ORIGINAL ARTICLE

Carotid Endarterectomy Under Local Anaesthesia is Safe and Effective In High Risk Elderly Patients

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ABSTRACT

Objective	*To assess the safety and effectiveness of carotid endarterectomy (CEA) under local anaesthesia (LA) in high risk elderly patients.*
Study design	*Descriptive case series.*
Place & Duration of study	*Department of Vascular Surgery Combined Military Hospital Lahore, from January 2011 to January 2015.*
Methodology	*Patients with 70% or more stenosis of internal carotid artery in asymptomatic patients while 50% or more in patients with symptomatic carotid artery disease on duplex scanning were included. They underwent endarterectomy under local anaesthesia. The indication of surgery, hospital stay, complications and mortality were noted.*
Results	*A total of 126 CEA in 112 patients (96 males and 16 females) were performed under LA. Four (3.1%) cases were converted to general anaesthesia (GA). Shunt was used selectively in 6 (4.7%) cases with bilateral severe carotid artery occlusive disease. Perioperative transient ischaemic attack occurred in 3 (2.3%) patients and permanent neurological deficit in one (0.8%) patient. There was no mortality in this series. The postoperative complications included haematoma formation in 4 (3.1%), bleeding in 3 (2.3%), temporary dropping of lower lip in 1 (0.8%) and pseudoaneurysm formation in 1 (0.8%) patient. Hospital stay ranged from 24 to 96 hours. Mean stay in patients who had CEA under LA was 28 hours while it was 52 hours in those who needed conversion to GA.*
Conclusion	*Carotid endarterectomy under local anaesthesia is safe and effective procedure in elderly and high risk patients.*
Key words	*Carotid artery, Vascular surgery, Local anaesthesia, High risk – elderly.*

INTRODUCTION:

Carotid endarterectomy is a surgical procedure in which atherosclerotic material is removed from the inside of an atherosclerotic carotid artery especially in area of its bifurcation.[1,2] Approximately 30–60% of the strokes are secondary to carotid artery bifurcation disease.[3] Approximately half the patients who suffer a stroke are permanently handicapped, in most cases severly.[4] Male gender, advanced age, diabetes mellitus, hypertension and smoking are the major risk factors.[5,6] The incidence of stroke and its related morbidity and mortality increases dramatically with age. Most of these patients have a mean age of 60 year.[7]

Clinically the carotid artery disease may be asymptomatic or present with symptoms of transient ischaemic attacks or permanent ischaemic damage to the brain or retina.[8] Incidence of stroke is 1–2% per year in asymptomatic carotid disease but quite higher in symptomatic disease. The diagnosis of carotid artery disease needs just duplex scan of carotid bifurcation and internal carotid artery.

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Computed tomographic angiography (CTA) may be done in selective cases.

Treatment options include medical treatment alone, combined medical treatment and surgical carotid endarterectomy and balloon angioplasty with stenting of internal carotid artery. Carotid endarterectomy can be performed under local or general anaesthesia with or without using shunt and results in stroke free survival in patients with either symptomatic or asymptomatic severe carotid bifurcation stenosis. Surgery in asymptomatic stenosis is still controvertial.[1] Indications for surgery in asymptomatic carotid artery stenosis is 70% or more stenosis,[9] and 50-99% stenosis in symptomatic patients.[10,11]

The surgical mortality of endarterectomy under GA in aged population is 10%.[1,11] GA also predisposes the patients to prolonged hospital stay due to increased recovery time. Considering the high morbidity and mortality under GA, this procedure was performed in this study under local anaesthesia with an aim to reduce the postoperative morbidity and mortality.

METHODOLOGY:

This descriptive study was performed in Department of Vascular Surgery, Combined Military Hospital Lahore from January 2011 and January 2015. All consecutive patients who had symptomatic carotid artery disease with 50-99% stenosis and asymptomatic patients with an incidental finding of 70-99% stenosis were included in the study. Those patients who had 100 % stenosis, stenosis less than 50%, patients unwilling for operation under LA and any refusal for surgical intervention, were excluded.

The demographic data including age and sex were noted. Risk factors of atherosclerosis i.e. smoking, diabetes and hypertension were also noted. All patients underwent carotid Duplex scan by a consultant radiologist to assess the degree of the stenosis. Patients underwent baseline investigations like complete blood count, renal and liver function tests, coagulation profiles, hepatitis serology, electrocardiogram, two dimensional echocardiogram and chest x-ray. All patients were assessed by a consultant anaesthetist before operation.

Patients who were already on oral aspirin and /or clopidogril were continued perioperatively. Local anaesthesia was infiltrated using a mixture of 20 ml 2% lignocaine and 10 ml 0.5% bupivacaine diluted to a total of 50 ml. Standard approach anterior to sternocleidomastoid was used. Shunt was used selectively only in those patients who developed neurological signs on carotid clamping during the operation or had critical bilateral carotid stenosis on preoperative Duplex scan. Neurological monitoring was performed as patients were conscious without monitoring of EEG and stump pressure measurement. Traditional CEA was performed as a routine but eversion endarterectomy was also performed in patients having long or kinking internal carotid artery.

Postoperatively, patients were nursed in intensive care unit for 24 hours and then in ward till discharge. Follow up was done weekly for first month, then monthly for next three months, then three monthly for a minimum of one year. Duration of hospital stay, conversion rate to GA and postoperative complications were noted.

The data was analysed using Statistical Package for Social Sciences (SPSS) version 20. The numerical outcomes e.g. age and hospital stay were presented as mean. Categorical data like gender were presented as frequency and percentage.

RESULTS:

In this study 112 patients were included. The minimum age of patients was 59 year and maximum 83 year with mean age of 71 year. Out of the total, 96 (85.7%) were males and 16 (14.2%) females. Male to female ratio was 6:1. The minimum follow up was 12 months and maximum 3 year. Fourteen (12.5%) patients had bilateral disease hence they underwent bilateral endarterectomy within an interval of four weeks. The risk factors for atherosclerotic disease in our cases are given in table I.

A total of 126 CEA were performed under local anaesthesia, 72 (57.1%) on left side and 54 (42.9%) on right side. Of 126, 120 (95.2%) procedures were conventional CEAs and 6 (4.8%) were done by eversion technique. Four (3.1%) patients were converted to general anaesthesia. Shunt was used selectively in 6 (4.7%) cases with bilateral severe

Table I: Risk Factors (n=112)

Risk Factor	No. (%)
Diabetes mellitus alone	60 (53.5%)
Hypertension alone	20 (17.8%)
Diabetes and Hypertension	25 (22.3%)
Smoking	37 (33.0%)
Diabetes, Hypertension and Smoking	18 (16%)

carotid artery occlusive disease.

Perioperative transient ischaemic attacks occurred in 3 cases (2.3%) which recovered completely within 24 hours of operation. Permanent neurological deficit occurred in one (0.8%) patient. There was no mortality in this series. The early postoperative complications included haematoma formation in 4 (3.1%) patients which was drained by opening the wound under local anaesthesia. Bleeding occurred in 3 (2.3%) cases which needed re-exploration of the wound in operation theatre under LA. In all three cases, there was no bleeding from the major vessels or arteriotomy site. Local wound infection occurred in 4 (3.1%), dropping of lower lip (temporary) in 1 (0.8%) and pseudo-aneurysm formation in 1 (0.8%) patient.

Hospital stay ranged from 24 to 96 hours. Mean hospital stay in patients who had CEA under LA was 28 hours while it was 52 hours in those who needed conversion to GA.

DISCUSSION:

Portuguese performed first endarterectomy on an occluded superficial femoral artery in 1946 and later in 1953 first CEA was successfully performed by Michael DeBakey. In 1954, Felix Eastcott reported first case of CEA.[12] In 30-60% cases strokes result from recurrent carotid emboli. The aim of CEA is to prevent the patient from such transient ischaemic attacks or strokes. The incidence of stroke and its related morbidity and mortality increases with the age.[2,9,11] Ascher et al demonstrated that the prevalence of high-grade carotid artery stenosis is high in male gender, those with advanced age, having diabetes mellitus and with smoking.[5] In this study carotid artery stenosis was more common in males, older age group (mean age of 71 year) and those with one or more atherosclerotic risk factors. All our patients had at least one of the risk factors. In 16% cases all the three risk factors i.e. smoking, diabetes and hypertension were present.

According to European Carotid SurgeryTrial (ECST) and North American Symptomatic Carotid Endarterectomy Trial (NASCET) indications of surgery are 50-99% carotid stenosis in symptomatic patients.[1,11] However in asymptomatic patients, CEA is indicated if stenosis is 70-99%.[11] We followed the same guidelines in this study.

Whether CEA is beneficial in asymptomatic patients or not, is still a matter of controversy. ACAS trial had shown benefits of CEA in asymptomatic carotid artery stenosis with less than 3% perioperative morbidity and mortality.[10,13] None of our patients who were operated for asymptomatic carotid artery stenosis developed stroke on contralateral side after surgery, however, perioperatively one patient developed transient ischaemic attack which completely resolved within 24 hours. There was no mortality in this series. These results are comparable to international literature.

NASCET described an overall neurological morbidity of 6.5% and a rate of permanent disabling stroke and death of 2.0%.[14] In our study, four patients (3.1%) developed peroperative neurological problems. Of these only one (0.8%) developed permanent neurological deficit. Four (3.1%) patients died after 6 weeks due to myocardial infarction thus mortality was not related to the procedure performed. The overall stroke (3.1%) and death (3.1%) rate in our series are comparable to international studies. Previously the elderly and high risk patients were not operated because of risks of general anaesthesia. We performed CEA successfully under LA in our elderly patients.

CONCLUSION:

Carotid endarterectomy is safe and effective procedure under local anaesthesia in all patients with carotid artery stenosis requiring surgical intervention, especially the elderly and high risk cases.

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