Boston Scientific

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Carotid WALLSTENT™

MONORAIL™ ENDOPROSTHESIS

Closed Cell Self-Expanding Stent

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℞ ONLY

Caution: Federal Law (USA) restricts this device to sale by or on the order of a physician.

WARNING

Contents supplied STERILE using irradiation process. Do not use if sterile barrier is damaged. If damage is found, call your Boston Scientific representative.

For single use only. Do not reuse, reprocess or resterilize. Reuse, reprocessing or resterilization may compromise the structural integrity of the device and/or lead to device failure which, in turn, may result in patient injury, illness or death. Reuse, reprocessing or resterilization may also create a risk of contamination of the device and/or cause patient infection or cross-infection, including, but not limited to, the transmission of infectious disease(s) from one patient to another. Contamination of the device may lead to injury, illness or death of the patient.

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

Carefully read all instructions prior to use. Observe all warnings and precautions noted throughout these instructions. Failure to do so may result in complications.

1. DEVICE DESCRIPTION

The Carotid WALLSTENT Monorail Endoprosthesis (Carotid WALLSTENT Endoprosthesis) is a closed cell design self-expanding stent composed of biomedical DFT (Drawn Filled Tubing) alloy monofilament wires braided in a tubular mesh configuration. The wires are manufactured from a biomedical grade cobalt-chromium-iron-nickel-molybdenum alloy (commonly known as Elgiloy® or Conichrome) containing an enhanced radiopaque tantalum core. The device has two components: the stent and the stent delivery system (see Figure 1).

The Monorail delivery system consists of two coaxially arranged shafts: an inner shaft (8) made of stainless steel proximally and thermoplast distally and an outer sheath (5) made of thermoplast. The central lumen (1) within the inner shaft continues to the tip (2) and accepts a 0.014 in (0.36 mm) guidewire, which exits the inner lumen through two guidewire holes (13, 14). To ensure that the inner guidewire lumen remains patent during the shelf life of the product, a packaging stylus (not pictured) is inserted through the tip (2) and out through the inner and outer shaft guidewire holes (13, 14).

The Carotid WALLSTENT™ Endoprosthesis (6) is pre-loaded on the stent carrier located on the distal segment of the inner shaft. Two radiopaque markers (3a,b) on the inner shaft and one radiopaque marker (4) on the retractable outer sheath are used to facilitate stent placement. The distal end of the outer sheath covers the Carotid WALLSTENT Endoprosthesis and is used to deploy the stent during the interventional procedure. The annular space between the coaxial inner shaft (8) and outer sheath (5) is accessed through the T-connector (9). The proximal end of the Carotid WALLSTENT Endoprosthesis is firmly held on the inner shaft with a holding mechanism (7), which enables a partially deployed Carotid WALLSTENT Endoprosthesis (up to 50%) to be reconstrained and repositioned. However, reconstrainment and repositioning of the Carotid WALLSTENT Endoprosthesis should only be done if absolutely necessary and should be strictly avoided when the partially deployed Carotid WALLSTENT Endoprosthesis is already in contact with the plaque of the stenosis. A black limit marker (11) on the proximal stainless steel tube (10) shows the maximum deployment still allowing reconstrainment of the Carotid WALLSTENT Endoprosthesis. A heart shaped hub (12) located at the end of the stainless steel tube (10) provides product identification.

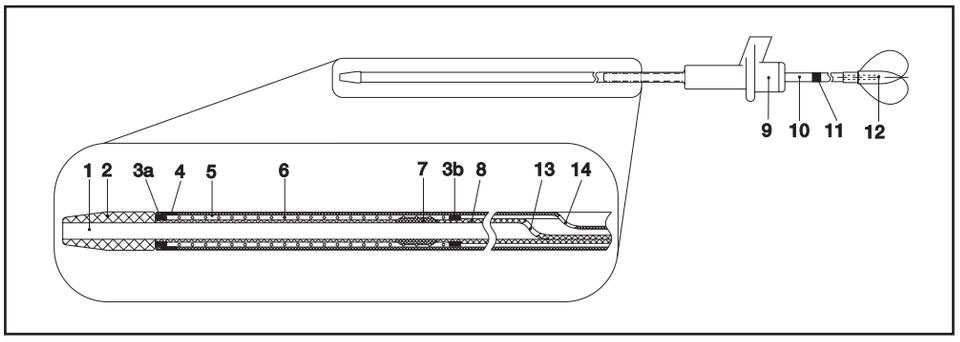


Figure 1. Carotid WALLSTENT Monorail™ Endoprosthesis

The stent is available in three unconstrained diameters (6 mm, 8 mm, and 10 mm; see Table 1). There is one length for the 6 mm stent (22 mm, unconstrained), and three lengths each for the 8 mm stent (21, 29, and 36 mm, unconstrained) and 10 mm stent (24, 31, and 37 mm, unconstrained).

Table 1. Carotid WALLSTENT Endoprosthesis (0.014 in / 0.36 mm Guidewire Lumen) Stent Sizes and Sizing

Catalog Number	Stent						Delivery Catheter		Compatibility	
	* Fully Open Diameter	Fully Open Length	Representative Length Adjustments				Outer Diameter	Working Length	Guiding Sheath Minimum ID	Guiding Catheter Minimum ID
			Vessel Diameter	Implanted Length	Vessel Diameter	Implanted Length				
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(F / mm)	(cm)	(F / mm / in)	(F / mm / in)
71-900	6	22	5	30	4	36	5.0 / 1.67	135	5 / 1.85 / 0.073	7 / 1.85 / 0.073
71-901	8	21	7	30	6	36	5.0 / 1.67	135	5 / 1.85 / 0.073	7 / 1.85 / 0.073
71-902	8	29	7	40	6	48	5.0 / 1.67	135	5 / 1.85 / 0.073	7 / 1.85 / 0.073
71-903	8	36	7	50	6	62	5.0 / 1.67	135	5 / 1.85 / 0.073	7 / 1.85 / 0.073
71-904	10	24	9	30	8	36	5.9 / 1.97	135	6 / 2.18 / 0.086	8 / 2.18 / 0.086
71-905	10	31	9	40	8	49	5.9 / 1.97	135	6 / 2.18 / 0.086	8 / 2.18 / 0.086
71-906	10	37	9	50	8	59	5.9 / 1.97	135	6 / 2.18 / 0.086	8 / 2.18 / 0.086

* Fully opened stent diameter selected should be 1 mm to 2 mm larger than nominal vessel diameter.

Guiding Catheter Compatibility:

7F (min. internal diameter 1.85 mm [0.073 in]): use with 71-900 to 71-903

8F (min. internal diameter 2.18 mm [0.086 in]): use with 71-904 to 71-906

Guiding Sheath Compatibility:

5F (min. internal diameter 1.85 mm [0.073 in]): use with 71-900 to 71-903

6F (min. internal diameter 2.18 mm [0.086 in]): use with 71-904 to 71-906

1.1 Contents

One (1) Carotid WALLSTENT Monorail Endoprosthesis.

2. INDICATIONS

The Carotid WALLSTENT Monorail Endoprosthesis (Carotid WALLSTENT Endoprosthesis), used in conjunction with the Boston Scientific embolic protection system, is indicated for the treatment of patients at high risk for adverse events from carotid endarterectomy due to either anatomic or comorbid conditions who require carotid revascularization in the treatment of ipsilateral or bilateral carotid artery disease and meet the criteria outlined below:

- Patients with neurological symptoms and ≥50% stenosis of the common, internal carotid artery and/or the bifurcation by ultrasound or angiogram OR patients without neurological symptoms and ≥80% stenosis of the common, internal carotid artery and/or the bifurcation by ultrasound or angiogram, AND
- Patients with a reference vessel diameter within the range of 4.0 mm and 9.0 mm at the target lesion.

3. CONTRAINDICATIONS

The Carotid WALLSTENT Endoprosthesis is contraindicated for use in:

- Patients in whom anticoagulant and/or antiplatelet therapy is contraindicated
- Patients with severe vascular tortuosity or anatomy that would preclude the safe introduction of a guide catheter, sheath, embolic protection system or stent system
- Patients with uncorrected bleeding disorders
- Lesions in the ostium of the common carotid artery

4. 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 stent placement should use the device.

4.1 General Warnings

- Refer to the Directions for Use supplied with any interventional devices to be used in conjunction with the Carotid WALLSTENT Endoprosthesis for their intended uses, contraindications, and potential complications.
- The safety and efficacy of the Carotid WALLSTENT Endoprosthesis have not been demonstrated with embolic protection devices other than the FilterWire EZ™ System.
- Risk of distal embolization may be higher if the Carotid WALLSTENT Endoprosthesis cannot be used in conjunction with an embolic protection system during the carotid stenting procedure.
- The use of a guiding sheath or guiding catheter with a fixed hemostasis valve may cause the embolic protection device filter membrane to tear at the hemostasis valve upon removal.
- During and after the procedure, appropriate antiplatelet and anticoagulation therapy must be provided to the patient, according to the current medical practice.
- The long-term performance of the Carotid WALLSTENT Endoprosthesis has not been established.
- As with any type of vascular implant, infection secondary to contamination of the stent may lead to thrombosis, pseudoaneurysm, or rupture.
- Stenting across a major bifurcation may hinder or prevent future diagnostic or therapeutic procedures.
- In patients requiring the use of antacids and/or H2-antagonists before or immediately after stent placement, oral absorption of antiplatelet agents such as aspirin may be adversely affected.
- Prior to use, the packaging and product should be inspected for signs of damage and expiration. Never use damaged or expired product or product from a damaged package.
- Flush all instruments entering the vascular system with sterile heparinized isotonic saline or a similar solution prior to use.
- The implantation of the Carotid WALLSTENT Endoprosthesis should be performed only under fluoroscopic observation with radiographic equipment providing high-resolution images.
- If pre-dilatation of the stenosis is necessary to allow crossing of the Carotid WALLSTENT Endoprosthesis, it is recommended to employ the smallest diameter balloon that allows safe passage of the stent system. A 2 mm to 3 mm balloon is typically sufficient.
- Always keep the Carotid WALLSTENT Endoprosthesis filled with sterile heparinized isotonic saline while it is in the vascular system.
- Never advance the Carotid WALLSTENT Endoprosthesis without the guidewire extending from the tip.
- Do not advance the Carotid WALLSTENT Endoprosthesis against significant resistance.
- The Carotid WALLSTENT Endoprosthesis should be oversized in relation to the artery diameter by 1 mm to 2 mm to prevent migration.
- Do not release the Carotid WALLSTENT Endoprosthesis if unusual force is required; in such a situation use another device.
- Never advance a partially deployed Carotid WALLSTENT Endoprosthesis distally.
- Reconstrainment and repositioning of the Carotid WALLSTENT Endoprosthesis should be strictly avoided when the partially deployed Carotid WALLSTENT Endoprosthesis is already in contact with the plaque of the stenosis.
- Use of this device in patients with hypersensitivity to cobalt, chromium, iron, nickel, or molybdenum may provoke an allergic reaction.
- Avoid using power injection in the cerebral circulation.

4.2 Patient Selection

The safety and efficacy of the Carotid WALLSTENT™ Endoprosthesis have NOT yet been established in patients with the characteristics noted below.

4.2.1 Patient Characteristics

- Low to moderate risk for adverse events from carotid endarterectomy
- Experiencing acute ischemic neurologic stroke or having experienced a stroke within 21 days of the procedure
- Intracranial mass lesion (i.e., abscess, tumor, or infection) or aneurysm >5 mm
- Arteriovenous malformations of the territory of the target carotid artery
- Coagulopathies
- Presence of fresh unlysed, unorganized thrombus
- Patients undergoing laser debulking or electrocoagulation within the stent
- Poor renal function or life threatening allergy which, in the physician's opinion, may constitute high risk for a reaction to contrast medium
- Carotid string sign
- Aneurysmal dilation immediately proximal or distal to the lesion
- Active infection
- Severe dementia
- Pregnancy
- Under the age of 18

4.2.2 Lesion Characteristics

- Evidence of intraluminal thrombus thought to increase the risk of plaque fragmentation and distal embolization
- Previously placed stent in the target artery
- Requirement of more than two stents
- Total occlusion of the target vessel
- Presence of carotid artery dissection prior to initiation of the procedure
- Highly calcified lesions

4.2.3 Access Characteristics

- Known peripheral vascular, supra-aortic, or internal carotid artery tortuosity that would preclude the use of catheter-based techniques
- Femoral access not possible
- Inadequate local hemostasis at the access site
- Failed guidewire or balloon catheter access

4.3 Device Use

- This device is intended for single-use only. Do not reuse. Do not resterilize as this can compromise device performance and increase the risk of cross contamination due to inappropriate reprocessing.
- Do not use the product after the "Use By" date specified on the package.
- Heparinize the patient to achieve and maintain an Activated Clotting Time (ACT) of ≥275 seconds (≥200 seconds if using GP IIb/IIIa inhibitors) to prevent thrombus formation on the devices.
- To minimize the possible introduction of air into the delivery system, it is important to maintain tight catheter connections and to thoroughly flush the delivery system.
- Maintain continuous flush while removing and reinserting devices on the guidewire. Perform all exchanges slowly to prevent air embolism or trauma to the artery.
- Implanting a stent may lead to dissection of the vessel distal and/or proximal to the stent and may cause acute closure of the vessel, requiring additional intervention (carotid endarterectomy, further dilatation, or placement of additional stents).
- The stent may cause a 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.
- In the event of complications such as infection, pseudoaneurysm or fistulization, surgical removal of the stent may be required.
- Overstretching of the artery may result in rupture and life-threatening bleeding.
- If a filter-based embolic protection system is used, allow for and maintain adequate distance between the filter and the stent delivery system or deployed stent to avoid potential entanglement. If filter basket entanglement or basket detachment occurs, surgical conversion or collapsing the basket with a second stent should be considered.
- Balloon angioplasty of the carotid bifurcation may initiate transient hemodynamic instability consisting of bradycardia or hypotension. Appropriate pharmacologic therapy must be immediately available.

5. PRECAUTIONS

5.1 Stent Handling

- Carefully inspect the Carotid WALLSTENT Endoprosthesis to verify that the device has not been damaged in shipment. Do not use damaged equipment.
- 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.
- Do not expose the delivery system to organic solvents like alcohol as structural integrity and/or function of the device may be impaired.
- Do not remove the stent from its delivery system as removal may damage the stent. The stent on the delivery system is intended to perform as a system. If removed, the stent cannot be put back on the delivery system.
- Special care must be taken not to handle or in any way disrupt the stent on the delivery system during catheter removal from packaging, stylus removal, placement over the guidewire and advancement through hemostatic valve adapter and guiding catheter or guiding sheath hub.
- Do not hold the sheath or stent during stylus removal.

5.2 Stent Placement

- The Carotid WALLSTENT Endoprosthesis is not compatible with any guidewire larger than 0.014 in (0.36 mm).
- The Carotid WALLSTENT Endoprosthesis must be used with a guiding catheter or guiding sheath to maintain adequate support of the 0.014 in (0.36 mm) guidewire throughout the procedure.
- For best device performance, the guidewire exit notch should remain within the guiding catheter or guiding sheath.
- Ensure the stent system is fully flushed with heparinized saline prior to use. Do not use the delivery system if flush is not observed exiting at the distal end of the sheath.
- 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.
- When catheters are in the body, they should be manipulated only under fluoroscopy. Radiographic equipment that provides high quality images is needed.
- The delivery system is not designed for use with power injection. Use of power injection may adversely affect device performance.
- If resistance is met during delivery system introduction, the system should be withdrawn and another system used.
- Prior to stent deployment, remove all slack from the delivery system.
- When more than one stent is required to cover the lesion, or if there are multiple lesions, the distal lesion should be stented first, followed by stenting of the proximal lesion.
- If overlap of sequential stents is necessary, the amount of overlap should be 5 mm. In no instance should more than 2 stents overlap.

5.3 Post Implant

- Care must be exercised when crossing a newly deployed stent with other interventional devices to avoid disrupting stent placement.
- In the event of thrombosis of the expanded stent, thrombolysis and PTA should be attempted.

Magnetic Resonance Conditional

5.4 Magnetic Resonance (MRI) Safety Information

Non-clinical testing has demonstrated the Carotid WALLSTENT System is MR Conditional for single and overlapping lengths up to a total length of 64 mm. It can be scanned safely under the following conditions:

- Static magnetic field of 1.5 Tesla or 3.0 Tesla using a quadrature body coil only
- Maximum spatial gradient field of <2500 gauss/cm (<25 T/m)
- Maximum MR system reported, whole body averaged specific absorption rate (SAR) of <1 W/kg for patient landmarks above the umbilicus (patient navel) and 2 W/kg (Normal Operating Mode) for patient landmarks below the umbilicus

MR imaging within these conditions may be performed immediately following the implantation of the stent.

Under the scan conditions defined above, the Carotid WALLSTENT System is expected to produce a maximum temperature rise of 4.5°C after 15 minutes of continuous scanning.

Image Artifact Information

The image artifact extends approximately 7 mm from the perimeter of the device diameter and 4 mm beyond each end of the length of the stent when scanned in non-clinical testing using a Spin Echo sequence. With a Gradient Echo sequence the image artifact extends 10 mm beyond the perimeter of the diameter and 7 mm beyond each end of the length with both sequences partially shielding the lumen in a 3.0 Tesla Intera (Achieva Upgrade), Philips Medical Solutions, software version Release 2.5.3.0 2007-09-28 MR system with a transmit/receive head coil.

Recommendations

It is recommended that patients register the conditions under which the implant can safely be scanned with the MedicAlert Foundation (www.medicalert.org) or an equivalent organization.

6. ADVERSE EVENTS

6.1 BEACH Observed Adverse Events

BEACH (Boston Scientific EPI: A Carotid Stenting Trial for High-Risk Surgical Patients) was a prospective, single-arm, multi-center trial to evaluate the safety and efficacy of the Carotid WALLSTENT Endoprosthesis in conjunction with the FilterWire EX®/FilterWire EZ™ Embolic Protection System to treat surgical high risk, symptomatic (≥50% stenosis) and asymptomatic (≥80% stenosis) patients with disease in the carotid artery. The primary objective of the trial was to show non-inferiority between carotid stenting and a historical control representative of outcomes with carotid endarterectomy, based upon the 1-year morbidity and mortality rate including non Q-wave MI to 24 hours; death, stroke, and Q-wave MI through 30 days; and ipsilateral stroke and neurologic death from 31 to 360 days. A total of 747 patients were enrolled in the trial: 189 roll-in patients, 480 pivotal patients and 78 bilateral registry patients.

Table 2 and Table 3 present Major Adverse Events (MAE) and Serious Adverse Events (SAE) respectively, as reported in the BEACH pivotal trial patients. A serious adverse event (SAE) may or may not be considered related to the device and was defined as follows:

- Death due to any cause
- Life-threatening condition (e.g., stroke)
- Persistent or significant disability/incapacity
- Any event resulting in an unscheduled in-patient hospitalization or prolongation of existing hospitalization >72 hours post index procedure
- Any event requiring intervention, except for comorbid scheduled events, which are scheduled and planned during the follow-up period
- Congenital abnormality or birth defect

Serious adverse events have been coded using the Medical Dictionary for Regulatory Activities (MedDRA™) version 5.0 and are presented by System Organ Class and Preferred Term as follows:

- BLOOD AND LYMPHATIC SYSTEM DISORDERS include events such as anemia.
- CARDIAC DISORDERS include events such as angina, arrhythmias, cardiac failure congestive and myocardial infarction.
- EYE DISORDERS include events such as retinal infarction.

- GASTROINTESTINAL DISORDERS include events such as gastrointestinal hemorrhage and retroperitoneal hemorrhage.
- GENERAL DISORDERS AND ADMINISTRATION SITE CONDITIONS include events such as death, multi-organ failure, and pyrexia.
- HEPATOBILIARY DISORDERS include events such as cholelithiasis.
- INFECTIONS AND INFESTATIONS include events such as pneumonia, sepsis and urinary tract infection.
- INJURY, POISONING AND PROCEDURAL COMPLICATIONS include events such as hip fracture and stent occlusion.
- INVESTIGATIONS include events such as blood creatinine increased and neurological examination abnormal.
- METABOLISM AND NUTRITION DISORDERS include events such as dehydration and hyperglycemia.
- MUSCULOSKELETAL AND CONNECTIVE TISSUE DISORDERS include events such as arthritis and pain.
- NEOPLASMS BENIGN, MALIGNANT AND UNSPECIFIED (INCLUDING CYSTS AND POLYPS) include events such as carcinomas, lung cancer, and neoplasms.
- NERVOUS SYSTEM DISORDERS include events such as cerebral hemorrhage, cerebrovascular accident, convulsions, dizziness, syncope and transient ischemic attack.
- PSYCHIATRIC DISORDERS include events such as confusion, depression and mental status changes.
- RENAL AND URINARY DISORDERS include events such as renal failure and impairment.
- REPRODUCTIVE SYSTEM AND BREAST DISORDERS include events such as vaginal hemorrhage.
- RESPIRATORY, THORACIC AND MEDIASTINAL DISORDERS include events such as chronic obstructive airway disease, dyspnea, pulmonary fibrosis, and respiratory failure.
- SKIN AND SUBCUTANEOUS TISSUE DISORDERS include events such as skin ulcer.
- SURGICAL AND MEDICAL PROCEDURES include events such as aortic valve replacement, arterial stent insertion, carotid endarterectomy, coronary artery surgery and revascularization, and hip arthroplasty.
- VASCULAR DISORDERS include events such as hematoma, hemorrhage, hypertension, hypotension, peripheral revascularization and vascular pseudoaneurysm.

Table 2. BEACH Trial Major Adverse Events

Adverse Events	**≤ 30 Days**			**31-360 Days**			**0-360 Days**		
Primary Endpoint	**# of Events**	**# of Patients**	**% Patients**	**# of Events**	**# of Patients**	**% Patients**	**# of Events**	**# of Patients**	**% Patients (N=448)**
1-Year Morbidity and Mortality[1]	NA	NA	NA	NA	NA	NA	50	40	8.9%
Major Adverse Events[2]	**# of Events**	**# of Patients**	**% Patients (N=478)**	**# of Events**	**# of Patients**	**% Patients (N=462)**	**# of Events**	**# of Patients**	**% Patients (N=469)**
Death	7	7	1.5%	29	29	6.3%	36	36	7.7%
Neurologic	2	2	0.4%	7	7	1.5%	9	9	1.9%
Non-neurologic	5	5	1.0%	22	22	4.8%	27	27	5.8%
Stroke	20	20	4.2%	19	19	4.1%	39	39	8.3%
Ipsilateral Stroke	15	15	3.1%	11	11	2.4%	26	26	5.5%
Major	5	5	1.0%	6	6	1.3%	11	11	2.3%
Minor	9	9	1.9%	2	2	0.4%	11	11	2.3%
Contralateral	5	5	1.0%	8	8	1.7%	13	13	2.8%
Major	0	0	0.0%	3	3	0.6%	3	3	0.6%
Minor	3	3	0.6%	4	4	0.9%	7	7	1.5%
Myocardial Infarction (MI)	5	5	1.0%	8	7	1.5%	13	12	2.6%
Non Q-wave MI	4	4	0.8%	7	6	1.3%	11	10	2.1%
Q-wave MI	1	1	0.2%	1	1	0.2%	2	2	0.4%

[1]The 1-year morbidity and mortality rate is defined as the cumulative incidence of any non Q-wave myocardial infarction within 24 hours, peri-procedural (≤30 days) death, stroke, and Q-wave myocardial infarction, and late ipsilateral stroke or death due to neurologic events from 31 days up to and including 12-month follow-up.

[2]Major adverse events are defined as any death, stroke, or myocardial infarction.

Table 3. BEACH Trial Serious Adverse Events

MedDRA™ System Organ Class/ Preferred Term	≤ 30 Days (N=480)			31-360 Days (N=470)			0-360 Days (N=480)		
	# of Events	# of Patients	% Patients	# of Events	# of Patients	% Patients	# of Events	# of Patients	% Patients
Any SAE	**196**	**115**	**24.0%**	**428**	**182**	**38.7%**	**624**	**251**	**52.3%**
Blood And Lymphatic System Disorders	**9**	**9**	**1.9%**	**14**	**12**	**2.6%**	**23**	**18**	**3.8%**
Anemia Not Otherwise Specified	9	9	1.9%	14	12	2.6%	23	18	3.8%
Cardiac Disorders	**26**	**21**	**4.4%**	**84**	**54**	**11.5%**	**110**	**69**	**14.4%**
Angina Pectoris	2	2	0.4%	17	12	2.6%	19	13	2.7%
Angina Unstable	0	0	0.0%	4	4	0.9%	4	4	0.8%
Bradycardia Not Otherwise Specified	3	3	0.6%	3	3	0.6%	6	6	1.3%
Cardiac Arrest	2	2	0.4%	3	3	0.6%	5	5	1.0%
Cardiac Failure Congestive	2	2	0.4%	19	15	3.2%	21	16	3.3%
Coronary Artery Disease Not Otherwise Specified	1	1	0.2%	2	2	0.4%	3	3	0.6%
Myocardial Infarction	6	6	1.3%	15	14	3.0%	21	20	4.2%
Other Cardiac Disorders	10	8	1.7%	21	19	4.0%	31	25	5.2%
Eye Disorders	**1**	**1**	**0.2%**	**0**	**0**	**0.0%**	**1**	**1**	**0.2%**
Gastrointestinal Disorders	**15**	**12**	**2.5%**	**30**	**23**	**4.9%**	**45**	**33**	**6.9%**
General Disorders And Administration Site Conditions	**6**	**5**	**1.0%**	**8**	**7**	**1.5%**	**14**	**11**	**2.3%**
Death Not Otherwise Specified	0	0	0.0%	2	2	0.4%	2	2	0.4%
Other General Disorders and Administration Site Conditions	6	5	1.0%	6	5	1.1%	12	9	1.9%
Hepatobiliary Disorders	**0**	**0**	**0.0%**	**2**	**2**	**0.4%**	**2**	**2**	**0.4%**
Infections And Infestations	**6**	**6**	**1.3%**	**37**	**29**	**6.2%**	**43**	**35**	**7.3%**
Injury, Poisoning And Procedural Complications	**1**	**1**	**0.2%**	**17**	**16**	**3.4%**	**18**	**17**	**3.5%**
Stent Occlusion	0	0	0.0%	5	5	1.1%	5	5	1.0%
Other Injury, Poisoning and Procedural Complications	1	1	0.2%	12	11	2.3%	13	12	2.5%
Investigations	**5**	**4**	**0.8%**	**5**	**4**	**0.9%**	**10**	**8**	**1.7%**
Metabolism And Nutrition Disorders	**2**	**2**	**0.4%**	**4**	**4**	**0.9%**	**6**	**5**	**1.0%**
Musculoskeletal And Connective Tissue Disorders	**1**	**1**	**0.2%**	**4**	**4**	**0.9%**	**5**	**4**	**0.8%**
Neoplasms Benign, Malignant And Unspecified (Including Cysts and Polyps)	**0**	**0**	**0.0%**	**10**	**10**	**2.1%**	**10**	**10**	**2.1%**
Nervous System Disorders	**53**	**43**	**9.0%**	**48**	**36**	**7.7%**	**101**	**75**	**15.6%**
Carotid Artery Dissection	3	3	0.6%	0	0	0.0%	3	3	0.6%
Carotid Artery Occlusion	3	3	0.6%	0	0	0.0%	3	3	0.6%
Carotid Artery Stenosis	0	0	0.0%	2	1	0.2%	2	1	0.2%
Cerebral Hemorrhage	2	2	0.4%	2	2	0.4%	4	4	0.8%
Cerebrovascular Accident	14	14	2.9%	19	19	4.0%	33	33	6.9%
Transient Ischemic Attack	17	17	3.5%	8	8	1.7%	25	24	5.0%
Vasovagal Attack	1	1	0.2%	1	1	0.2%	2	2	0.4%
Other Nervous System Disorders	13	11	2.3%	16	12	2.6%	29	22	4.6%
Psychiatric Disorders	**2**	**1**	**0.2%**	**7**	**7**	**1.5%**	**9**	**8**	**1.7%**
Renal And Urinary Disorders	**10**	**10**	**2.1%**	**8**	**8**	**1.7%**	**18**	**18**	**3.8%**
Reproductive System And Breast Disorders	**1**	**1**	**0.2%**	**0**	**0**	**0.0%**	**1**	**1**	**0.2%**
Respiratory, Thoracic And Mediastinal Disorders	**8**	**7**	**1.5%**	**27**	**24**	**5.1%**	**35**	**30**	**6.3%**
Skin And Subcutaneous Tissue Disorders	**0**	**0**	**0.0%**	**2**	**2**	**0.4%**	**2**	**2**	**0.4%**
Surgical And Medical Procedures	**16**	**15**	**3.1%**	**62**	**50**	**10.6%**	**78**	**60**	**12.5%**
Carotid Endarterectomy	0	0	0.0%	2	2	0.4%	2	2	0.4%
Other Surgical and Medical Procedures	16	15	3.1%	60	48	10.2%	76	58	12.1%
Vascular Disorders	**34**	**28**	**5.8%**	**59**	**46**	**9.8%**	**93**	**73**	**15.2%**
Hematoma Not Otherwise Specified	8	8	1.7%	2	2	0.4%	10	10	2.1%
Hemorrhage Not Otherwise Specified	2	2	0.4%	2	2	0.4%	4	4	0.8%
Hypotension Aggravated	1	1	0.2%	0	0	0.0%	1	1	0.2%
Hypotension Not Otherwise Specified	10	10	2.1%	0	0	0.0%	10	10	2.1%
Vascular Pseudoaneurysm	3	3	0.6%	1	1	0.2%	4	4	0.8%
Other Vascular Disorders	10	10	2.1%	54	43	9.1%	64	53	11.0%

Table 4 presents all deaths, regardless of device or procedure relatedness.

Table 4. BEACH Trial Causes of Death

Death (by type)	0-30 Days		31-360 Days	
	(N=480)		(N=470)	
	n	%	n	%
Neurologic	2	0.4	7	1.5
Cardiac	3	0.6	8	1.7
General	2	0.4	7	1.5
Respiratory/ Pulmonary	0	0.0	5	1.1
Infectious/ Inflammatory	0	0.0	2	0.4

6.2 CABANA Observed Adverse Events

CABANA (A Carotid Stenting Boston Scientific Surveillance Program) was a nonrandomized, open-label study intended to: 1) compile early clinical outcomes data for the Carotid WALLSTENT™ and FilterWire EZ™ Embolic Protection System (FilterWire EZ System) in routine clinical practice; 2) evaluate clinical outcomes using a composite rate of death, stroke, and myocardial infarction (MI) rate ≤30 days, in total and by center experience tier; 3) assess the adequacy of the BSC Carotid Stenting Device Training Program.

A total of 1097 patients were enrolled in the trial. Investigators were grouped into one of three tiers according to whether they had a high, medium, or low level of previous CAS experience and were also categorized by their CAS-credential-based training requirements for the CABANA study. The endpoint was the composite rate of major adverse events (MAEs), defined as CEC-adjudicated death, stroke, and MI, through 30 days post-index procedure, as well as the rates of these individual events, by physician experience tier, and by physician training tier.

Table 5 and Table 6 present the Major Adverse Events (MAE) and Serious Adverse Events (SAE) respectively, as reported in the CABANA patients. A serious adverse event (SAE) may or may not be considered related to the device and was defined as:

- Death due to any cause.
- Life-threatening condition (e.g., stroke).
- Persistent or significant disability/incapacity.
- Requires unplanned in-patient hospitalization or prolongation (> 72 hrs) of existing hospitalization (except for comorbid scheduled events, which are scheduled and planned during the follow-up period).
- Intervention to prevent a permanent impairment of a body function or permanent damage to a body structure.
- Congenital abnormality or birth defect.

Serious adverse events have been coded similar to BEACH using the MedDRA™ version 11.1 with the addition of:

- IMMUNE SYSTEM DISORDERS include events such as anaphylactic reaction,

There were no REPRODUCTIVE SYSTEM AND BREAST DISORDERS reported in the CABANA study.

Table 5. CABANA Major Adverse Events, 30 Days, All Enrolled Patients (N=1097)

Parameter	N=1025 Evaluable Patients	95% Confidence Interval
30-Day MAE	4.6% (47/1025)	[3.4%, 6.1%]
Death	1.3% (13/1025)	[0.7%, 2.2%]
Neurologic Death	0.5% (5/1025)	[0.2%, 1.1%]
Cardiac Death	0.5% (5/1025)	[0.2%, 1.1%]
Non-neurologic and Non-cardiac Death	0.3% (3/1025)	[0.1%, 0.9%]
Stroke	3.3% (34/1025)	[2.3%, 4.6%]
Classification 1: Major or Minor		
Major Stroke	2.0% (20/1025)	[1.2%, 3.0%]
Minor Stroke	1.4% (14/1025)	[0.7%, 2.3%]
Classification 2: Ipsilateral or Contralateral		
Ipsilateral Stroke	2.9% (30/1025)	[2.0%, 4.2%]
Contralateral Stroke	0.4% (4/1025)	[0.1%, 1.0%]
Classification 3: Ischemic or Hemorrhagic		
Ischemic Stroke	2.8% (29/1025)	[1.9%, 4.0%]
Hemorrhagic Stroke	0.5% (5/1025)	[0.2%, 1.1%]
MI	0.5% (5/1025)	[0.2%, 1.1%]
Q-wave MI	0.0% (0/1025)	[0.0%, 0.4%]
Non-Q-wave MI	0.5% (5/1025)	[0.2%, 1.1%]
Death, Stroke, and MI (≤ 24 hours)	2.8% (29/1025)	[1.9%, 4.0%]
Death, Stroke, and MI (>24 hours and ≤ 30 days)	2.1% (22/1025)	[1.3%, 3.2%]

Numbers are % (count/sample size)

Table 6. CABANA Rates of Center-Reported Serious Adverse Events, All Enrolled Patients (N=1097)

MedDRA™ System Organ Class/ Preferred Term	≤ 30 Days (N=1097)		
	# of Events	# of Patients	% Patients
TOTAL	389	223	20.3%
Blood and lymphatic system disorders	17	17	1.5%
Cardiac disorders	56	55	5.0%
Angina pectoris	7	6	0.5%
Angina unstable	1	1	0.1%
Bradycardia	14	14	1.3%
Cardiac arrest	5	5	0.5%
Cardiac failure congestive	7	7	0.6%
Cardio-respiratory arrest	1	1	0.1%
Coronary artery disease	1	1	0.1%
Myocardial infarction	5	5	0.5%
Sinus bradycardia	1	1	0.1%
Other cardiac disorders	14	14	1.3%
Eye disorders	5	5	0.5%
Gastrointestinal disorders	22	18	1.6%
General disorders and administration site conditions	27	26	2.4%
Death	1	1	0.1%
Other general disorders and administration site conditions	26	25	2.3%
Hepatobiliary disorders	2	2	0.2%
Immune system disorders	1	1	0.1%
Infections and infestations	28	22	2.0%
Injury, poisoning and procedural complications	12	11	1.0%
Investigations	14	12	1.1%
Metabolism and nutrition disorders	6	6	0.5%
Musculoskeletal and connective tissue disorders	6	6	0.5%
Neoplasms benign, malignant and unspecified (incl cysts and polyps)	1	1	0.1%
Nervous system disorders	73	68	6.2%
Carotid artery occlusion	1	1	0.1%
Cerebral haemorrhage	2	1	0.1%
Cerebrovascular accident	25	25	2.3%
Haemorrhagic stroke	4	3	0.3%
Ischaemic stroke	1	1	0.1%
Transient ischaemic attack	9	9	0.8%
Other nervous system disorders	31	28	2.6%
Psychiatric disorders	7	7	0.6%
Renal and urinary disorders	11	10	0.9%
Respiratory, thoracic and mediastinal disorders	31	28	2.6%
Skin and subcutaneous tissue disorders	1	1	0.1%
Surgical and medical procedures	1	1	0.1%
Vascular disorders	68	67	6.1%
Haemorrhage	1	1	0.1%
Hypertension	4	4	0.4%
Hypotension	47	47	4.3%
Orthostatic hypotension	4	3	0.3%
Other vascular disorders	12	12	1.1%

Table 7. CABANA Rates of Site-Reported Device-Related Adverse Events, Entire Study Experience, All Enrolled Patients (N=1097)

MedDRA™ Classification (N=1097)	Serious Adverse Events			Non-Serious Adverse Events			All Events		
MedDRA System Organ Class/ Preferred Term	# of Events	# of Patients	% Patients	# of Events	# of Patients	% Patients	# of Events	# of Patients	% Patients
TOTAL	50	44	4%	139	102	9.3%	189	139	12.7%
Blood and lymphatic system disorders	1	1	0.1%	0	0	0.0%	1	1	0.1%
Cardiac disorders	2	2	0.2%	23	22	2.0%	25	24	2.2%
Eye disorders	0	0	0.0%	2	2	0.2%	2	2	0.2%
General disorders and administration site conditions	1	1	0.1%	11	9	0.8%	12	9	0.8%
Injury, poisoning and procedural complications	3	3	0.3%	6	6	0.5%	9	9	0.8%
Investigations	0	0	0.0%	7	6	0.5%	7	6	0.5%
Musculoskeletal and connective tissue disorders	0	0	0.0%	11	9	0.8%	11	9	0.8%
Nervous system disorders	28	26	2.4%	15	14	1.3%	43	40	3.6%
Carotid artery occlusion	1	1	0.1%	0	0	0.0%	1	1	0.1%
Other nervous system disorders	27	25	2.3%	15	14	1.3%	42	39	3.6%
Psychiatric disorders	0	0	0.0%	1	1	0.1%	1	1	0.1%
Skin and subcutaneous tissue disorders	0	0	0.0%	2	1	0.1%	2	1	0.1%
Vascular disorders	15	15	1.4%	61	60	5.5%	76	75	6.8%

Table 8. CABANA Rates of Site-Reported Procedure-Related Adverse Events, Entire Study Experience, All Enrolled Patients (N=1097)

MedDRA Classification (N=1097)	Serious Adverse Events			Non-Serious Adverse Events			All Events		
MedDRA System Organ Class/ Preferred Term	# of Events	# of Patients	% Patients	# of Events	# of Patients	% Patients	# of Events	# of Patients	% Patients
TOTAL	162	123	11.2 %	813	429	39.1%	975	486	44.3%
Blood and lymphatic system disorders	4	4	0.4%	13	12	1.1%	17	16	1.5%
Cardiac disorders	25	22	2.0%	91	85	7.7%	116	106	9.7%
Ear and labyrinth disorders	0	0	0.0%	4	4	0.4%	4	4	0.4%
Eye disorders	1	1	0.1%	5	5	0.5%	6	6	0.5%
Gastrointestinal disorders	3	3	0.3%	44	40	3.6%	47	43	3.9%
General disorders and administration site conditions	16	15	1.4%	244	182	16.6%	260	194	17.7%
Infections and infestations	1	1	0.1%	1	1	0.1%	2	2	0.2%
Injury, poisoning and procedural complications	7	6	0.5%	22	22	2.0%	29	28	2.6%
Investigations	6	6	0.5%	40	34	3.1%	46	39	3.6%
Metabolism and nutrition disorders	2	2	0.2%	14	8	0.7%	16	9	0.8%
Musculoskeletal and connective tissue disorders	3	3	0.3%	50	47	4.3%	53	50	4.6%
Nervous system disorders	40	38	3.5%	67	59	5.4%	107	95	8.7%
Psychiatric disorders	2	2	0.2%	4	4	0.4%	6	6	0.5%
Renal and urinary disorders	4	4	0.4%	11	10	0.9%	15	14	1.3%
Respiratory, thoracic and mediastinal disorders	2	2	0.2%	12	11	1.0%	14	13	1.2%
Skin and subcutaneous tissue disorders	0	0	0.0%	7	6	0.5%	7	6	0.5%
Vascular disorders	46	45	4.1%	184	172	15.7%	230	213	19.4%

6.3 Potential Adverse Events

Based on the literature, and on clinical and commercial experience with carotid stents and embolic protection systems, potential adverse events include, but are not limited to the following:

- Abrupt vessel closure
- Additional interventional or surgical treatment (e.g., stenting or carotid endarterectomy)
- Allergic reactions (including to antiplatelet agents, contrast medium or stent materials)
- Aneurysm
- Angina/coronary ischemia
- Arrhythmia
- Arteriovenous fistula
- Bacteremia or septicemia
- Bleeding
- Bradycardia
- Cerebral vascular event such as edema
- Cerebral ischemia/transient ischemic attack
- Congestive heart failure (CHF)
- Death
- Detachment and/or implantation of a component
- Emboli (air, tissue, plaque, thrombus, device or other)
- Fever
- Filter thrombosis/occlusion
- Hematoma
- Hemorrhage
- Hyperperfusion syndrome
- Hypotension/hypertension
- Hypotonia
- Infection
- Ischemia/infarction of tissue or organ
- Myocardial Infarction (MI)
- Pain
- Pseudoaneurysm
- Renal failure/insufficiency
- Restenosis of stented segment
- Seizure
- Severe unilateral headache
- Stent embolization
- Stent/filter entanglement or damage
- Stent migration
- Stent malposition
- Stent thrombosis/occlusion
- Stroke/cerebrovascular accident (CVA)
- Vessel injury/dissection/perforation/rupture/trauma
- Vessel occlusion or thrombosis
- Vessel spasm or recoil

Any device related adverse event involving the Carotid WALLSTENT™ Monorail™ Endoprosthesis (Carotid WALLSTENT Endoprosthesis) should be reported immediately to Boston Scientific, Customer Service, at (888) 272-1001.

7. CLINICAL STUDIES

7.1 BEACH

BEACH, (Boston Scientific EPI: A Carotid Stenting Trial for High-Risk Surgical Patients), was a prospective, single-arm, multi-center trial to evaluate the safety and efficacy of the Carotid WALLSTENT Endoprosthesis in conjunction with the FilterWire EX®/FilterWire EZ™ Embolic Protection System to treat high-surgical-risk, symptomatic (≥50% stenosis) and asymptomatic (≥80% stenosis) patients with disease in the carotid artery. A trial design utilizing a roll-in phase for initial clinical experience was employed in the study. In addition, a bilateral registry was included for patients presenting with bilateral carotid artery disease requiring treatment. A total of 747 patients were enrolled at 47 centers in the United States, including 189 roll-in patients, 480 pivotal patients and 78 bilateral registry patients. This trial is summarized in Table 9.

Table 9. Overview of BEACH Trial Study Design

Product Evaluated: Carotid WALLSTENT Endoprosthesis and FilterWire EX/FilterWire EZ System
Sample Size for Pivotal Patients: 480
Number of Centers: 47
Primary Endpoint: 1-Year Morbidity and Mortality:
Non Q-wave MI through 24 hours
Death, Stroke, Q-wave MI through 30 days
Neurologic Death, Ipsilateral Stroke from 31-360 days
Secondary Endpoints:
FilterWire EX/FilterWire EZ System Technical Success[1]
Carotid WALLSTENT Endoprosthesis Technical Success[2]
System Technical Success[3]
Angiographic Success[4]
Procedure Success[5]
30-Day Clinical Success[6]
Peri-Procedural Morbidity and Mortality[7]
Peri-Procedural Overall Morbidity[8]
1-Year Clinical Success[9]
Late Stroke, TIA and Death[10]
Study Hypothesis: Non-inferiority to historical control
Patient Follow-up:
Neurological assessment by independent neurologist
CK/CKMB to 24 hours
ECG: discharge and 30 days
Carotid ultrasound: discharge, 30 days, 6 months and 1 year to 3 years
AEs: discharge, 30 days, 6 months, 1 year to 3 years

[1] FilterWire EX/FilterWire EZ System successfully delivered and deployed beyond the target lesion and successfully retrieved after completion of the stent placement. Calculated based on the number of FilterWire® System uses attempted.

[2] Deployment of the Carotid WALLSTENT Endoprosthesis at the intended location and successful retrieval of the delivery catheter after stent placement. Calculated based on the number of stent implantations attempted.

[3] Includes FilterWire System Technical Success combined with Carotid WALLSTENT Endoprosthesis Technical Success. Calculated based on the number of system placement attempts.

[4] System Technical Success with a residual diameter stenosis ≤30% immediately after post-dilatation as determined by angiographic core lab. Calculated based on number of patients on whom a procedure is attempted.

[5] Includes System Technical Success and Angiographic Success without death, stroke and MI (Q-wave and non Q-wave) immediately following the index procedure. Calculated based on number of patients attempted to be treated.

[6] Procedure Success without any death, stroke or MI (Q-wave) up to and including 30 days post procedure. Calculated based on number of patients on whom a procedure is attempted.

[7] Non Q-wave MI through 24 hours post procedure and death, stroke and Q-wave MI through 30 days post procedure.

[8] Morbidity occurring up to and including 30 days after the index procedure, including complications associated with routine catheterization, e.g., infection, hematoma, etc.

[9] Defined as a patent vessel by Duplex Ultrasound (as assessed by core laboratory to be <50% stenosis and confirmed by angiogram in patients that develop symptoms post procedurally) combined with freedom from stroke and death through 30 days, ipsilateral stroke and neurologic death 31-360 days and interim target vessel revascularization through 360 days. One-year clinical success was calculated based on the number of patients treated.

[10] Defined as the incidence of any stroke (major or minor), TIA or death occurring after 30 days and up to and including 1 year post procedure. Major stroke: a new focal ischemic neurological deficit of abrupt onset, which is present after 7 days and increases the NIH Stroke Scale by ≥4. Minor stroke: a new focal ischemic neurological deficit of abrupt onset, lasting >24 hours and increases the NIH Stroke Scale by ≤3. TIA: a focal ischemic neurological deficit of abrupt onset and of presumed vascular etiology that resolves completely within 24 hours of onset.

The BEACH trial was designed to show non-inferiority between carotid stenting and a historical control, based on standard of care. The historical control was established based on a review of the current literature on carotid endarterectomy and was defined as a weighted Objective Performance Criterion (OPC). A criterion of 15% for patients who had comorbidity risk factors and a criterion of 11% for patients who had anatomic risk factors were selected. A spread of 4% for the "delta" definition of equivalency was selected.

Weighted OPC = (% Comorbid x 15%) + (% Anatomic x 11%)

Two patients did not meet either the comorbid or anatomic high-risk criteria. Of the remaining 478 patients, 41.2% (197/478) were in the comorbid group and 58.8% (281/478) were in the anatomic group; therefore, the weighted OPC for BEACH was 12.6%. Note that 59 patients included in the comorbid group presented with both comorbid and anatomic risk factors.

12.6% = (41.2% x 15%) + (58.8% x 11%)

Based on the weighted OPC of 12.6% and the pre-specified delta of 4%, the threshold for claiming non-inferiority to CEA is 16.6%, i.e., the one-sided upper 95% confidence limit of the primary endpoint must be <16.6% to conclude non-inferiority.

The protocol required regular patient follow-up by the treating physician and follow-up neurological assessments by an independent neurologist. Core laboratories provided independent assessments for angiographic, ultrasound, ECG and CT/MRI testing. Monitors reviewed all safety data to ensure appropriate reporting of adverse events. A Clinical Events Committee adjudicated suspected primary endpoint events. A Data Safety Monitoring Board reviewed adverse events to ensure patient safety.

7.1.1 Eligibility Criteria Summary

The study population consisted of male and female patients, at least 18 years of age, with discrete lesions in the common carotid artery (CCA), internal carotid artery (ICA) or carotid bifurcation. Patients had to be at high-risk for surgical intervention; both symptomatic (≥50% stenosis) and asymptomatic (≥80% stenosis) patients were eligible.

The key inclusion criteria included the following:

- Symptomatic: Carotid stenosis of ≥50% via angiography with cerebral or retinal TIA or ischemic stroke symptoms determined to have occurred ipsilateral to the target lesion and to be reasonably attributable to the lesion within 180 days of the stenting procedure
- Asymptomatic: Carotid stenosis of ≥80% via angiography without cerebral or retinal TIA or ischemic stroke symptoms within 180 days of the stenting procedure
- Patient had to have an anatomic or comorbid high-risk condition as outlined below:

7.1.1.1 Anatomic High-Risk Conditions

ONE (1) criterion qualifies

1. Surgically inaccessible lesions at or above C2 or below the clavicle
2. Previous neck or head radiation therapy or surgery that included the area of stenosis/repair or ipsilateral radical neck dissection for cancer
3. Spinal immobility of the neck due to cervical arthritis or other cervical disorders
4. Restenosis after a previous or unsuccessful attempt of CEA (≥50% symptomatic, ≥80% asymptomatic) at least 31 days prior to enrollment if arteriotomy was performed
5. Presence of laryngeal palsy or laryngectomy
6. Presence of a tracheostoma
7. Contralateral total occlusion with a qualifying lesion on the ipsilateral side (Note: Applied to roll-in and pivotal groups only)
8. Bilateral carotid artery disease (Note: Patients with bilateral disease were placed in the Bilateral Registry provided that both ipsilateral and contralateral arteries required treatment at the time of enrollment.)

7.1.1.2 Comorbid High-Risk Conditions

CLASS I [ONE (1) criterion qualifies]

1. Congestive heart failure (NYHA Class III/IV)
2. Unstable angina (CCS Class III/IV)
3. Requirement for staged and scheduled Coronary Artery Bypass Graft (CABG) or valve replacement post carotid index procedure (Note: The staged procedure had to occur >30 days post index procedure.)
4. Chronic Obstructive Pulmonary Disease (COPD) manifested with a forced expiratory volume (FEV) ≤30%
5. Known severe left ventricular ejection fraction (LVEF) ≤30%

CLASS II [TWO (2) criteria qualify]

1. Age ≥75 years
2. Recent MI (Q-wave and/or non Q-wave) >72 hours and ≤30 days, with any elevation in CK-MB greater than the local laboratory upper limit of normal values
3. Two or more major diseased coronary arteries with ≥70% stenosis at the time of index procedure in patients with a history of angina
4. Requirement for staged and scheduled peripheral vascular surgery or other major surgeries [e.g., abdominal aortic aneurysm (AAA)] post carotid index procedure

7.1.1.3 Specific Inclusion Criteria for the Carotid WALLSTENT Monorail Endoprosthesis (Carotid WALLSTENT Endoprosthesis) and FilterWire EZ System

1. Target lesion in the common carotid artery (CCA), internal carotid artery (ICA) or carotid bifurcation
2. Diameter of the target arterial segment to be stented ≥4.0 mm and ≤9.0 mm

3. Vessel diameter distal to the target lesion ≥3.5 mm and ≤5.5 mm as an optimal "landing zone" for placement of the FilterWire EZ™ System with visual angiographic recommendations

7.1.2 Description of Patients Evaluated

Table 10 summarizes patient follow-up at the endpoint evaluation time points of 30 days, 6 months, and 12 months. Patients were considered to have been evaluated if they had physician contact as evidenced by at least one of the following at the given time point: office visit, neurologic evaluation, AE log, stroke scales, event forms such as Repeat Carotid Angiography Form, SAE Notification Form, Subsequent Hospitalization Form, Vascular Event Form, Neurological Event Form, etc.

Table 10. BEACH Patient Follow-up

	Pivotal (N=480)
Primary Analysis Sample (ITT[1])	480
30-day Follow-up Evaluation Completed	466
6-month Follow-up Evaluation Completed	435
12-month Follow-up Evaluation Completed	418
12-month Follow-up Evaluation not Completed	62
Death	36
Lost to Follow-up	10
Missed Visit	16
Patients with Ultrasound Data Pre-Procedure	455
Patients with Ultrasound Data at 30 Days	446
Patients with Ultrasound Data at 6 Months	418
Patients with Ultrasound Data at 12 Months	377

[1]ITT is Intent to Treat

Baseline patient demographics, lesion characteristics, and High-Risk Inclusion Criteria for the study are presented in Table 11. All reported angiographic data on the treated lesions are based on measurements obtained by the centralized angiographic core laboratory.

Table 11. Baseline Patient Demographics, Lesion Characteristics, and High-Risk Inclusion Criteria

Demographic and Medical History	Value	95% CI
Age (years)		
Mean ± SD (N)	70.9±9.3 (480)	[70.0, 71.7]
Range (min, max)	(41.0, 92.0)	
Gender %		
Male	65.2% (313/480)	[60.8%, 69.5%]
History %		
Diabetes mellitus	33.8% (162/480)	[29.5%, 38.2%]
Hypertension	89.4% (429/480)	[86.3%, 92.0%]
Hyperlipidemia	86.5% (415/480)	[83.1%, 89.4%]
Current or history of smoking	74.6% (358/480)	[70.4%, 78.4%]
Number of Symptomatic Patients	23.3% (112/480)	[19.6%, 27.4%]
Baseline Lesion Characteristics		
Calcification %	48.8% (234/480)	[44.2%, 53.3%]
Lesion Length (mm)		
Mean ± SD (N)	15.13±7.25 (480)	[14.48, 15.78]
Range (min, max)	(2.46, 57.60)	
Minimal Lumen Diameter (mm)		
Mean ± SD (N)	1.33±0.58 (480)	[1.27, 1.38]
Range (min, max)	(0.12, 3.51)	
Percent Diameter Stenosis (%DS)		
Mean ± SD (N)	71.61%±10.71% (480)	[70.65%, 72.58%]
Range (min, max)	(36.75%, 96.52%)	
High-Risk Inclusion Criteria		**Value**
Anatomic High-Risk Conditions (One Criterion Qualifies)		
Surgically inaccessible lesions		9.2% (44/480)
Previous head/neck radiation therapy or radical neck surgery		10.8% (52/480)
Spinal immobility		7.3% (35/480)
Restenosis after previous, or unsuccessful attempt, of CEA		34.2% (164/480)
Presence of laryngeal palsy or laryngectomy		1.0% (5/480)
Presence of tracheostoma		2.1% (10/480)
Contralateral total occlusion		18.1% (87/480)
Comorbid High-Risk Conditions- Class I (One Criterion Qualifies)		
Congestive heart failure (NYHA Class III/IV)		11.7% (56/480)
Unstable angina (CCS Class III/IV)		12.5% (60/480)
Requirement for CABG or valve replacement		6.5% (31/480)
COPD manifested with a forced expiratory volume (FEV) ≤30%		2.3% (11/480)
Known severe left ventricular ejection fraction (LVEF) ≤30%		12.1% (58/480)
Comorbid High-Risk Conditions - Class II (Two Criteria Qualify)		
Age ≥75 years old		39.0% (187/480)
Recent MI (Q-wave and/or non Q-wave) >72 hours and ≤30 days		1.3% (6/480)
Two or more major diseased coronary arteries with ≥70% stenosis		21.7% (104/480)
Requirement for peripheral vascular or other major surgery		2.9% (14/480)

7.1.3 Results

The primary endpoint for the BEACH trial was 1-year morbidity and mortality defined as the cumulative incidence of any non Q-wave myocardial infarction within the 24 hours following carotid stenting, peri-procedural (≤30 days) death, stroke, Q-wave myocardial infarction, and late ipsilateral stroke or death due to neurologic events from 31 to 360 days. The 1-year morbidity and mortality rate was 8.9%. Rates for each contributor to the composite primary endpoint rate are presented along with the secondary endpoints in Table 12.

The trial utilized the FilterWire EX® and the FilterWire EZ embolic protection devices. A total of 195 patients were enrolled using the FilterWire EX System and 285 patients were enrolled using the FilterWire EZ System. Poolability analysis was conducted to determine baseline homogeneity. No significant differences between the groups were found. In addition, a group difference on peri-procedural outcome analysis was performed. There was no evidence found against pooling the FilterWire EX System and FilterWire EZ System groups for purposes of estimating the treatment effect on 1-year morbidity and mortality.

The primary objective of the BEACH trial was met. The observed 1-year morbidity and mortality rate of 8.9% with an upper confidence limit of 11.5% fell well below the predefined weighted OPC + delta of 16.6%, demonstrating that carotid stenting with the Carotid WALLSTENT™ Endoprosthesis and the FilterWire® Embolic Protection System is non-inferior to surgical treatment for carotid artery disease in patients who were at high risk for CEA.

Table 12. Clinical Results Through 360 Days Follow-up

Primary Endpoint Measures	Pivotal (N=480)	95% CI[1]
1-Year Morbidity and Mortality	8.9% (40/448)	[11.5%]
Non Q-wave MI (Through 24 hours)	0.9% (4/448)	[0.2%, 2.3%]
Death, Stroke, Q-wave MI (Through 30 days)	5.4% (24/448)	[3.5%, 7.9%]
Death	1.6% (7/448)	[0.6%, 3.2%]
Neurologic	0.4% (2/448)	[0.1%, 1.6%]
Cardiac	0.7% (3/448)	[0.1%, 1.9%]
General	0.4% (2/448)	[0.1%, 1.6%]
Stroke	4.5% (20/448)	[2.8%, 6.8%]
Ipsilateral[2]	3.3% (15/448)	[1.9%, 5.5%]
Major Ischemic	1.1% (5/448)	[0.4%, 2.6%]
Minor Ischemic	2.0% (9/448)	[0.9%, 3.8%]
Hemorrhagic (excludes Subarachnoid Hemorrhages)	0.2% (1/448)	[0.0%, 1.2%]
Contralateral	1.1% (5/448)	[0.4%, 2.6%]
Major Ischemic	0.0% (0/448)	[0.0%, 0.8%]
Minor Ischemic	0.7% (3/448)	[0.1%, 1.9%]
Hemorrhagic (excludes Subarachnoid Hemorrhages)	0.4% (2/448)	[0.1%, 1.6%]
Subarachnoid Hemorrhagic	0.0% (0/448)	[0.0%, 0.8%]
Q-wave MI	0.2% (1/448)	[0.0%, 1.2%]
Neurologic Death, Ipsilateral Stroke (31 days through 360 days)	3.1% (14/448)	[1.7%, 5.2%]
Neurologic Death	1.6% (7/448)	[0.6%, 3.2%]
Ipsilateral Stroke	2.5% (11/448)	[1.2%, 4.4%]
Major Ischemic	1.3% (6/448)	[0.5%, 2.9%]
Minor Ischemic	0.4% (2/448)	[0.1%, 1.6%]
Hemorrhagic (excludes Subarachnoid Hemorrhages)	0.7% (3/448)	[0.1%, 1.9%]
Freedom from 1-Year Morbidity and Mortality – KM Estimate	91.6%	[89.0%, 94.2%]
Secondary Endpoint Measures	**Pivotal (N=480)**	**95% CI**
FilterWire EX® and FilterWire EZ™ System Technical Success[3]	97.1% (475/489)	[95.2%,98.4%]
Carotid WALLSTENT™ Endoprosthesis Technical Success[4]	94.1% (475/505)	[91.6%,96.0%]
System Technical Success[5]	98.3% (469/477)	[96.7%,99.3%]
Angiographic Success[6]	90.8% (433/477)	[87.8%,93.2%]
Procedure Success[7]	87.6% (418/477)	[84.3%,90.5%]
30-Day Clinical Success[8]	85.3% (405/475)	[81.8%,88.3%]
Peri-Procedural Morbidity and Mortality[9]	5.6% (27/478)	[3.8%,8.1%]
Peri-Procedural Overall Morbidity[10]	68.5% (328/479)	[64.1%,72.6%]
1-Year Clinical Success[11]	69.9% (297/425)	[65.3%,74.2%]
Late Stroke, TIA and Death (31 days through 360 days)[12]	10.6% (49/462)	[7.9%,13.8%]
Post-procedure In-lesion Minimal Lumen Diameter (mm): Mean ± SD (N) Range (min, max)	 4.2±0.8 (478) (2.3, 7.9)	 [4.1, 4.2]
Post-procedure In-lesion Percent Diameter Stenosis: Mean ± SD (N) Range (min, max)	10.6%±14.4% (478) (-73.3%,51.9%)	[9.4%, 11.9%]
Target Vessel Revascularization (TVR) Rate (≤ 360 days)[13]	4.7% (20/425)	[2.9%, 7.2%]
1-Year Restenosis Rate (≥ 50% Stenosis via Duplex U/S)	18.7% (72/385)	[14.9%, 23.0%]
Carotid Duplex Ultrasound ICA/CCA Ratio: Pre-Procedure Post-Procedure At 1 month At 6 months At 12 months	 5.3±3.1 (420) 1.4±0.5 (438) 1.4±0.5 (434) 1.9±1.2 (399) 1.9±1.1 (362)	 [5.0, 5.6] [1.4, 1.5] [1.4, 1.5] [1.8, 2.1] [1.8, 2.0]

Numbers are % (count/sample size) or %.

[1] 1-sided 95% upper confidence limit is presented for 1-year morbidity and mortality.

[2] Patient 42-014 was originally denoted to have suffered a minor ipsilateral stroke 27 days post-procedure. This event was sent back to the CEC for additional review after the CT/MRI core lab provided a review of films made available to them. Based upon the core lab report, the CEC adjudicated the event as a TIA.

[3] FilterWire EX/ FilterWire EZ System successfully delivered and deployed beyond the target lesion and successfully retrieved after completion of the stent placement. Calculated based on the number of FilterWire® uses attempted.

[4] Deployment of the Carotid WALLSTENT Monorail™ Endoprosthesis (Carotid WALLSTENT Endoprosthesis) at the intended location and successful retrieval of the delivery catheter after stent placement. Calculated based on the number of stent implantations attempted. Three patients did not have a Carotid WALLSTENT Endoprosthesis implantation attempted.

[5] Includes FilterWire System Technical Success combined with Carotid WALLSTENT Endoprosthesis Technical Success. Calculated based on the number of system placement attempts.

[6] System Technical Success with a residual diameter stenosis ≤30% immediately after post-dilatation as determined by angiographic core lab. Calculated based on number of patients on whom a procedure is attempted.

[7] Includes System Technical Success and Angiographic Success without death, stroke and MI (Q-wave and non Q-wave) immediately following the index procedure. Calculated based on number of patients attempted to be treated.

[8] Procedure Success without any death, stroke or MI (Q-wave) up to and including 30 days post procedure. Calculated based on number of patients on whom a procedure is attempted.

[9] Non Q-wave MI through 24 hours post procedure and death, stroke and Q-wave MI through 30 days post procedure.

[10] Morbidity occurring up to and including 30 days after the index procedure, including complications associated with routine catheterization, e.g., infection, hematoma, etc.

[11] Defined as a patent vessel by Duplex Ultrasound (as assessed by core laboratory to be <50% stenosis and confirmed by angiogram in patients that develop symptoms post procedurally) combined with freedom from stroke and death through 30 days, ipsilateral stroke and neurologic death 31-360 days and interim target vessel revascularization through 360 days. One-year clinical success was calculated based on the number of patients treated.

[12] Defined as the incidence of any stroke (major or minor), TIA or death occurring after 30 days and up to and including 1-year post procedure. Major stroke: a new focal ischemic neurological deficit of abrupt onset, which is present after 7 days and increases the NIH Stroke Scale by ≥4. Minor stroke: a new focal ischemic neurological deficit of abrupt onset, lasting >24 hours and increases the NIH Stroke Scale by ≤3. TIA: a focal ischemic neurological deficit of abrupt onset and of presumed vascular etiology that resolves completely within 24 hours of onset.

[13] Defined as any surgical or percutaneous attempt to revascularize the target lesion after the initial treatment. The target lesion is defined as the stented segment including 0.5 cm at the proximal and distal margins of the stented segment.

The Kaplan-Meier curve through 360 days for all pivotal patients is presented in Figure 2. As can be seen, most major adverse events occur within 30 days with acceptable adverse event rates within 1 year.

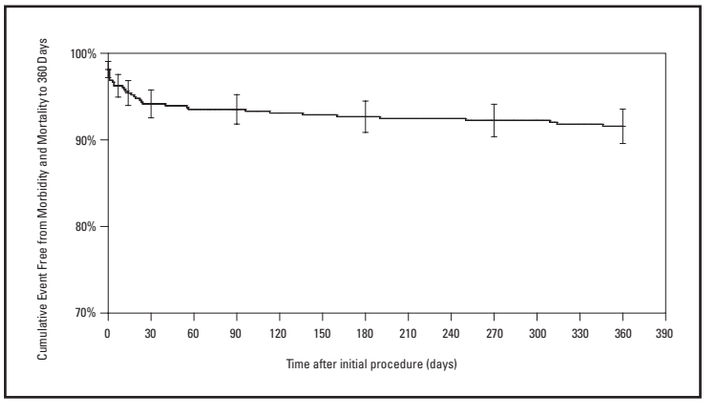


Figure 2. All Pivotal Patients, Freedom from Morbidity and Mortality through 360 Days

Time After Initial Procedure	0	7	14	30	90	180	270	360
PIVOTAL								
# Entered	480	471	460	456	450	441	432	422
# Censored	0	2	0	0	6	5	8	17
# At Risk	480	470	460	456	447	439	428	414
# Patients with Events	9	9	4	6	3	4	2	3
% Event-Free	98.1%	96.2%	95.4%	94.2%	93.5%	92.7%	92.2%	91.6%
SE	0.6%	0.9%	1.0%	1.1%	1.1%	1.2%	1.3%	1.3%

Figures 3 and 4 present the Kaplan-Meier curves through 360 days for symptomatic and asymptomatic patients, respectively.

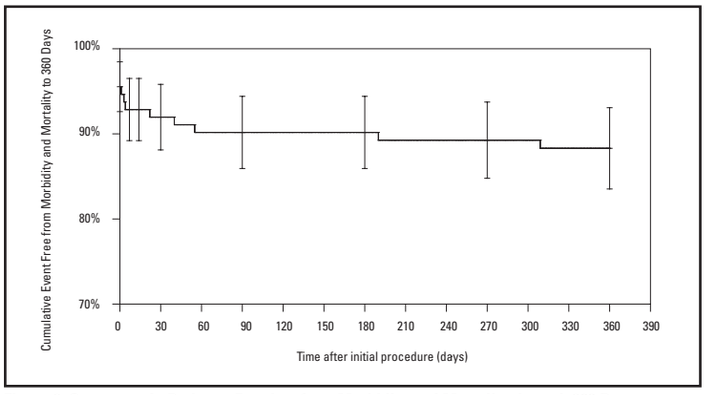


Figure 3. Symptomatic Patients, Freedom from Morbidity and Mortality through 360 Days

Time After Initial Procedure	0	7	14	30	90	180	270	360
PIVOTAL								
# Entered	112	107	104	104	103	100	100	96
# Censored	0	0	0	0	1	0	3	5
# At Risk	112	107	104	104	103	100	99	94
# Patients with Events	5	3	0	1	2	0	1	1
% Event-Free	95.5%	92.9%	92.9%	92.0%	90.2%	90.2%	89.3%	88.3%
SE	2.0%	2.4%	2.4%	2.6%	2.8%	2.8%	3.0%	3.2%

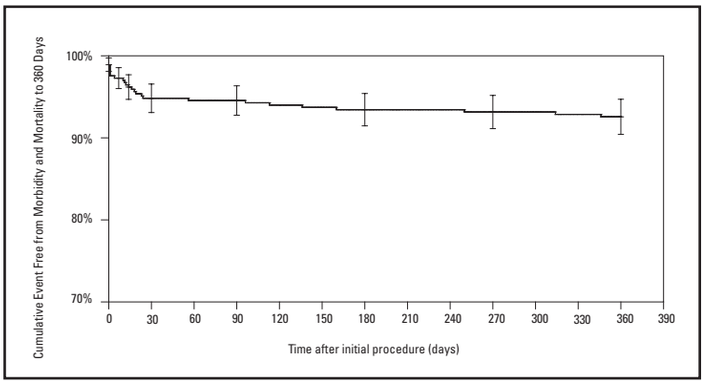


Figure 4. Asymptomatic Patients, Freedom from Morbidity and Mortality through 360 Days

Time After Initial Procedure	0	7	14	30	90	180	270	360
PIVOTAL								
# Entered	368	364	356	352	347	341	332	326
# Censored	0	2	0	0	5	5	5	12
# At Risk	368	363	356	352	345	339	330	320
# Patients with Events	4	6	4	5	1	4	1	2
% Event-Free	98.9%	97.3%	96.2%	94.8%	94.5%	93.4%	93.1%	92.6%
SE	0.5%	0.9%	1.0%	1.2%	1.2%	1.3%	1.4%	1.4%

7.2 CABANA

CABANA (A Carotid Stenting Boston Scientific Surveillance Program) was a nonrandomized, open-label study intended to: 1) compile early clinical outcomes data for the Carotid WALLSTENT™ and FilterWire EZ™ Embolic Protection System (FilterWire EZ System) in routine clinical practice; 2) evaluate clinical outcomes using a composite rate of death, stroke, and myocardial infarction (MI) rate ≤30 days, in total and by center experience tier; 3) assess the adequacy of the BSC Carotid Stenting Device Training Program. The trial is summarized in Table 13.

Table 13. Overview of CABANA Trial Study Design

Product Evaluated: Carotid WALLSTENT Endoprosthesis and FilterWire EZ Embolic Protection System

Sample Size: 1097
Number of Centers: 99
Registry Endpoint: Composite of major adverse events (MAEs) stroke, death, and myocardial infarction (MI) ≤30 days.

Additional Data Analyses:
MAEs reported in the following subgroups:
- Death (≤30 days)
- Stroke (≤30 days)
- MI (≤30 days)
- Death, stroke and MI (<24 hours)
- Death, stroke and MI (>24 hours ≤30 days)
- Death, stroke and MI (≤ 30 days) by center experience tier[1]
- Death, stroke and MI (≤ 30 days) by physician training categories[2]

Adverse Events:
- Device Related
- Index Procedure-related
- Not related to index procedure or devices

System Technical Success[3]
Device Malfunction
Target Lesion Revascularization[4]

Objectives:

To compile early clinical outcomes data for the Carotid WALLSTENT Endoprosthesis and FilterWire EZ System in routine clinical practice.

To evaluate clinical outcomes using the death, stroke, and myocardial infarction (MI) rate ≤30 days, in total and by center experience tier.

To assess the adequacy of the Boston Scientific Corporation (BSC) Device Training Program.

Patient Follow-up:

Neurological assessment by independent neurologist : pre-discharge and at 30 days (±7 days) post-procedure

NIH stroke scale: pre-discharge and at 30 days (±7 days) post-procedure

Medication History: pre-discharge and at 30 days (±7 days) post-procedure

AEs: pre-discharge and at 30 days (±7 days) post-procedure

Experience Tier	CAS Procedures by Principal Investigator
Tier 1 (High)	≥ 75 procedures; ≥15 with the Carotid Wallstent Endoprosthesis and FilterWire System
Tier 2 (Medium)	≥ 40 procedures with any carotid stent and embolic protection system
Tier 3 (Low)	≥ 25, but < 40 procedures with any carotid stent and embolic protection system, ≥ 13 as primary operator

1 Center Experience Tier Designations

Investigator Category	CAS Credentials	Required Proctoring	Required Device Module Training
Category 1	≥ 5 CAS procedures with Carotid Wallstent Endoprosthesis and FilterWire EX/EZ System	None	Optional
Category 2	< 5 CAS procedures with Carotid Wallstent Endoprosthesis and FilterWire EX/EZ System or ≥ 3 CAS procedures/ month with any device as primary operator.	3 live cases	Optional
Category 3	0 CAS procedures with Carotid Wallstent Endoprosthesis and FilterWire EX/EZ System or ≤ 2 CAS procedures/ month with any device as primary operator.	3 live cases	Yes
CAS=Carotid Artery Stenting			

2 Proctoring and Device Module Training Requirements for CABANA Physicians

3 System Technical Success: System technical success includes successful delivery and deployment of the FilterWire EZ System beyond the target lesion site, delivery and deployment of the Carotid WALLSTENT Endoprosthesis at the intended location, and successful retrieval of the delivery catheter and FilterWire EZ System after stent placement.

4 Target Lesion Revascularization: Any surgical or percutaneous attempt to revascularize the target lesion after the initial treatment

7.2.1 Eligibility Criteria Summary

The study population consisted of male and female patients who provided consent and were willing and able to comply with all follow-up requirements. Patients requiring bilateral carotid artery stenting (as long as the contralateral procedure did not occur within the 30-day follow-up window from the initial procedure) and patients at high risk for adverse events from carotid endarterectomy due to anatomic or comorbid conditions who required carotid revascularization in the treatment of ipsilateral or bilateral carotid artery disease were eligible. The key inclusion criteria included the following:

CMS-Approved Comorbidity High Risk Criteria
• Age ≥80
• Recent (< 30 days) Myocardial Infarction (MI)
• Left Ventricle Ejection Fraction (LVEF) < 30%
• Contralateral carotid occlusion
• New York Heart Association (NYHA) Class III or IV congestive heart failure
• Unstable angina: Canadian Cardiovascular Society (CCS) Class III/IV
• Renal failure: end stage renal disease on dialysis
• Severe chronic lung disease
CMS-Approved Anatomical High Risk Criteria
• Common Carotid Artery (CCA) lesion(s) below clavicle
• Previous neck radiation
• High cervical Internal Carotid Artery (ICA) lesion(s) (C2 or above)
• Restenosis of prior carotid endarterectomy (CEA)
• Tracheostomy
• Laryngeal nerve palsy
High risk inclusion criteria from recent CAS trials such as ARCHER, CABERNET, SAPPHIRE, BEACH, and MAVERIC II.

7.2.1.1 Specific Inclusion Criteria for the Carotid WALLSTENT Monorail™ Endoprosthesis (Carotid WALLSTENT Endoprosthesis) and FilterWire EZ System

Patients with neurological symptoms, including history of cerebral or retinal TIA or ischemic stroke symptoms, who have ≥50% stenosis of the common, internal carotid artery and/or the bifurcation by ultrasound or angiogram
Patients without neurological symptoms, but with ≥80% stenosis of the common, internal carotid artery and/or the bifurcation by ultrasound or angiogram.
Reference vessel diameter (RVD) of target lesion ≥4.0 mm and ≤9.0 mm
Vessel diameter distal to the target lesion of ≥3.5 mm and ≤5.5 mm, providing an optimal "landing zone" for placement of the FilterWire EZ System.

7.2.2 Description of Patients Evaluated

The CABANA study enrolled 1097 patients from December 17, 2008 to September 28, 2010. Table 14 provides the follow-up status for the referenced time period for the 30-day follow-up visit.

Table 14. CABANA Patient Follow-up through the 30-Day Postprocedure Visit

	Number (N=1097)
30-Day Follow-up Completed	1040
Death <30 Days	13
Missed Visit	22
Lost to Follow-up	16
Withdrawn	6

Baseline patient demographics and clinical characteristics for the study are presented in Table 15 below.

Table 15. CABANA Baseline Demographics and Clinical Characteristics

Demographics and Clinical Characteristics	N=1097 Patients*	95% CI
Age (years)	71.3*9.2 (1097) (40.0, 96.0)	[70.7, 71.8]
Male Gender	62.3% (683/1097)	[59.3%, 65.1%]
History %		
History of TIA	25.1% (275/1097)	[22.5%, 27.7%]
History of Stroke	21.1% (231/1097)	[18.7%, 23.6%]
Family History of Cerebrovascular Accidents	18.9% (207/1097)	[16.6%, 21.3%]
History of Carotid Atherosclerosis	64.4% (707/1097)	[61.5%, 67.3%]
History of Carotid Restenosis	21.7% (238/1097)	[19.3%, 24.3%]
History of CEA	29.3% (321/1097)	[26.6%, 32.1%]
History of Carotid PTA	6.0% (66/1097)	[4.7%, 7.6%]
History of Carotid Stenting	10.3% (113/1097)	[8.6%, 12.3%]
Current Carotid Bruit	54.2% (595/1097)	[51.2%, 57.2%]
Smoking Status		
Current	22.3% (245/1097)	[19.9%, 24.9%]
Previous	51.6% (566/1097)	[48.6%, 54.6%]
Never	23.7% (260/1097)	[21.2%, 26.3%]
Unknown	2.4% (26/1097)	[1.6%, 3.5%]
Current Diabetes Mellitus	39.5% (433/1097)	[36.6%, 42.4%]
History of Hyperlipidemia	86.0% (943/1097)	[83.8%, 88.0%]
History of Hypertension	90.5% (993/1097)	[88.6%, 92.2%]

*Denominators may not reflect total number of patients due to missing or incomplete data.
Numbers are presented as mean ± SD (n) (minimum, maximum) or % (count/sample size).
Abbreviations: CI=confidence interval; PTA=percutaneous transluminal angioplasty; TIA=transient ischemic attack.

The CABANA study also evaluated the relationship between Principal Investigator (PI) experience and patient outcomes. Results are presented in Table 16. The results show that patients treated at Tier 1 study centers, had a lower rate of MAEs than patients treated at Tier 2 centers; the patients treated at Tier 3 centers had the lowest rate of MAE.

The results from Tier 3 centers should be interpreted with caution since the centers in this study tier treated a substantially smaller proportion of the CABANA population (34 patients in total), relative to the Tier 1 and Tier 2 centers. Furthermore, it is generally difficult to draw conclusions about the relationship between the experience of the PI at a given center and the center outcomes, because the carotid stenting experience of the center PI may not accurately reflect the experience of the participating sub-investigators at the same center. Also, the high complexity and co-morbidities of the patients enrolled in the study make it difficult to predict treatment outcomes based on PI experience alone.

Outcomes in CABANA demonstrate that physicians (PIs and sub-investigators) who received the greatest amount of training prior to the start of the CABANA trial (Category 3 physicians) had the lowest rate of patients with major adverse events compared to Category 1 and Category 2 physicians. Also, Category 1 physicians, who received the least amount of training but had the highest level of prior carotid stenting experience, and Category 2 physicians, who received moderate training, also produced relatively low rates of MAE. Based on these results, it can be concluded that training programs (like BSC's) and prior experience are associated with a lower rate of MAEs in treated patients.

Table 16. Additional Data Analysis

CEC-Adjudicated Major Adverse Events, 30 Days, Stratified by Center Experience Tier, All Enrolled Patients (N=1097)		
Center Experience Tier	**N = 1097 Patients**	**[95% CI]**
Tier 1: High	4.2% (23/546)	[2.7%, 6.3%]
Tier 2: Medium	5.2% (23/445)	[3.3%, 7.7%]
Tier 3: Low	2.9% (1/34)	[0.1%, 15.3%]
CEC-Adjudicated Major Adverse Events, 30 Days, Stratified by Physician Training Category, All Enrolled Patients (N=1097)		
Physician Training Category	**N = 1097 Patients**	**[95% CI]**
Category 1	5.8% (5/86)	[1.9%, 13.0%]
Category 2	4.8% (35/724)	[3.4%, 6.7%]
Category 3	3.3% (7/215)	[1.3%, 6.6%]
System Technical Success	**N= 1097 Patients**	**[95% CI]**
Evaluable for System Technical Success*	97.7% (1072/1097)	[96.7%, 98.5%]
System Technical Success	97.1% (1041/1072)	[95.9%, 98.0%]
System Technical Failure	2.9% (31/1072)	[2.0%, 4.1%]
FilterWire EZ™ System Technical Failure	2.2% (24/1072)	[1.4%, 3.3%]
Carotid WALLSTENT™ Technical Failure	0.7% (8/1072)	[0.3%, 1.5%]

*Evaluable patients for System Technical Success are patients who had Carotid WALLSTENT deployment attempted.
Numbers are % (count/sample size).

A total of 1,150 Carotid WALLSTENTs were used or opened for use in CABANA procedures. Of these 1,150 devices, a total of 61 device malfunctions were reported. One such malfunction was a stent fracture that occurred as a result of a mechanical problem during preparation of the stent. This stent was not implanted, but instead, a second Carotid WALLSTENT was successfully implanted in the patient. The stent that fractured was not returned by the study site for analysis.

Device malfunctions that occurred with the FilterWire EZ System are also listed in Table 17.

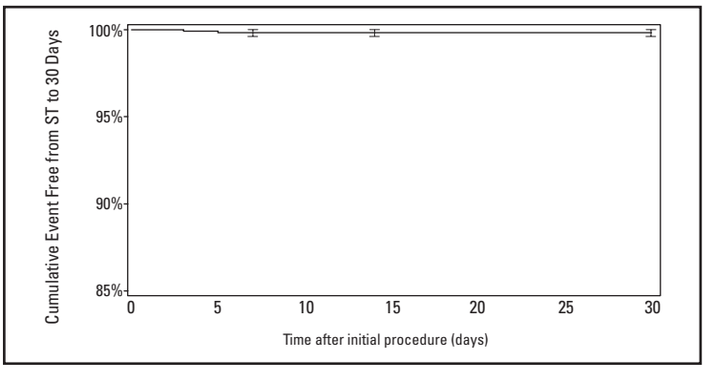
Table 17. Device Malfunctions

Carotid WALLSTENT Malfunctions	N=1150 Devices
Prep/flush related	1.3% (15/1150)
Stent failed to cross lesion	0.8% (9/1150)
Stent deployment difficulties	0.3% (3/1150)
Stent kinked or deformed	0.2% (2/1150)
Sheath/shaft malfunction damage	0.4% (5/1150)
Guidewire related	0.5% (6/1150)
Suboptimal placement	0.5% (6/1150)
Distal migration of stent	0.2% (2/1150)
Other	1.1% (13/1150)
FilterWire EZ System Malfunctions	**N=1144 Devices**
Delivery sheath failed	0.5% (6/1144)
Failed to cross lesion	2.6% (30/1144)
Guidewire bent/kinked	1.0% (12/1144)
Tip damaged/stretched	0.7% (8/1144)
Tip detached	0.0% (0/1144)
Unable to deploy	0.3% (4/1144)
Unable to retract FilterWire EZ System (sheath)	0.4% (5/1144)
Other	1.7% (19/1144)
Numbers are % (count/sample size)	

Stent thrombosis (ST) was any imaging-confirmed thrombus in a target lesion, whether associated with a clinically significant ischemic event, or not.

At the conclusion of the study, there were no CEC-adjudicated Target Lesion Revascularizations (TLRs). There were two CEC-adjudicated ST events. Figure 5 presents the Kaplan-Meier (KM) analysis for freedom from ST through the 30-day follow-up period.

Figure 5. CABANA: Freedom from ST to 30 Days



ST Freedom	0	7	14	30 (1-month)
Entered	1097	1095	1050	1041
Censored	2	43	9	529
At Risk	1096	1073.5	1045.5	776.5
Events	0	2	0	0
Event Free	100%	99.8%	99.8%	99.8%
Standard Error	0%	0.1%	0.1%	0.1%

The 30-day MAE rate of the CABANA patients was compared with the 30-day results of the BEACH Pivotal cohort. Between-group differences, their two-sided 95% confidence intervals and P values are shown in Table 18.

Table 18. CEC-Adjudicated Major Adverse Events: Comparison to BEACH

Parameter	Rate of Patients with Events (BEACH-Pivotal, N=480)	Rate of Patients with Events (CABANA, N=1061)	Difference	95% CI for Difference	P value*
30-Day MAE	5.7% (27/473)	4.7% (47/991)	1.0%	[-1.5%, 3.4%]	0.4303
Death	1.5% (7/473)	1.3% (13/991)	0.2%	[-1.1%, 1.5%]	0.7955
Neurologic Death	0.4% (2/473)	0.5% (5/991)	-0.1%	[NA]	1.0000*
Cardiac Death	0.6% (3/473)	0.5% (5/991)	0.1%	[NA]	0.7183*
Non-neurologic and Non-cardiac Death	0.4% (2/473)	0.3% (3/991)	0.1%	[NA]	0.6606
Stroke	4.2% (20/473)	3.4% (34/991)	0.8%	[-1.3%, 2.9%]	0.4490
Classification 1: Ipsilateral or Contralateral					
Ipsilateral Stroke	3.2% (15/473)	3.0% (30/991)	0.1%	[-1.8%, 2.0%]	0.8813
Contralateral Stroke	1.1% (5/473)	0.4% (4/991)	0.7%	[NA]	0.1584*
Classification 2: Ischemic or Hemorrhagic					
Ischemic Stroke	3.6% (17/473)	2.9% (29/991)	0.7%	[-1.3%, 2.6%]	0.4934
Hemorrhagic Stroke	0.6% (3/473)	0.5% (5/991)	0.1%	[NA]	0.7183*
MI	1.1% (5/473)	0.5% (5/991)	0.6%	[NA]	0.3077*
Q-wave MI	0.2% (1/473)	0.0% (0/991)	0.2%	[NA]	0.3231*
Non-Q-wave	0.8% (4/473)	0.5% (5/991)	0.3%	[NA]	0.4816*

*Fisher's Exact Test P values (indicated with *) are presented.
Abbreviations: CI=confidence interval; MAE=major adverse event; MI=myocardial infarction

Results:

The primary endpoint of the CABANA Registry was the composite rate of all major adverse events (MAE), including CEC-adjudicated death, stroke, and myocardial infarction (MI), through 30-day follow-up. Based on the final study results, the Carotid WALLSTENT™ demonstrates an acceptable safety profile, with a low 30-day rate of composite death, stroke, and MI, as well as low rates of the individual events.

When the results of the CABANA study were compared to 30-day MAE rates in the BEACH Pivotal cohort (Table 18), which tested the Carotid WALLSTENT in a similar, though more rigorously defined, patient population, they were demonstrated to be similar. There were no statistical differences between overall 30-day MAE rates in BEACH (5.7%) and CABANA (4.7%; P=0.4303), nor were there statistical differences in the rates of any of the individual components of 30-day MAE (death, stroke and MI) between studies. The similarity between outcomes in the CABANA study and those reported in BEACH offers further evidence that treatment with the Carotid WALLSTENT, when used in conjunction with the FilterWire EZ™ System, is safe for use in patients at high risk for adverse events from CEA.

Study Limitations:

The CABANA Registry provides valuable data from a large, real-world experience; however, interpretation of the data is limited by the 30-day follow-up duration.

8. CLINICAL USE INFORMATION

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

Warning: Do not use after the "Use By" date specified on the package. Assure that the device has been properly stored in a cool, dry, dark place prior to use.

Warning: The Carotid WALLSTENT™ Monorail™ Endoprosthesis (Carotid WALLSTENT Endoprosthesis) is supplied STERILE and intended for single use only. Do not use if the package is open or damaged. Do not reuse. Do not resterilize as this can compromise device performance and increase the risk of cross-contamination due to inappropriate reprocessing.

Refer to Section 1 for a description and diagram (Figure 1) of device components and a chart (Table 1) with available stent sizes and sizing information.

8.1 Materials Recommended

1. Guiding Catheter or Guiding Sheath
   - Guiding Catheter Compatibility:

     7F (min. internal diameter 1.85 mm [0.073 in]): use with 71-900 to 71-903

     8F (min. internal diameter 2.18 mm [0.086 in]): use with 71-904 to 71-906
   - Guiding Sheath Compatibility:

     5F (min. internal diameter 1.85 mm [0.073 in]): use with 71-900 to 71-903

     6F (min. internal diameter 2.18 mm [0.086 in]): use with 71-904 to 71-906
2. 5-ml sterile syringe for flushing
3. Small basin containing heparinized sterile isotonic saline
4. Guiding sheath or guiding catheter equipped with a rotating hemostatic valve (RHV) Touhy-Borst Tip (The use of a guiding sheath or guiding catheter with a fixed hemostasis valve may cause the embolic protection device filter membrane to tear at the hemostasis valve upon removal.)
5. Boston Scientific embolic protection device with a 0.014 in (0.36 mm) guidewire
6. 0.014 in (0.36 mm) balloon dilatation catheter

8.2 Periprocedural Care

In the BEACH trial, it was recommended that patients receive aspirin and a total of at least 450mg of clopidogrel prior to the procedure. After the procedure, it was recommended that patients receive clopidogrel 75mg qd for 30 days and aspirin 325mg qd indefinitely, if possible. If clopidogrel was contra-indicated, ticlopidine was recommended as an alternative to clopidogrel.

Warning: The appropriate antiplatelet and anticoagulation therapy should be administered pre- and post-procedure as suggested in these instructions. Special consideration should be given to those patients with recently active gastritis or peptic ulcer disease.

8.3 Pre-procedure

Placement of the Carotid WALLSTENT Endoprosthesis in a stenotic or obstructed carotid artery should be done in an angiography procedure room. Angiography should be performed to map out the extent of the lesion(s) and the collateral flow. If thrombus is present, do not proceed with stent deployment. Access vessels must be sufficiently patent or sufficiently recanalized to proceed with further intervention. Patient preparation and sterile precautions should be the same as for any angioplasty procedure.

8.4 Stent Size Determination

Select the proper size Carotid WALLSTENT Endoprosthesis (see Table 1) based on the largest diameter of the artery adjacent to the stenosis and the length of the segment to be stented. The unconstrained diameter of the Carotid WALLSTENT Endoprosthesis should be at least 1 mm to 2 mm larger than the diameter of the largest vessel to be stented. The Carotid WALLSTENT Endoprosthesis should overlap healthy tissue by at least 5 mm on each side of the lesion.

Note: For carotid bifurcation stenting, select the Carotid WALLSTENT Endoprosthesis size based on the diameter of the largest vessel (normally the CCA). The unconstrained diameter of the Carotid WALLSTENT Endoprosthesis should be at least 1 mm to 2 mm larger than the largest artery diameter. The Carotid WALLSTENT Endoprosthesis should overlap healthy tissue by at least 5 mm into the CCA and 5 mm into the ICA.

Warning: Appropriate sizing of the stent to the vessel is required to reduce the possibility of stent migration.

8.5 Inspection Prior to Use

1. Carefully remove the Carotid WALLSTENT Endoprosthesis from its packaging. Do not remove the packaging stylus from the inner lumen.

   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.
2. Visually inspect the entire Carotid WALLSTENT Endoprosthesis for damage and check that the stent and the distal radiopaque marker (3a in Figure 1) are fully covered by the distal end of the outer sheath.

   Caution: Special care must be taken not to handle or in any way disrupt the stent on the delivery system. This is most important during catheter removal from packaging, stylus removal, placement over the guidewire and advancement through a hemostatic valve and guiding catheter or guiding sheath hub.

   Caution: Do not remove the stent from its delivery system as removal may damage the stent. The stent on the delivery system is intended to perform as a system. If removed, the stent cannot be put back on the delivery system.

8.6 Preparation

8.6.1 Carotid WALLSTENT Endoprosthesis Preparation

Caution: Do not expose the delivery system to organic solvents (e.g., alcohol) as structural integrity and/or function of the device may be impaired.

1. Carefully remove the Carotid WALLSTENT Endoprosthesis from its protective hoop and place it uncoiled on the sterile field.
2. Keep the packaging stylus in the guidewire lumen and check that the stent and the distal radiopaque marker (3a in Figure 1) are fully covered by the distal end of the outer sheath.
3. Attach a 5-ml syringe filled with sterile heparinized saline to the T-connector (9 in Figure 1) and vigorously inject the saline into the annular space between the coaxial inner shaft and outer sheath until the fluid comes out of the guidewire hole (14 in Figure 1).
4. Clamp the device between the fingers covering the guidewire hole (14 in Figure 1) and continue flushing until the saline solution comes out of the catheter tip and the outer sheath at the marker. If necessary, refill the syringe.

   Caution: Ensure the stent delivery system is fully flushed with heparinized saline prior to use. Do not use if saline is not observed exiting the distal end of the outer sheath.
5. Hold the distal tip of the delivery system and gently remove the packaging stylus. If the packaging stylus does not remove easily, do not use the device.

   Caution: Do not hold the outer sheath where the stent is present during stylus removal.
6. Flush again after removal of packaging stylus and observe saline exiting distal tip.

8.6.2 Embolic Protection System Preparation and Delivery

The Carotid WALLSTENT Endoprosthesis is indicated for use in conjunction with a Boston Scientific carotid embolic protection system. Please refer to the Directions for Use included with the embolic protection system for information on device preparation and placement.

Warning: If a filter-based embolic protection system is used, allow for and maintain adequate distance between the filter and the stent delivery system or deployed stent to avoid potential entanglement. If filter basket entanglement or basket detachment occurs, surgical conversion or collapsing the basket with a second stent should be considered.

8.6.3 Lesion Preparation

Warning: Maintain an Activated Clotting Time (ACT) of ≥275 seconds (≥200 seconds if using GP IIb/IIIa inhibitors) to prevent thrombus formation on the devices.

Caution: 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.

Warning: The use of a guiding sheath or guiding catheter with a fixed hemostasis valve may cause the embolic protection device filter membrane to tear at the hemostasis valve upon removal.

Caution: When catheters are in the body, they should be manipulated only under fluoroscopy. Radiographic equipment that provides high quality images is needed.

Warning: To minimize the possible introduction of air into the delivery system, it is important to maintain tight catheter connections and to thoroughly flush the delivery system.

Warning: Maintain continuous flush while removing and reinserting devices on the guidewire. Perform all exchanges slowly to prevent air embolism or trauma to the artery.

1. Define the largest artery diameter and the proximal and distal limits of the stenosis.
2. Use the selected guiding catheter or guiding sheath.
3. If needed, pre-dilate the lesion with an appropriate size balloon dilatation catheter.

   Note: If no pre-dilatation is performed, there must be an adequate luminal opening to enable passage of the stent delivery system.
4. Maintain the embolic protection system wire position across the stenosis and withdraw the balloon dilatation catheter. Do not remove the guiding catheter or guiding sheath.

8.7 Delivery Procedure

1. After the pre-dilatation catheter has been removed, backload the Carotid WALLSTENT Endoprosthesis over the 0.014 in (0.36 mm) embolic protection system wire.

   Caution: For best device performance, the guidewire exit notch should remain within the guiding catheter or sheath.

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

   Caution: If the shaft kinks during preparation of the Carotid WALLSTENT Endoprosthesis or its insertion over the guidewire, remove the device and use another one.
2. When advancing (or retracting when necessary) the Carotid WALLSTENT Endoprosthesis and during deployment, loosen the hemostatic valve of the introducer to allow easy movement.
3. Maintain the stent delivery system as straight as possible outside the body removing all slack. As the Carotid WALLSTENT Endoprosthesis deploys, it shortens from both ends towards the middle. Therefore, place the proximal and distal radiopaque markers of the inner shaft overlapping both edges of the stenosis.
4. Immobilize the stainless steel tube and confirm stent position angiographically.

8.8 Stent Deployment

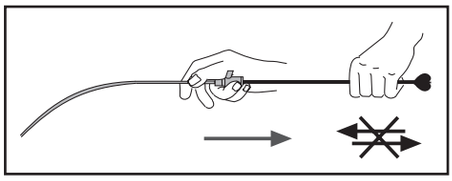


Figure 6. Stent Deployment

Caution: Do not push the stainless steel tube!

1. Deploy the Carotid WALLSTENT™ Monorail™ Endoprosthesis (Carotid WALLSTENT Endoprosthesis) stepwise a few millimeters at a time (see Figure 5) by sliding the T-connector gently towards, but not past, the black limit marker (11 in Figure 1) until the Carotid WALLSTENT Endoprosthesis is approximately 50% deployed.
2. During deployment, the radiopaque marker on the outer sheath (4 in Figure 1) is retracted from the distal marker (3a in Figure 1), which allows fluoroscopic control of the Carotid WALLSTENT Endoprosthesis release.
3. Check position of the partially deployed Carotid WALLSTENT Endoprosthesis within the stenosis.
4. Contrast medium can be injected through the guiding catheter or guiding sheath, if desired.
5. If the Carotid WALLSTENT Endoprosthesis does not need to be repositioned, continue with final deployment (see Section 8.9 for Repositioning instructions).
6. Immobilize the stainless steel tube once again.
7. When the Carotid WALLSTENT Endoprosthesis is in its final position, gently slide the T-connector on the immobilized stainless steel tube towards the heart shaped hub (12 in Figure 1), until complete deployment of the Carotid WALLSTENT Endoprosthesis (see Figure 6).

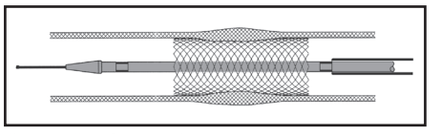


Figure 7. Final Stent Deployment

8. After full Carotid WALLSTENT Endoprosthesis deployment, carefully remove the stent delivery system under fluoroscopic guidance, leaving the embolic protection system in place.

Caution: If the tip catches on the distal stent filaments upon removal of the stent delivery system, free the tip with gentle movements!

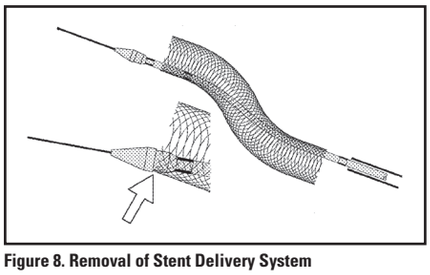


Figure 8. Removal of Stent Delivery System

Note: Balloon dilatation with an undersized balloon inside the Carotid WALLSTENT Endoprosthesis is recommended.

Caution: When more than one stent is required to cover the lesion or if there are multiple lesions, the distal lesion should be stented first, followed by stenting of the proximal lesion allowing a minimal overlap of at least 5 mm.

Caution: Care must be exercised when crossing a newly deployed stent with other interventional devices to avoid disrupting stent placement.

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

8.9 Stent Repositioning (Only when absolutely necessary)

As previously noted, reconstrainment and repositioning of the Carotid WALLSTENT Endoprosthesis should be strictly avoided when the partially deployed Carotid WALLSTENT Endoprosthesis is already in contact with the plaque of the stenosis.

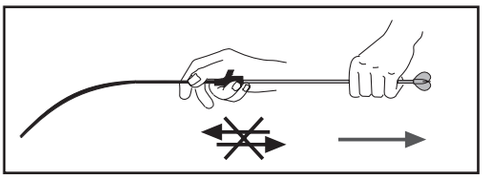


Figure 9. Stent Repositioning

Caution: Do not reconstrain the Carotid WALLSTENT Endoprosthesis more than twice!

1. Repositioning of a partially deployed Carotid WALLSTENT Endoprosthesis is possible if the stent has not been deployed past the limit marker (11 in Figure 1).
2. Immobilize the T-connector and carefully pull back the stainless steel tube (see Figure 8), reconstraining the Carotid WALLSTENT Endoprosthesis into the outer sheath.
3. Position the Carotid WALLSTENT Endoprosthesis appropriately across the lesion and commence deployment steps outlined earlier (Section 8.8).

Caution: When reconstraining, do not pull the inner shaft with excessive force to avoid damage to the tip.

8.10 Post Stent Placement

1. Following stent placement, perform a final angiogram to confirm optimal angiographic appearance of the deployed stent and vessel patency.

Warning: The stent may cause a 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.

2. Upon completion of the angiogram, the embolic protection system should be removed according to the Directions for Use supplied with the device.
3. Patients should be put on an appropriate regimen of anticoagulants and/or antiplatelets.

Warning: In the event of complications such as infection, pseudoaneurysm, or fistulization, surgical removal of the stent may be required.

Warning: The long-term performance of the Carotid WALLSTENT Endoprosthesis has not been established.

9. PATIENT INFORMATION

The Carotid WALLSTENT Endoprosthesis is packaged with a Patient Implant Card for the patient that contains specific information about the Carotid WALLSTENT Endoprosthesis. All patients should keep this card in their possession at all times for procedure and stent identification.

A Patient Guide, which includes information on carotid artery disease and the carotid stent implant procedure using embolic protection, can be obtained from Boston Scientific by visiting the online Web site at www.bostonscientific.com or by contacting Customer Service at (888) 272- 1001.

10. HOW SUPPLIED

Sterile: This device is sterilized and non-pyrogenic.

Do not use if package is opened or damaged.

Do not use if labeling is incomplete or illegible.

10.1 Storage

Store in a cool, dry, dark place.

11. WARRANTY

Boston Scientific Corporation (BSC) warrants that reasonable care has been used in the design and manufacture of this instrument. **This warranty is in lieu of and excludes all other warranties not expressly set forth herein, whether express or implied by operation of law or otherwise, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose.** Handling, storage, cleaning and sterilization of this instrument as well as other factors relating to the patient, diagnosis, treatment, surgical procedures and other matters beyond BSC's control directly affect the instrument and the results obtained from its use. BSC's obligation under this warranty is limited to the repair or replacement of this instrument and BSC shall not be liable for any incidental or consequential loss, damage or expense directly or indirectly arising from the use of this instrument. BSC neither assumes, nor authorizes any other person to assume for it, any other or additional liability or responsibility in connection with this instrument. **BSC assumes no liability with respect to instruments reused, reprocessed or resterilized and makes no warranties, express or implied, including but not limited to merchantability or fitness for a particular purpose, with respect to such instruments.**

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BRA Brazil Local Contact

Para informações de contato da Boston Scientific do Brasil Ltda, por favor, acesse o link www.bostonscientific.com/bra

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