80% as determined by the angiographic core lab within 12 months of the index procedure;
- In-Stent Restenosis (ISR), defined as > 70% narrowing observed within the Neuroguard stent per core lab ultrasound analysis through 12 months, 24 months and 36 months post index procedure;
- Major stroke, defined as a new focal ischemic neurological deficit of abrupt onset which is present after 7 days and results in ≥ 4-point increase in NIHSS compared to baseline through 30 days post index procedure;
- Minor stroke through 30 days, defined as a new focal ischemic neurological deficit of abrupt onset lasting > 24 hours and increasing NIHSS by ≤ 3 points at 7 days;
- Neurological death, defined as death after a stroke that is either a direct consequence of the stroke or a complication of the stroke, through 12 months post index procedure.

All clinical events were adjudicated by an independent Clinical Events Committee (CEC).

11.2. Subject Accountability

At the time of database lock, of 305 subjects enrolled in the study, 93.4% (n = 285) subjects were active at 12 months for primary endpoint analysis. The Intent-to-treat (ITT) cohort consisted of all 305 patients enrolled in the study, regardless of treatment received. Subject disposition is presented in Figure 2 below.

Figure 2. Subject Disposition per ITT Analysis



* One subject completed the scheduled 30-day follow-up visit on Day 25 post-procedure and died on Day 30 post-procedure (non-neurological death). As the 30-day visit was within the follow-up window, the subject visit is included in the analysis.

11.3. Study Population Demographics and Baseline Parameters

A total of 305 subjects with 305 lesions were treated at 23 U.S. and 9 OUS investigational sites. All subjects were considered at high-risk for complications if treated with CEA; 19.67% of subjects were categorized as symptomatic as described in Table 3 below.

Table 3. PERFORMANCE II Study Subject Comorbidity Status

Subject Characteristics	Symptomat c (N=60)	Asymptomatic (N=245)	Total (N=305)
High-Risk for CEA Conditions			
Anatomic only	.67% (13/60)	.90% (61/245)	.26% (74/305)
Comorbid only	51.67% (31/60)	6.12% (113/245)	7.21% (144/305)
Both conditions	6.67% (16/60)	8.98% (71/245)	8.52% (87/305)
None of the conditions above	.00% (0/60)	.00% (0/245)	.00% (0/305)

Per ITT analysis, the mean age of the study population was 69.59 ± 7.47 SD years and 201/305 (65.90%) were male. The prevalence of traditional cardiovascular risk factors in enrolled subjects included 132/305 (43.28%) diabetes mellitus, 219/305 (71.80%) current/former smoker, and coronary artery disease 184/305 (60.33%). Table 4 below presents subject baseline demographics and medical history.

Table 4. PERFORMANCE II Study Subject Demographics and Medical History

Subject Characteristics	Neuroguard IEP System (N=305)
Age (years)	
Mean±SD (N)	69.59±7.47 (305)
Median	71.08
Range (Min,Max)	(43.38,80.96)
Male gender at birth, %(n/N)	65.90% (201/305)
Ethnicity, %(n/N)	
American Indian or Alaska Native	.00% (0/305)
Asian	.98% (3/305)
Native Hawaiian or Other Pacific Islander	.00% (0/305)
Black or African American	5.25% (16/305)
White	92.79% (283/305)
Other	.98% (3/305)
Current or Former Smoker, %(n/N)	71.80% (219/305)
Alcohol intake in the past or at present, %(n/N)	.82% (94/305)
Coronary artery disease, %(n/N)	60.33% (184/305)
Previous Q wave or non-Q wave MI, %(n/N)	7.70% (54/305)
Known Left Ventricular dysfunction, %(n/N)	6.89% (21/305)
Hyperlipidemia requiring medication, %(n/N)	92.79% (283/305)
History of hypertension, %(n/N)	92.79% (283/305)
History of Clinical COPD, %(n/N)	.62% (69/305)
History of NYHA Class III or IV congestive heart failure, %(n/N)	.95% (9/305)
History of chronic renal impairment with serum creatinine > 2.5 ml/dL or estimated GFR < 30 cc/min, %(n/N)	.66% (2/305)
Diabetes mellitus, %(n/N)	.28% (132/305)
History of cancer, %(n/N)	.66% (63/305)
Previous carotid endarterectomy, %(n/N)	.49% (32/305)
Current contralateral disease, %(n/N)	7.38% (114/305)
History of peripheral vascular disease, %(n/N)	.79% (100/305)
Previous coronary stenting or angioplasty, %(n/N)	5.88% (108/301)
Previous or planned CABG, %(n/N)	9.02% (58/305)
History of TIA, %(n/N)	9.02% (58/305)
History of stroke, %(n/N)	.31% (65/305)
History of amaurosis fugax ipsilateral to the carotid lesion, %(n/N)	
History of non-lateralizing symptoms (dizziness, etc.), %(n/N)	6.39% (50/305)
Other neurological events, %(n/N)	7.21% (22/305)

Table 5 below presents lesion and vessel characteristics while Table 6 presents procedural characteristics. Target lesions were categorized as *de novo* (92.76%, 282/304) and restenotic CEA (7.24%, 22/304). All lesion and vessel characteristics were interpreted by an independent angiographic core laboratory.

Table 5. PERFORMANCE II Study Lesion and Vessel Characteristics

Subject Characteristics	Neuroguard IEP System (N=305)
Core peripheral artery segment	
Right common carotid artery	.66% (2/304)
Right internal carotid artery	50.66% (154/304)
Left common carotid artery	.63% (8/304)
Left internal carotid artery	6.05% (140/304)
Lesion Length, mm	
Mean ± SD (N)	9.08±6.66 (304)
Median	9.08
Range (Min,Max)	(4.61,38.58)
Eccentric, % (n/N)	.04% (67/304)
ICA Calcification, % (n/N)	
None / Mild	.88% (103/304)
Moderate	.58% (96/304)
Severe	.54% (105/304)
ICA Tortuosity, % (n/N)	7.24% (22/304)
Lesion Bend, degrees	
Mean±SD (N)	9.40±22.82 (41)
Median	.00
Range (Min,Max)	(0.00,90.00)
Bifurcation, % (n/N)	
No Bifurcation	.18% (34/304)
A	.99% (3/304)
B	76.64% (233/304)
C	.62% (11/304)
D	.30% (7/304)
E	.32% (4/304)
F	.00% (0/304)
G	.95% (12/304)
Bifurcation Angulation, degrees	
Mean±SD (N)	6.96±15.16 (303)
Median	5.00
Range (Min,Max)	(16.90,89.10)
ECA, %	
Mean±SD (N)	54.27±27.03 (67)
Median	5.00
Range (Min,Max)	(0.00,100.00)
TIMI Flow, % (n/N)	
Normal	.00% (304/304)
ECA TIMI Flow, % (n/N)	
Normal	97.04% (295/304)
Decreased	.32% (4/304)
No flow	.64% (5/304)
Calcification, % (n/N)	
None/Mild	99.32% (290/292)
Moderate	.00% (0/292)

Subject Characteristics	Neuroguard IEP System (N=305)
Severe	.68% (2/292)

Table 6. PERFORMANCE II Study Procedural Characteristics

Procedure Characteristics	Neuroguard IEP System (N=305)
Duration of procedure, minutes (sheath insertion to removal)	
Mean±SD (N)	50.50±19.97 (305)
Median	7.00
Range (Min,Max)	(16.00,165.00)
Primary EPD deployment to retrieval	
Mean±SD (N)	6.03±8.08 (303)
Median	.00
Range (Min,Max)	(3.00,70.00)
Neuroguard filter deployment to retrieval	
Mean±SD (N)	.63±3.41 (294)
Median	.00
Range (Min,Max)	(0.00,32.00)
Pre-dilation performed prior to EPD	.66% (2/305)
Pre-dilation performed prior to Neuroguard	63.93% (195/305)
Total Contrast Injection, mL	
Mean±SD (N)	.16±51.50 (303)
Median	5.00
Range (Min,Max)	(30.00,375.00)
Primary Embolic Protection, % (n/N)	.00% (305/305)
Procedure Medications	
Anticoagulant therapy	
Heparin	67.54% (206/305)
Angiomax (bivalirudin)	.13% (98/305)
Other	.33% (1/305)
Pre-dilation Balloon Parameters	
Maximal diameter, mm	
Mean±SD (N)	.85±0.58 (224)
Median	.00
Range (Min,Max)	(2.00,6.00)
Maximal length, mm	
Mean±SD (N)	5.12±6.68 (221)
Median	.00
Range (Min,Max)	(12.00,60.00)

The Neuroguard IEP System is indicated to be used in conjunction with an available primary distal embolic protection device as described in the IFU. Table 7 below presents the distribution of primary distal embolic protection devices used in the PERFORMANCE II study by successfully implanted stent size. Twelve (12) of 305 subjects did not receive a successful Neuroguard stent implantation. The safety and effectiveness of the

Neuroguard IEP System has not been evaluated with primary distal embolic protection devices other than those listed in Table 7.

Table 7. PERFORMANCE II Primary Distal Embolic Filters Used

Neuroguard IEP System Model Number	Stent Diameter (mm)			Stent Length (mm)	Stents implanted (N)	Primary Distal Filter Used (n)		
	Proximal Tapered Diameter	Nominal Diameter	Distal Tapered Diameter			Emboshield NAV6	FilterWire EZ	SpiderFX
NG-0730-140-2	9	7	8	30	138	121	8	9
NG-0740-140-2	9	7	8	40	92	71	14	7
NG-0630-140-2	8	6	7	30	15	8	4	3
NG-0640-140-2	8	6	7	40	48	38	6	4
				TOTAL	293	238	32	23

11.4. Safety and Effectiveness Results

Primary Safety and Effectiveness Endpoint

The analysis of the primary endpoint of 30-day rate of Major Adverse Event (MAE), defined as death, all stroke, and myocardial infarction (MI) within 30 days of the index carotid stenting procedure, plus ipsilateral stroke through 12 months post-procedure was carried out on all ITT subjects who experienced the primary endpoint or had at least 330 days of follow-up (i.e., complete cases). All clinical events were adjudicated by an independent CEC.

The 12-month MAE rate was 2.84% (8/282). Table 8 presents the primary endpoint and individual components below.

Table 8. PERFORMANCE II Study Primary Endpoint Analysis

Study Endpoints	Neuroguard IEP System (N=305)
Major Adverse Event, %(n/N)	.84% (8/282)
Death to 30 days post-procedure, %(n/N)	.35% (1/282)
All Stroke to 30 days post-procedure, %(n/N)	.42% (4/282)
Minor, %(n/N)	.42% (4/282)
Major, %(n/N)	.00% (0/282)
Myocardial Infarction to 30 days post-procedure, %(n/N)	.71% (2/282)
Ipsilateral stroke to 360 days post-procedure, %(n/N)	.79% (5/280)
Minor, %(n/N)	.79% (5/280)
Major, %(n/N)	.00% (0/279)

The corresponding Z-score was 5.316, greater than the Z-score of 1.645 pre-defined in the study protocol and statistical analysis plan. Thus, the null hypothesis is rejected and the study goal was met ($p<0.05$, 1-sided test).

Examination of individual components of the MAE primary endpoint reveal event rates of 0.35% (1/282) for all death, 1.42% (4/282) for all stroke and 0.71% (2/282) for any MI through 30 days post-procedure. The one subject death was due to cardiac arrest and adjudicated by the independent CEC as unlikely related to the study procedure or device. All strokes occurring through 30 days were minor (ipsilateral) strokes; no major strokes were reported.

From 30-days post-procedure through 12-month follow-up, only 1 subject experienced ipsilateral (minor) stroke 276 days post-procedure, yielding a 30-day all-stroke plus ipsilateral stroke through 12 months rate of 1.79% (5/280). Importantly, no major strokes occurred post-procedure through 12-month follow-up.

Secondary Endpoint Results

Secondary clinical and angiographic endpoint results for the ITT population were descriptive in nature; no formal statistical hypotheses were tested. Through 30 days post-procedure, minor stroke (all ipsilateral) occurred in 1.31% (4/305) of subjects and no subjects experienced major stroke.

No subjects experienced neurological death through 12 months post-procedure. Also at 12 months post-procedure, no subjects experienced CD-TLR, defined as any revascularization procedure of the original treatment site associated with narrowing of > 80% as determined by the angiographic core laboratory. All TLR through 12 months post-procedure was 1.08% (3/279).

In-stent restenosis, defined as > 70% narrowing observed within the Neuroguard stent per angiographic core laboratory ultrasound analysis, was 3.65% (10/274) through 12 months post-procedure.

Overall, in-hospital and 30-day MAE rates were 0.98% (3/305) and 2.30% (7/305), respectively. Table 9 below describes secondary endpoints per ITT analysis.

Table 9. PERFORMANCE II Study Secondary Endpoint Analysis

Study Endpoints	Neuroguard IEP System (N=305)	95% Confidence nterval
cute Success Rates		
Procedure Success	96.69% (292/302)	[93.99%,98.40%]
Successful Neuroguard carotid stent implantation	96.07% (293/305)*	[93.23%,97.95%]
≤ 50% residual angiographic stenosis of the target lesion as determined by the angiographic core lab	99.67% (301/302)	[98.17%,99.99%]
Technical Success	95.68% (288/301)	[92.73%,97.68%]
Successful deployment of the Neuroguard carotid stent in the targeted treatment location with a residual diameter stenosis ≤ 50% immediately after post-dilation as determined by the angiographic core lab	96.69% (292/302)	[93.99%,98.40%]
Successful delivery and deployment of the Neuroguard filter beyond the target lesion and retrieval after completion of the stent placement	96.07% (293/305)	[93.23%,97.95%]
Successful post-dilation of the Neuroguard carotid stent with the integrated angioplasty balloon	95.72% (291/304)	[92.80%,97.70%]
Successful removal of the delivery system	.00% (305/305)	[98.80%,100.00%]
linical Events		
Clinically-driven target lesion revascularization to 360 days post-procedure	.00% (0/279)	[0.00%,1.31%]
Any target lesion revascularization to 360 days post-procedure	.08% (3/279)	[0.22%,3.11%]
In-stent restenosis to 360 days post-procedure	.65% (10/274)	[1.76%,6.61%]
Major stroke through 30 days	.00% (0/305)	[0.00%,1.20%]
Minor stroke through 30 days	.31% (4/305)	[0.36%,3.32%]
Neurological death through 12 months	.00% (0/279)	[0.00%,1.31%]

* Twelve (12) of 305 subjects did not receive successful Neuroguard stent implantation due to inability to cross the target lesion (n=4) or inability to deploy the integrated filter (n=8).

Adverse effects that occurred in the clinical study

Adverse events (AEs) were defined as any untoward medical occurrence, unintended disease or injury, or untoward clinical sign (including abnormal laboratory findings) in subjects whether or not related to the investigational medical device. Serious Adverse Events (SAEs) were defined as adverse events that led to the following:

- Death,
- Serious deterioration in the health of the subject, that either resulted in
  1) a life-threatening illness or injury, or
  2) a permanent impairment of a body structure or a body function, or
  3) in-patient or prolonged hospitalization, or
  4) medical or surgical intervention to prevent life-threatening illness or injury or permanent impairment to a body structure or a body function,
- Fetal distress, fetal death or a congenital abnormality or birth defect.

Planned hospitalization for a pre-existing condition, or a procedure required by the clinical investigational plan (protocol), without serious deterioration in health, was not considered a serious adverse event.

Of the 305 subjects, 114 (37.4%) subjects experienced an adverse event through 30-day follow-up, and 186 (61.0%) subjects experienced an adverse event through 12-month follow-up as described below in Table 10. Fifty-nine (59) subjects (19.3% experienced a serious adverse event through the 30-day follow-up, and 107 (35.1%) subjects experienced a serious adverse event through the 12-month follow up. No subject experienced an unanticipated adverse event.

Table 10. Adverse Events to 360 Days Post-procedure – ITT Population

System Organ Class/Preferred Term	Number of Events	Number of Subjects (N= 305)
Any Adverse Event	565	186 (61.0%)
Blood And Lymphatic System Disorders	**18**	**13 (4.3%)**
Anemia	12	
Other Blood and Lymphatic Disorders	6	
Cardiac Disorders	**77**	**52 (17.0%)**
Acute Coronary Syndrome	3	
Angina	14	
Arrhythmia	6	
Atrial Fibrillation	3	
Atrial Flutter	3	
Bradycardia	9	
Cardiogenic Shock	3	
Congestive Heart Failure	11	
Coronary Artery Disease Progression	3	
Non ST Segment Elevation Myocardial Infarction	6	
Unstable Angina	4	
Other Cardiac Disorders	12	
Ear And Labyrinth Disorders	**2**	**2 (0.7%)**
Vertigo	2	
Endocrine Disorders	**1**	**1 (0.3%)**
Diabetic Ketoacidosis	1	
Eye Disorders	**8**	**7 (2.3%)**
Amaurosis Fugax	4	
Glaucoma	2	
Other Eye Disorders	2	
Gastrointestinal Disorders	**32**	**24 (7.9%)**
Abdominal Pain	5	
Constipation	4	
Gastrointestinal Bleed	3	
Nausea and Vomiting	3	
Other Gastrointestinal Disorders	17	
General Disorders And Administration Site Conditions	**24**	**19 (6.2%)**
Non-Cardiac Chest Pain	7	
Non-specific Chest Pain	3	
Peripheral Edema	6	
Other General Disorders and Administration Site Conditions	8	

System Organ Class/Preferred Term	Number of Events	Number of Subjects (N= 305)
Hepatobiliary Disorders	**4**	**4 (1.3%)**
Cholecystitis	1	
Choledocholithiasis	1	
Cholelithiasis	1	
Hepatopathy	1	
Immune System Disorders	**2**	**2 (0.7%)**
Allergic Drug Rash	2	
Infections And Infestations	**79**	**54 (17.7%)**
Cellulitis of Foot	3	
Coronavirus (COVID-19) Infection	13	
Pneumonia	14	
Sepsis	3	
Urinary Tract Infection	14	
Viral Infection	3	
Other Infections and Infestations	29	
Injury, Poisoning And Procedural Complications	**19**	**18 (5.9%)**
Vascular Access Site Hematoma	3	
Vascular Access Site Pain	3	
Vascular Access Site Pseudoaneurysm	3	
Other Injury, Poisoning and Procedural Complications	10	
Investigations	**12**	**11 (3.6%)**
Doppler Ultrasound Abnormal	8	
Other Investigations	4	
Metabolism And Nutrition Disorders	**17**	**13 (4.3%)**
Diabetes Mellitus	3	
Hypokalemia	3	
Other Metabolism and Nutrition Disorders	11	
Musculoskeletal And Connective Tissue Disorders	**22**	**19 (6.2%)**
Pain, Musculoskeletal	9	
Other Musculoskeletal and Connective Tissue Disorders	13	
Neoplasms Benign, Malignant And Unspecified (Incl Cysts And Polyps)	**10**	**9 (3.0%)**
Basal Cell Carcinoma	2	
Lung Cancer	2	
Squamous Cell Carcinoma	2	
Other Neoplasms Benign, Malignant and Unspecified	4	
Nervous System Disorders	**51**	**45 (14.8%)**
Dizziness	7	
Headache	11	
Minor Ischemic Stroke	4	
Transient Ischemic Attack	12	
Other Nervous System Disorders	17	
Psychiatric Disorders	**4**	**4 (1.3%)**
Depression	2	
Other Psychiatric Disorders	2	

System Organ Class/Preferred Term	Number of Events	Number of Subjects (N= 305)
Renal And Urinary Disorders	**13**	**11 (3.6%)**
Acute Kidney Injury	3	
Other Renal and Urinary Disorders	10	
Reproductive System And Breast Disorders	**5**	**3 (1.0%)**
Balanitis	1	
Benign Prostatic Hyperplasia	1	
Hydrocele	1	
Testicular Pain	1	
Varicocele	1	
Respiratory, Thoracic And Mediastinal Disorders	**34**	**22 (7.2%)**
Chronic Obstructive Pulmonary Disease	3	
Dyspnea	6	
Pleural Effusion	4	
Respiratory Failure	6	
Other Respiratory, Thoracic and Mediastinal Disorders	15	
Skin And Subcutaneous Tissue Disorders	**11**	**7 (2.3%)**
Foot Ulcer	3	
Other Skin and Subcutaneous Tissue Disorders	8	
Surgical And Medical Procedures	**19**	**17 (5.6%)**
Non-Target Vessel Revascularization	6	
Target Lesion Revascularization	4	
Other Surgical and Medical Procedures	9	
Vascular Disorders	**101**	**75 (24.6%)**
Atherosclerosis of Arteries of the Extremities with Intermittent Claudication	19	
Carotid Artery Stenosis, Non-Target Vessel	4	
Edema of Lower Extremity	4	
Hypertension	6	
Hypotension	15	
Orthostatic Dizziness	3	
Orthostatic Hypotension	7	
Procedural Hypotension	20	
Other Vascular Disorders	23	

Subgroup Analyses

To assess the consistency of the treatment effect, primary endpoint outcomes were analyzed in subgroups defined according to pre-specified factors: race, gender, age (< 75 years), symptomatic status, high-risk status for CEA and site region (US vs. EU). High-risk status was based on the anatomic and co-morbid conditions specified in the eligibility criteria of the study protocol. Consistency was assessed using a test at a 0.05 level of significance. Within the ITT population, primary endpoint outcomes were consistent across all subgroups as described in Table 11 below.

Table 11. MAE Subgroup Analyses to 360 Days Post-procedure – ITT Population

Subject Characteristics	Major Adverse Event, % (n/N)	P-Value*
Ethnicity		
American Indian or Alaska Native	--,--	
Asian	0.00% (0/3)	
Black or African American	0.00% (0/13)	0.897
Native Hawaiian or Other Pacific Islander	--,--	
White	3.04% (8/263)	
Other	0.00% (0/3)	
Sex		
Male	2.67% (5/187)	1.000
Female	3.16% (3/95)	
Age		
<75 years	1.90% (4/210)	0.118
>=75 years	5.56% (4/72)	
Symptomatic Status		
Asymptomatic	2.64% (6/227)	0.656
Symptomatic	3.64% (2/55)	
High-Risk For CEA Conditions		
Anatomic	1.39% (1/72)	
Comorbid	1.52% (2/132)	0.082
Both	6.41% (5/78)	
Site Location		
US	2.70% (6/222)	0.679
Europe	3.33% (2/60)	

* Note the study was not powered to detect differences between subgroups.

12. OPERATOR'S INSTRUCTIONS

12.1. Recommended Materials

The following parts are required to use the Neuroguard IEP System and are included in the package:

- Preparation syringe with filter flushing tip – Flushing Syringe A (included)
- Preparation tip with catheter flushing tip – Flushing Syringe B (included)

The following parts are required to use the Neuroguard IEP System but are not supplied and should be selected based on the physician's experience:

- 0.014" diameter primary distal filter-based embolic protection device
- 6 Fr sheath (minimum) or 8Fr guide
- Standard hemostatic valve or Tuohy Borst adaptor

- Inflation device
- Balloon Inflation Solution (20% contrast / 80% sterile saline)
- Sterile saline

Non-clinical testing has demonstrated the Neuroguard IEP System to be compatible with the following primary distal filter based embolic protection devices:

- Medtronic SpiderFX™ Embolic Protection Device
- Abbott Emboshield® Nav6 Embolic Protection System
- Boston Scientific FilterWire EZ™

12.2. Stent Size Determination

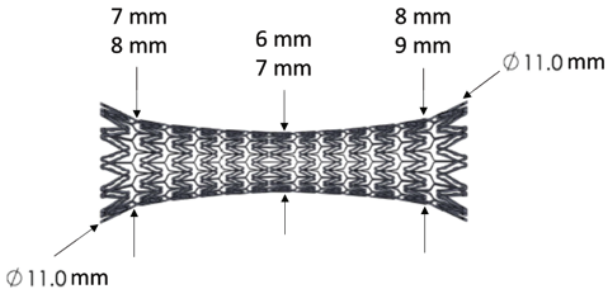
Select the appropriate size Neuroguard IEP Stent (Figure 3) using Table 12 below based on the largest diameter of the artery adjacent to the stenosis and the length of the segment to be stented. Ensure the stent sizing provides both proximal and distal stent apposition. The proximal stent end should be sized to the common carotid artery and the distal end sized to the internal carotid artery. Examine pre-treatment angiograms for correct and accurate vessel measurements. See Table 12 for recommended Reference Vessel Diameters.

The unconstrained mid-stent diameter (see Table 12) of the Neuroguard IEP Stent should be at least 1 mm to 2 mm larger than the diameter of the vessel to be stented. The Neuroguard IEP Stent should overlap healthy tissue by at least 5 mm on each side of the lesion.

Table 12. Neuroguard stent size determination

Unconstrained Stent Diameter (mm)			Reference Vessel Diameter, RVD (mm)		
Proximal end	Mid-Stent	Distal end	Common Carotid Artery (CCA)	Internal Carotid Artery (ICA) at Mid- Stent	Internal Carotid Artery (ICA) at Distal Stent
8.0	6.0	7.0	6.0 – 7.0	4.0 – 5.0	5.0 – 6.0
9.0	7.0	8.0	7.0 – 8.0	5.0 – 6.0	6.0 – 7.0

Figure 3. Stent Diameters



12.3. Foreshortening

Note that the Neuroguard stent deploys distally. That is, the distal end will expand at the point where the distal end of the stent is located with the delivery catheter (Figure 4). As the outer sheath is retracted the constrained stent will expand and foreshorten from the proximal end as shown in table 13 below:

Table 13: Stent Foreshortening

Stent Size	Recommended Vessel Diameter (mm) Mid-stent	Foreshortening (%)	Mean Foreshortening (mm)
8/6/7 X 30	4.0 – 5.0	20%	8 mm
8/6/7 X 40	4.0 – 5.0	20%	8 mm
9/7/8 X 30	5.0 – 6.0	20%	10 mm
9/7/8 X 40	5.0 – 6.0	20%	10 mm

Figure 4 – Stent Deployment

13. DIRECTIONS FOR USE

13.1. Inspection Prior to Use

1. Remove the pouch enclosing the Neuroguard IEP System components from the carton.
2. Inspect the pouch for any signs of damage to the sterile barrier.

Warning: If it is suspected that the sterile barrier seal has been opened or comprised, do not use the Neuroguard IEP System. Please return to the manufacturer.

3. Peel open pouch and remove the enclosed tray containing the Neuroguard IEP System.

Note. Instructions are printed on the tray lid. Do not discard.

13.2. Delivery System Preparation - Neuroguard

Caution: Only prepare and flush the Neuroguard IEP System with the supplied flushing syringes and tips.

1. Remove the filter tip sheath and the packaging stylet from the catheter and discard (Figure 5).
2. Carefully remove the device from the hoop in the tray (Figure 6).
3. Fill a separate basin with saline ensuring the distal end of the catheter is fully submerged (Figure 7)

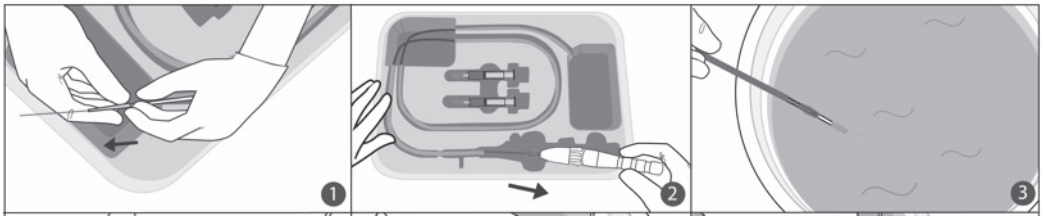


Figure 5 Figure 6 Figure 7

4. With the distal end fully submerged in saline in the basin, partially open the filter by rotating the Filter Deployment Knob on the handle counter-clockwise (Figure 8).
5. Fill the enclosed Flushing Syringe A with saline. Remove air bubbles within the Flushing Syringe A (Figure 9).
6. Flush the filter until no air bubbles are seen (Figure 10).

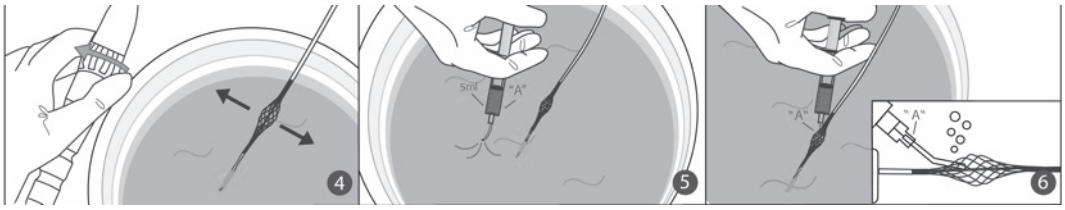


Figure 8 Figure 9 Figure 10

7. Close the filter by rotating the Filter Deployment Knob clockwise while gently massaging the filter membrane to ensure that there is no entrapped air within it (Figure 11).
8. While still maintaining the distal end submerged in saline, gently advance the outer sheath over the filter until the end of the outer sheath contacts the soft distal tip <u>while holding the catheter proximal to the outer sheath</u> (Figure 12).
9. Flush the distal tip of the catheter with the enclosed Flushing Syringe B until saline is seen exiting the proximal end of the outer sheath (Figure 13).

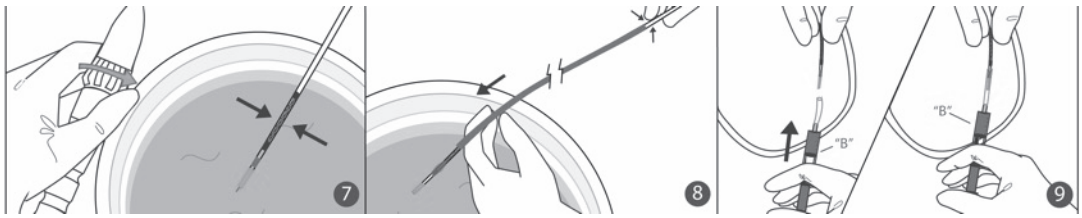


Figure 11 Figure 12 Figure 13

Caution: The delivery system has an internal hypotube. Take care to avoid unnecessary handling, which may kink or damage the delivery system. Do not use if the device is kinked.

13.3. Balloon Preparation

1. Attach a stopcock to the balloon inflation port of the catheter.

2. Prepare an inflation device according to the manufacturer's instructions.

3. Purge air from the catheter using the inflation device syringe filled with 5 mL of the balloon inflation solution.

4. Hold the syringe with nozzle pointing downward and aspirate the lumen for 5-10 seconds. Repeat until no bubbles are seen during aspiration.

13.4. Filter Placement and Deployment

Note: The Neuroguard IEP System can be used with a sheath or a guide catheter. The internal diameter of the sheath introducer or guide catheter should be at least 0.084" or greater.

Warning: Maintain continuous flush while inserting and removing the Neuroguard IEP System over the guidewire. Perform all exchanges slowly to prevent air embolism or trauma to the artery.

1. The Neuroguard IEP System should always be used in conjunction with a commercially-available primary distal embolic protection device. When using the primary distal embolic protection device with a 0.014" guidewire, advance it beyond the target lesion and deploy in the distal cervical internal carotid artery.

2. Ensure that the primary distal embolic protection device is in place prior to introduction of the Neuroguard IEP Stent System or pre-dilation of the target lesion.

Note: Ensure adequate landing zone in the cervical carotid artery to allow the deployment of the primary distal embolic protection device and the Neuroguard IEP System, keeping in mind that the Neuroguard IEP System tip extends beyond the distal end of the stent (refer to Figure 1a and Table 1).

3. Under fluoroscopic guidance, advance the Neuroguard IEP System over the 0.014" guidewire until the lesion is visualized between the distal and proximal markers.

4. Ensure the Neuroguard IEP System within the carotid artery is such that the filter is located immediately beyond the lesion and the stent is over the lesion.

   Note: There should be at least 1 cm between the distal marker of the Neuroguard IEP System and the proximal end of the primary distal embolic protection device.

5. Before deploying the filter, confirm the desired stent location and make any final adjustments to stent positioning within the artery.

6. Remove the locking pin from the handle and discard.

7. Slowly retract the outer sheath by rotating the Thumb Wheel towards the proximal end of the handle (Figure 14). As the outer sheath retracts, audible clicking will be heard. In addition, a radiopaque marker on the distal end of the outer sheath will be visual during retraction of the outer sheath.

Figure 14. Outer Sheath retraction to expose the filter using the Thumb Wheel

8. Retract the outer sheath until the radiopaque marker at the distal end of the outer sheath is positioned below the bottom of the filter and above the stent. The filter will be fully exposed at this point and can be deployed.

9. Deploy the filter by slowly turning the Filter Deployment Knob counter-clockwise, or to the left. (Figure 15).

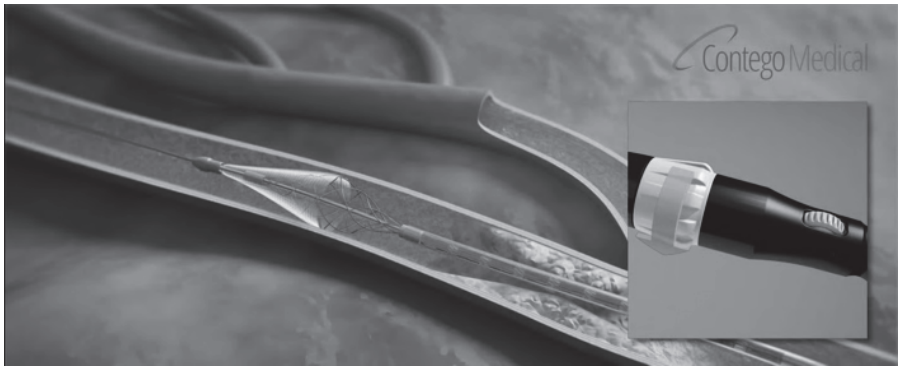


Figure 15. Filter Deployment Knob

10. Verify that the filter is fully expanded and apposed to the vessel wall by visually confirming under fluoroscopy.

11. Caution: Do not force the knob if it is not turning freely. Take care not to oversize the filter to minimize vessel trauma.

12. Connect the balloon inflation device to the stopcock on the balloon port of the catheter and check to see that the connection is secure. This will reduce the possible introduction of air to the system.

13.5. Stent Placement and Deployment

Note: The Neuroguard stent is deployed by retracting the outer sheath using the rotating the Thumb Wheel toward the proximal end of the handle (Figure 16).

Note: Always maintain the position of the delivery system handle relative to the patient during stent deployment.

Figure 16. Outer Sheath retraction to deploy the stent using the Thumb Wheel

1. The marker on the distal end of the outer sheath should be fluoroscopically monitored during outer sheath retraction. Stop retraction via the Thumb Wheel when the marker on the distal end of the outer sheath reaches the proximal end of the stent.
2. Following stent deployment, angiographically confirm that the distal and proximal balloon markers are still properly positioned within the stent and across the target lesion.
3. After the stent has been completely deployed, angiographically verify placement within the artery.

13.6. Stent Post-Dilation

1. Prior to post-dilation, ensure the pre-positioned balloon is within the stent.
2. Using an inflation device, inflate the pre-positioned post-dilation balloon to the desired size, using the compliance chart in Table 14 as a guide.
3. The inflated nominal diameter of the post-dilation balloon should be approximately the same as the diameter of the referenced native vessel.
4. Deflate the balloon after the desired size has been reached.

Table 14. 5.0 mm OD Balloon Compliance Chart

Balloon Pressure (atm)	Balloon Pressure (kPa)	Balloon Diameter (mm)
4	400	4.5
5	500	4.6
6	600	4.8
7	700	4.9
8*	800*	5.0
9	900	5.1
10	1000	5.2
11	1100	5.2
12	1200	5.3
13	1300	5.3
14**	1400**	5.4
15	1500	5.4
16	1600	5.5
17	1700	5.5
18	1800	5.6
19	1900	5.7
20	2000	5.8

*Nominal

** Burst

13.7. Withdrawing the Neuroguard IEP System

1. Collapse the filter by turning the Filter Deployment Knob clockwise. Continue turning until the handle stops turning. Angiographically confirm that the filter has collapsed using the circumferential filter markers.
2. Withdraw the catheter slowly while preserving guidewire position.

   Note: A radiopaque marker is located 1 - 2 mm proximal to the catheter tip and can be visualized fluoroscopically during advancement and retraction through the lumen of the deployed stent.

   Note. The guidewire should remain across the lesion until an accepted result is obtained and verified angiographically.
3. As the filter passes through the deployed stent, withdraw slowly and under angiographic guidance. Ensure that there is no resistance when withdrawing the filter through the stent.
4. If resistance is felt, gently advance the catheter under angiographic guidance, rotate, and then withdraw again.
5. Remove the catheter slowly through the guide or sheath under angiographic guidance. Ensure that the hemostasis valve / Tuohy-Borst Adaptor is fully open when removing the device.

6. Upon final angiography confirming a satisfactory result, the primary distal filter-based embolic protection device should be removed along with the sheath or guiding catheter. Refer to the manufacturer's Instructions for use when removing the distal filter-based embolic protection. Hemostasis of the puncture site should be established.

14. WARRANTY / LIABILITY

The product and each component of its system have been designed, manufactured, tested and packaged with all reasonable care. The warnings contained in Contego Medical Instructions for Use are expressly considered as an integral part of this provision. Contego Medial warranties the product until the expiration date indicated on the same. The warranty is valid provided that the use of the product was consistent with the Instructions for Use. Contego Medical disclaims any warranty of merchantability or fitness for a particular purpose of the product. Contego Medical is not liable for a particular purpose of the product. Except in the case of fraud or grave fault on Contego Medical part, compensation of any damage to the buyer will not, in any event, be greater than the invoice price of the disputed products. The guarantee contained in this provision incorporates and substitutes the legal guarantees for defects and compliance, and excludes any other possible liability of Contego Medical, however originating, from its product supplied. These limitations of liability and warranty are not intended to contravene any mandatory provisions of law applicable. If any clause of the disclaimer is considered by a competent court to be invalid or to be in conflict with the applicable law, the remaining part of it shall not be affected and remain in full force and effect. The invalid clause shall be substituted by a valid clause which best reflects Contego Medical legitimate interest in limiting its liability or warranty. No person has any authority to bind Contego Medical to any warranty or liability regarding the product.

15. REFERENCE

The physician should consult recent literature on current medical practice on carotid stenting and embolic protection devices, such as that published by ACC/AHA or ESC.

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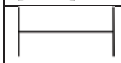
Made in USA.

16. SYMBOL DEFINITIONS

	Open and close embolic protection filter
REF	Reference number
LOT	Lot / Batch number
	Use by Date
	Manufactured Date
	Do not use when packaging is damaged
	Balloon diameter
	Balloon length
	Does not contain latex
STERILE EO	Contents sterile unless enclosed package has been opened or damaged. Sterilization by ethylene oxide
	Keep dry
	Non-pyrogenic
	Consult Instructions for Use
	Contents
R/X	Rapid Exchange catheter
	Do not re-use
	Do not re-sterilize
	MR Conditional
	Single sterile barrier system with protective packaging outside
Rx Only	Caution: Federal law restricts this device to sale by or on the order of a physician.

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