

Content available at: <https://www.ipinnovative.com/open-access-journals>

IP Indian Journal of Anatomy and Surgery of Head, Neck and Brain

Journal homepage: <https://www.ijashnb.org/>

## Case Report

# A case report of transient ischemic attack with carotid artery stenosis and discussion on the need for carotid endarterectomy

Premkumar Daivasikamani<sup>1,\*</sup>, Aung San Phy<sup>1</sup>, Rajagopal<sup>1</sup>, Bernard Fanthome<sup>1</sup><sup>1</sup>Dept. of Surgery, AIMST University, Bedong, Malaysia

### ARTICLE INFO

#### Article history:

Received 12-09-2023

Accepted 14-10-2023

Available online 30-10-2023

#### Keywords:

Carotid artery

stenosis

endarterectomy

stroke

hypoperfusion

hyper perfusion

arteriogram

neurological deficit

### ABSTRACT

Carotid endarterectomy is common vascular procedure for atherosclerosis of carotid artery. Usually, it is done when the artery is narrowed more than 80% but it can be done even when it is narrowed 50 % if it produces symptoms. Carotid endarterectomy (CEA) is delayed 6 to 8 weeks after acute stroke, as the stroke can be progressive. Carotid endarterectomy (CEA) is done after optimal recovery from the stroke by the patient. The recovery depends on the preoperative size of the infarct and the neurological deficit. Emergency endarterectomy can be done when there is fluctuating neurological deficits due to acute carotid artery obstruction. CEA is contraindicated when the patient's general condition is poor due to other serious illness which shorten life expectancy. It is not done in a case of major stroke as the recovery may not satisfactory.

This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: [reprint@ipinnovative.com](mailto:reprint@ipinnovative.com)

## 1. Introduction

Most done noncardiac vascular surgery is carotid endarterectomy. 55 years old man complaints of weakness over left side of the body. Patient is confused and disoriented. He is not a hypertensive and not a diabetic. MRI brain and MR angiography of carotid vessels was done. It showed reduction in calibre of intracranial portion of left internal carotid artery. Left middle cerebral artery is narrowed and shows reduced flow magnitude. Left middle cerebral artery shows flow through left posterior communicating artery. A1 segment of left anterior cerebral artery appears hypoplastic. A2 and A3 segments of left anterior cerebral artery receive collateral flow through anterior communicating artery from contralateral side. [ figure 1] Soft tissue plaque seen in the left carotid bulb extending into the left internal carotid artery. Left internal carotid artery is narrowed (50%) from its origin

throughout its course. [Figure 2] Sagittal T1 and axial T1 and T2 weighted images of the brain findings. The study reveals acute infarct evident by diffusion restriction and corresponding low ADC value in the left capsule-ganglionic region. Old infarct with gliosis noted in right capsule-ganglionic region. Acute infarct in the left capsule-ganglionic region. [Figure 3]. Nonspecific treatment was given, and patient recovered completely.

## 2. Discussion

Carotid endarterectomy is a surgical procedure done for the removal of the fatty deposits called plaque which builds-up inside the carotid artery and leads to narrowing of the artery. Carotid endarterectomy is usual surgical procedure when one or both carotid arteries are narrowed due to atherosclerosis caused by the build-up of fatty deposits

\* Corresponding author.

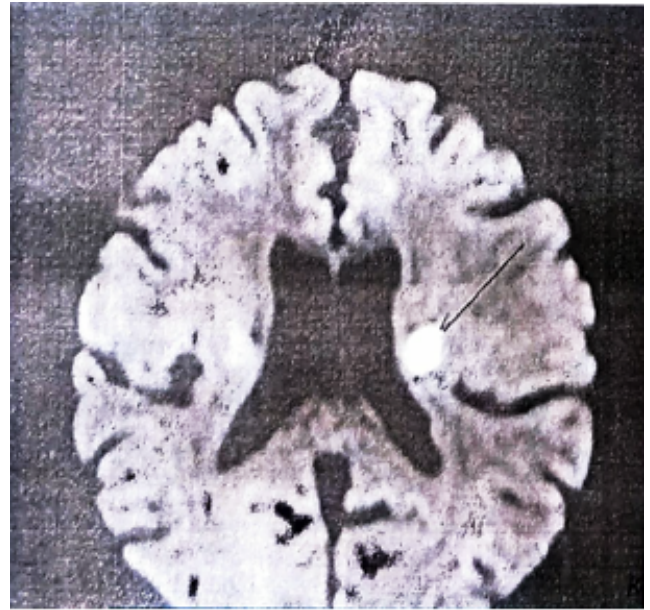
E-mail address: [dr.premkumar52@gmail.com](mailto:dr.premkumar52@gmail.com) (P. Daivasikamani).



**Fig. 1:** MR angiography by using 3D PCA technique



**Fig. 2:** MR angiography of the neck vessels by using M2D TOF technique.



**Fig. 3:** Sagittal T1 and axial T1 and T2 weighted images of the brain.

called plaque.

Indication for Carotid endarterectomy are stroke, mini-stroke, or TIA (transient ischemic attack) with moderate (50-79%) blockage of a carotid artery in patients producing symptoms.

Even if the narrowing is 70% or greater without history of a stroke or a TIA carotid endarterectomy is done to reduce the risk of stroke risk. Carotid endarterectomy will be helpful if the stenosis is over 50% if the patient had a stroke or TIA. For the moderate strokes with ipsilateral severe stenosis of the internal carotid artery the Carotid endarterectomy is very much useful.<sup>1</sup> Carotid artery stenosis of 50% or more with one or more transient ischemic attacks (TIAs) in the preceding 6 months. In progressive stroke with Carotid artery stenosis more than 70%. If artery stenosis narrowing is more than 60% even without symptoms in good-risk patients the Carotid endarterectomy can be done. In these asymptomatic patients' surgical mortality and morbidity is less than 3%.<sup>2</sup>

Usually carotid endarterectomy (CEA) is done 6 to 8 weeks after acute stroke because the stroke can progress during post operative period. But this delay can produce an interval stroke rate of 9% to 15%.

The important risks associated with carotid endarterectomy. They are:

1. Stroke – 2% of the patients can develop during the post operative period and it will be higher for patients who have or had a stroke before the surgery.
2. Death – 1% or less people will die following the surgery due to stroke or heart attack.

3. 2 to 4 % people develop recurrence of stenosis the carotid artery and require surgery.

Risk factors are previous TIA, Diabetes, hypertension, and diabetes are other risk factors.

CEA is contraindicated are poor general condition with serious illness which will increase morbidity and mortality. It is also contraindicated in patients who present with major stroke or who had a major stroke recently with little or no recovery or a patient with altered level of consciousness. While doing emergency CEA in an acutely occluded carotid artery there is the risk of converting an ischemic cerebral infarct into a haemorrhagic infarct resulting in death.

Other procedure are carotid artery balloon dilatation and placement of stent. Long-term result from a successful stent placement is same as carotid endarterectomy.<sup>3</sup> A preoperative carotid angiography is mandatory to identify the patients who would benefit from surgical intervention and reduce the postoperative mortality rate. We do not know the condition of the opposite artery. Many authors have documented that if an endarterectomy is considered it must be done within 1 hour.<sup>4</sup>

For older people more than 70 years Carotid angioplasty and for younger people carotid artery stenting (CAS) is preferable but CEA can be done. For older people CEA may be associated with improved outcome when compared to CAS when the arterial anatomy does not favour endovascular intervention; For younger patients both CAS and CEA are equal in terms of risk for procedural complications and long-term risk for ipsilateral stroke.

### 2.1. Prophylactic endarterectomy

For patients with asymptomatic carotid stenosis and contralateral carotid occlusion, prophylactic endarterectomy can be considered. Toronto study showed that the patients with asymptomatic neck bruits have annual stroke rate is 1-2%, but the annual rate of cardiac death is 2-4%.<sup>5</sup>

## 3. Management of Risk Factors for Carotid Endarterectomy

### 3.1. Hypertension

Most important factor in developing post operative hypertension is Preoperative hypertension. During surgery the common carotid artery, vagus nerve and the carotid sinus must be protected to prevent carotid baroreceptor dysfunction.<sup>6</sup>

### 3.2. Postoperative hypotension

If there is significant postoperative hypotension myocardial infarction must be ruled out.

### 3.3. Hyper perfusion syndrome

Sudden increase in cerebral blood flow will cause a severe unilateral headache that subsides with upright posture.

### 3.4. Intracerebral haemorrhage

Intracerebral haemorrhage is 0.6% of patients and occurs within 2 weeks after surgery.

### 3.5. Seizures

Seizures without postoperative cerebral infarction or post endarterectomy intracerebral haemorrhage is due to cerebral hyper perfusion syndrome with hypertensive encephalopathy. Another cause is brain oedema secondary to hyperperfusion.<sup>7</sup>

### 3.6. Cerebral hyper perfusion syndrome

After carotid-endarterectomy, patients may develop cerebral hyper perfusion syndrome. Patients will complain of headaches and hypertension. There may be seizures or focal neurological signs.<sup>8,9</sup> If patients develop hypertension after carotid endarterectomy, hypertension must be treated aggressively.<sup>10</sup>

## 4. Source of Funding

None.


## 5. Conflict of Interest

None.

## References

1. MRC European Carotid Surgery Trial: interim results for symptomatic patients with severe (70-99%) or with mild (0-29%) carotid stenosis. *Lancet*. 1991;337(8752):1235–43.
2. Endarterectomy for asymptomatic carotid artery stenosis. Executive Committee for the Asymptomatic Carotid Atherosclerosis Study. *JAMA*. 1995;273(18):1421–9.
3. Meyer FB, Piegras DG, Sandok BA, Sundt TM, Forbes G. Emergency Carotid Endarterectomy for Patients with Acute Carotid Occlusion and Profound Neurological Deficits. *Ann Surg*. 1986;203(1):82–9.
4. Mentzer RM, Finkelmeier BA, Crosby IK, Wellons HA. Emergency carotid endarterectomy for fluctuating neurological deficits. *Surgery*. 1981;89(1):60–6.
5. Chambers BR, Norris JW. Outcome in Patients with Asymptomatic Neck Bruits. *N Engl J Med*. 1986;315:860–5.
6. Fein JM. Cerebrovascular Surgery. vol. 2. and others, editor. New York: Springer-Verlag; 1985. p. 399–427.
7. Breen JC, Caplan LR, Dewitt LD, Belkin M, Mackey WC, Donnell O, et al. Brain edema after carotid surgery. *Neurology*. 1996;46(1):175–81.
8. Naylor AR, Ruckley CV. The post-carotid endarterectomy hyperperfusion syndrome. *JR Soc Med*. 2005;98(10):472–4.
9. Naylor AR, Ruckley CV. The post-carotid endarterectomy hyperperfusion syndrome. *J Vasc Endovasc Surg*. 1995;9(4):365–7.
10. Breen JC, Caplan LR, Dewitt LD, Belkin M, Mackey WR. Brain edema after carotid surgery. *Neurology*. 1996;46(1):175–81.

**Author biography**

**Premkumar Daivasikamani**, Professor  <https://orcid.org/0000-0002-9700-0300>

**Aung San Phy**, Associate Professor

**Rajagopal**, Professor

**Bernard Fanthome**, Professor

**Cite this article:** Daivasikamani P, Phy AS, Rajagopal, Fanthome B. A case report of transient ischemic attack with carotid artery stenosis and discussion on the need for carotid endarterectomy. *IP Indian J Anat Surg Head, Neck Brain* 2023;9(3):99-102.