Carotid Artery Endarterectomy Under Local Anaesthesia – Case Series

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Abstract: Carotid artery stenosis accounts for approximately 10% of all ischemic strokes, causing significant morbidity and mortality. Carotid endarterectomy is a preventive surgery aimed at reducing the rate of stroke in patients at high risk of such an event. It is a procedure that is performed commonly for patients with symptomatic carotid artery stenosis. Carotid endarterectomy (CEA) can be done under local or general anaesthesia. Local anaesthesia is being proven advantageous over general anaesthesia. However, general anaesthesia is still indicated in case of patient preference or in conditions when conversion from local anaesthesia becomes necessary. The aim of the paper is to highlight the importance and benefit of regional anaesthesia in case of surgery of carotid endarterectomy.

Keywords: Carotid endarterectomy (CEA), Local Anaesthesia (LA), General Anaesthesia (GA)

I. Introduction

Carotid artery disease is a manifestation of generalised arteriosclerosis. In carotid artery, atherosclerotic plaques develop at the lateral aspect of bifurcation of carotid artery. Thrombosis is most likely to occur where plaques narrow the lumen to the greatest degree and that is the time when it is alarming for patient as he/she is prone for stroke and in case of significant stenosis, patient can be planned for carotid endarterectomy. Patients undergoing carotid endarterectomy may undergo the procedure under either local anaesthesia or general anaesthesia. Advantages and disadvantages of each type of anaesthesia must be considered when choosing optimal anaesthetic for each patient. Technique of administration of local anaesthesia is easier and it also proves beneficial in terms of patient compliance. GA is preferred by surgeons for its advantages of operating on a patient without any movement, a clean operative field, early and stable control of the airway and ventilation, and the availability of devices to protect the brain in case ischemia develops.

Case Series

Case 1- A 70 year old gentleman, a known case of coronary artery disease, congestive heart failure and diabetes mellitus type II presented to surgery department with the diagnosis of right carotid artery stenosis. Ultrasound Carotid vertebral Doppler showed circumferential plaque in right common carotid artery with extension into right internal carotid artery causing 60-70% stenosis of common carotid artery and 80% stenosis of proximal Internal carotid artery. His Echo report showed dilated cardiomyopathy, severe MR and TR, mild AR, global hypokinesia, reduced LV systolic function with LVEF-25%. He underwent right CEA under local anaesthesia. Intraoperatively it was seen that there was high bifurcation of right common carotid artery; atherosclerotic plaque at the bifurcation of the common carotid artery was extending into internal and external carotid artery (Figure 1 and 2). Intraoperative period was uneventful. The patient was conscious, oriented and stable throughout the surgery, she was alert and well responsive to the commands of anaesthetists and the operating team. She recovered well and was discharged in satisfactory condition. He is presently on regular follow-up and recovering well.

Case 2- A 63 year old lady, a known case of coronary artery disease, diabetes mellitus-type II and old cerebrovascular accident, presented to the hospital with complaints of left sided weakness for three days. CT Angiography of neck and brain revealed partially calcified concentric plaque at the right common carotid bifurcation extending into ICA and ECA with severe stenosis of 80-90% in the proximal ICA and 70-75% in ECA. Her cardiac status was normal with LVEF-55%. She underwent right carotid endarterectomy under LA. Intraoperatively right common carotid artery was seen to have high bifurcation and the atherosclerotic plaques at the bifurcation of the common carotid artery extended into the ICA, ECA causing severe stenosis. During the surgery, she was alert and well responsive to the commands of anaesthetists and the operating team. She required minimal intra-operative monitoring of neurological and cardiac status. She recovered well and was discharged in satisfactory condition 3 days following the surgery.

Case 3- A 52 year old gentleman, a known case of systemic hypertension, diabetes mellitus-type II, presented to the casualty with chief complaints of weakness in left upper limb for one hour prior to the time of presentation. He was diagnosed to have progressive stroke. He was evaluated by CT Angiography- brain which showed lipid rich atheromatous plaque involving the right CCA bifurcation, causing moderate stenosis of
around 80%, most severe at ICA origin. Right carotid endarterectomy was done under LA. Operative findings of
the surgery were as follows- lipid rich soft plaque at common carotid artery bifurcation with right carotid artery
bifurcation and posterior medial aspect of distal common carotid extending into the proximal ICA; moderate
stenosis; External Carotid Artery was free of plaques. During the procedure, the patient was fully awake,
conscious and oriented. His vital signs remained stable with good oxygen saturation. Postoperatively, he was
discharged after an observation period of 4 days in view of his progressive stroke. Presently the patient is doing
dowell, asymptomatic and on regular follow-up visits.

Figure 1: Isolated Common Carotid Artery, Internal Carotid Artery and External Carotid Artery

Figure 2: After applying the PTFE Patch

II. Discussion

Carotid endarterectomy was described as an effective modality for prevention of strokes in patients
with carotid artery stenosis. Carotid End Arterectomy performed under LA proved advantageous over GA in
terms of decreased morbidity with respect to incidence of postoperative Myocardial Infarction, stroke. CEA
performed under LA proves beneficial as it causes less postoperative pain which enables early ambulation,
better respiratory outcome and faster recovery. The advantages of LA must also be weighed against the
possible patient anxiety during the procedure due to maintaining consciousness, or the possibility of a difficult
lesion extending the operating time and increasing patient discomfort. Local Anaesthesia is advantageous over
General Anaesthesia with respect to easy neurological assessment during carotid cross clamping as against
assessment measures in GA namely somatosensory evoked potentials, TCD, processed EEG and infrared
spectroscopy. Procedure under LA is preferred in view of immediate postoperative neurological assessment,
greater cardiovascular stability, better postoperative analgesia, shorter hospital stay thereby being economically
better. Conversion of form of anaesthesia from LA to GA when indicated, though rare, is feared by the
operating team due to danger of chances of added morbidity and mortality. Cross-clamping of internal carotid
artery during CEA causes arterial supply shutdown to the contralateral cerebral hemisphere. Hence, a major
issue in carotid endarterectomy is assessment of cerebral perfusion after the procedure. Operations under GA
demand neurological monitoring by EEG, somatosensory evoked potentials, transcranial Doppler and carotid artery stump pressure. Performance of CEA under Local Anaesthesia surpasses use of sophisticated neurological monitoring methods and enables efficient cerebral perfusion adequacy assessment by neurological observation. In our study it was noted that for patients with co-morbidities where general anaesthesia should be avoided in view of its possible dangers, surgical procedure under local anaesthesia proves advantageous with respect to intraoperative monitoring and postoperative patient care.

**Conclusion**

The choice of anaesthesia in performing Carotid End Arterectomy affects patient outcome to a great extent. In centres where cerebral perfusion monitoring and cardiac status assessment is difficult, local anaesthesia is found to be a safer option in terms of patient’s comfort. General anaesthesia wherever indicated, requires efficient patient monitoring to ensure good surgical outcome. Monitoring of an awake patient is easy while operating on an awake patient is challenging as it demands good patient cooperation.

**References**


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