

Dale Maharaj and R. Clement Darling III

---

## Indications

- Asymptomatic stenosis >60%
- Symptomatic carotid stenosis >50% (as for standard carotid endarterectomy)

---

## Contraindications

- Previous carotid endarterectomy with patch closure (relative)
- Prior irradiation, radical neck dissection, and extensive high lesions
- Carotid bypass

---

## Complications

- Stroke, hematoma, thrombosis, cranial nerve injury, infection
- Recurrent laryngeal nerve/hoarseness, ipsilateral tongue deviation, marginal mandibular branch – ipsilateral lip drop

---

## Advantages of Eversion

- Less chance of closure-related stenosis. No need for patch.

---

D. Maharaj, MD  
Caribbean Vascular and Vein Clinic Ltd.,  
Port of Spain, Trinidad and Tobago

R.C. Darling III, MD (✉)  
The Vascular Group, Department of Vascular Surgery,  
Albany Medical College/Albany Medical Center  
Hospital, Albany, NY, USA  
e-mail: [darlingc@albanyvascular.com](mailto:darlingc@albanyvascular.com)

- Plaque extraction is simpler and clamp time minimized.
- Better visualization and management of endpoint.
- Quick, simple reanastomosis.
- Lower incidence of recurrent carotid stenosis.
- Lower incidence of cranial nerve injury.

---

## Essential Steps

1. Skin incision at the anterior border of the sternocleidomastoid.
2. Divide platysma and retract the sternocleidomastoid laterally.
3. Identify and then retract internal jugular laterally.
4. Transect and suture-ligate the facial vein (branch of internal jugular vein crossing over carotid bifurcation).
5. Expose the common, internal, and external carotid arteries.
6. Identify and preserve the vagus and hypoglossal nerves.
7. Anticoagulate (30 U/kg) heparin.
8. Cross-clamp the internal, external, and common carotid arteries.
9. Transect the internal carotid artery at the bulb obliquely and dissect circumferentially.
10. Insert Javid type shunt (only for neurological deterioration) before or after the endarterectomy.
11. Extend arteriotomy on the internal and common carotid cephalad and caudally, respectively, as needed.
12. Evert the internal carotid artery while holding the plaque in place with a forceps.

13. Remove the common and external carotid plaque as with a standard endarterectomy (transect the plaque and deal with the common carotid and external carotid plaques individually).
14. Assess the endarterectomized surface and the endpoints and remove atherosclerotic debris.
15. Reconstruct the internal and common carotid using a continuous 6/0 polypropylene suture starting at the cephalad corner.
16. Backbleed the internal and external carotid arteries, and forward bleed the common carotid artery just before complete closure, and flush with heparinized saline.
17. Resume flow into the external, common, then internal carotid arteries.
18. Assess reconstruction – Doppler and duplex scan.
19. Ensure hemostasis.
20. Close the platysma and skin.

The Rt/Lt neck was prepped and draped in a standard surgical fashion.

A longitudinal incision was made overlying the anterior border of the sternocleidomastoid muscle and continued through the platysma.

The sternocleidomastoid muscle was retracted laterally.

The internal jugular vein was identified and dissection proceeded along the medial border of this vessel.

The facial vein was transected and suture ligated.

The common carotid, the internal carotid, external carotid, and the superior thyroid arteries were exposed and dissected.

The vagus and hypoglossal nerves were identified and preserved.

30 U/kg of heparin was administered intravenously.

The internal carotid and external carotid arteries were clamped with Yasargil clips, and the common carotid artery was clamped with a Cooley vascular clamp.

The internal carotid artery was transected from the carotid bulb initially using a # 11 blade and a Metzenbaum scissors, in an oblique fashion.

An arteriotomy was carried cephalad and caudally on the internal and carotid artery, respectively, for 5–10 mm.

\*Shunting as needed for neurologic deterioration.

The internal carotid artery was everted using ring forceps while the plaque was held stable with a DeBakey’s forceps.

The plaque was “feathered” from the endpoint, ensuring that there was no residual plaque or debris.

Attention was now shifted to the common/external carotid artery.

The endarterectomy plane was developed with a Staphylorrhaphy elevator within the carotid bulb.

The plaque was transected proximally in the common carotid artery.

In the distal internal carotid artery, the plaque was feathered leaving a very smooth endpoint. Eversion endarterectomy of the external carotid artery was performed leaving disease-free vessel just proximal to the superior thyroid artery.

**Operative Note**

Preoperative diagnosis	Rt/Lt; carotid stenosis
Procedure	Rt/Lt; eversion carotid endarterectomy with/without shunt
	Cervical block/general anesthesia
Postoperative diagnosis	Same
Indications	___-year-old man/woman
	Asymptomatic/TIAs/stroke
	Duplex/angiography/MRA:
	___% stenosis of the Rt/Lt internal carotid artery

**Description of the Procedure** The patient was placed in the supine position with the neck extended and lateral.

Time-outs were performed using both preinduction and pre-incision safety checklists to verify correct patient, procedure, site, and additional critical information prior to beginning the procedure.

The procedure was performed under cervical block/general anesthesia.

The endarterectomized surface was gently irrigated with heparinized saline solution.

All remaining free debris was removed with a fine forceps and the endpoint reinspected.

Tacking sutures of 7-0 or 8-0 polypropylene were used to secure the distal endpoint (rarely needed).

The internal carotid artery and the carotid bulb were reconstructed using a continuous 6-0 polypropylene suture, commencing at the heel (cephalad apex) of the internal carotid artery.

Prior to placement of the last three sutures, the carotid vessels were “flushed” and irrigated with heparinized saline.

Flow was reestablished to the external carotid artery and then into the internal carotid artery.

The suture line was inspected for hemostasis, and gelfoam thrombin/additional sutures were placed. Doppler/duplex assessment revealed triphasic flow signals through the internal carotid, external carotid, and common carotid arteries.

The platysma was closed using 3-0 Vicryl.

The skin was closed with staples/subcuticular continuous suture.

Throughout the procedure, and at the completion of the procedure, the patient remained neurologically stable.

A debriefing checklist was completed to share information critical to postoperative care of the patient. The patient was transferred to the postanesthesia care unit, neurologically intact in hemodynamically stable condition.