

COMBINED CAROTID ENDARTERECTOMY (CEA) AND CORONARY ARTERY BYPASS GRAFTING (CABG): IMPACT ON MORBIDITY AND MORTALITY

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ABSTRACT

The co-existence of significant carotid stenosis and coronary artery disease poses a serious management challenge. The options include either staged or combined carotid and coronary revascularization procedures. We report on four cases of combined carotid endarterectomy (CEA) and coronary artery bypass surgery (CABG) with excellent perioperative results.

INTRODUCTION

Atherosclerosis is a generalized disease not limited to just the coronary circulation and increases with advancing age. Asymptomatic severe (> 70%) carotid disease may be present in 3.3% to as many as 12% of patient undergoing coronary artery bypass grafting (CABG), which poses a serious challenge to the best treatment strategy for this subset of patients^{1,2}. The options for these patients are either staged carotid endarterectomy (CEA) or carotid stenting (PCI) followed by CABG and vice versa or combined CEA and CABG (CEA+CABG). Controversy still exists regarding the best modality for these patients as no large scale randomized data exists. Numerous observational studies have shown good results of the combined procedure with similar mortality/morbidity as compared to isolated CABG with a history of previous CEA^{3,4,5,6}. We report the cases of four patients who underwent CEA+CABG at Shifa International Hospital with excellent outcome.

Case Report:

Table-1 shows the detailed perioperative characteristics of all four patients.

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Case-1:

A 63 year old male diabetic, cigarette smoker who presented with stroke and dyspnea on exertion. His Angiography showed severe triple vessel coronary artery disease (CAD). Carotid duplex study revealed 50% stenosis in the mid Rt-common carotid artery (CCA) and 90% Rt-internal carotid artery (ICA) stenosis. Patient underwent CEA+CABG. Patient had no cardiac or neurological complications but he developed hoarseness and Horner's syndrome. He stayed in the CCU for 2 days and in the ward for 3days after which he was discharged in a stable condition and was well at one year follow-up.

Case-2:

A 58 year old male diabetic, hypertensive presented with exertional angina and syncope. Coronary angiography revealed severe two vessel CAD. Carotid duplex study showed severe Lt-CCA stenosis and moderate Rt-CCA stenosis. He underwent CEA+CABG. There were no peri-operative complications. The patient stayed in the CCU for four days and in the ward for 2 days after which he was discharged in a stable condition.

Case-3:

A 59 year old male diabetic, hypertensive presented with unstable angina. He also had a history of stroke. His angiography revealed triple vessel CAD. Carotid duplex study showed severe Rt-ICA and moderate Lt-CCA stenosis. CEA + CABG were carried out without complications. He stayed in the hospital for 7 days including two in the CCU after which he was discharged in a stable condition. He was doing fine

for about one and a half year after which he did not return for follow-up.

Case-4:

A 69 year old male diabetic, hypertensive presented with the unstable angina and transient ischemic attack (TIA). His angiography showed severe three vessel CAD. Carotid Duplex study showed severe Rt-ICA and moderate Lt-CCA stenosis. He underwent CEA+ CABG without any complications. He stayed in the CCU for 4 days and ward for 2 days. He was discharged in a stable condition.

DISCUSSION

Patients with significant CAD may have co-existent significant asymptomatic carotid disease as well, which can lead to serious preoperative complications. Patients undergoing isolated CABG have a significant risk of perioperative stroke in the presence of untreated significant carotid disease³. Similarly, patients with significant CAD, undergoing isolated CEA have a much higher risk of perioperative myocardial infarction. The options for these patients are a variable combination of percutaneous and

Table-1 : Clinical and Perioperative Characteristics

Characteristics	Patient-1	Patient-2	Patient-3	Patient-4
Gender	Male	Male	Male	Male
Age (yrs)	63	58	59	69
Diabetes	Yes	Yes	Yes	Yes
Presentation	Stroke	Exertional angina	UA & TIA	TIA & UA
HTN	No	Yes	Yes	Yes
Coronary anatomy	3-vessel	2-vessel	3-vessel	3-vessel
Renal function	Normal	Normal	Normal	Normal
LVEF (%)	60	65	70	60
Carotid anatomy	Severe Lt-ICA Moderate Rt-CCA stenosis	Severe Lt-CCA Moderate Rt-CCA stenosis	Severe Rt-ICA Moderate Lt-CCA stenosis	Severe Rt-ICA Moderate Lt-CCA stenosis
CEA data	Left side	Left side with SV angioplasty	Right side with SV angioplasty	Right side
Pre-shunt (sec)	2	2	1:30	1:30
Post-shunt (sec)	4	3	3	3:20
CABG data				
LIMA	Yes	Yes	Yes	Yes
SVG	3	3	4	
Cardioplegia	Antegrade	Antegrade	Antegrade	Antegrade
Cross clamp time (min)	85	66	84	60
Bypass time (min)	124	96	149	90
Post-operative complications	Horner's syndrome	None	None	none
ICU stay (days)	2	4	2	4
Total hospital stay (days)	5	6	7	6

UA: **unstable angina**
 TIA: **transient ischemic attack**
 LIMA: **left internal mammary artery**
 SV/SVG: **saphenous vein graft**

surgical intervention. Each strategy has its own pros and cons and a very careful evaluation is needed to provide the best possible option to the patient. One option is combined CEA and CABG (CEA + CABG), but even in this strategy, performing CEA first or CABG first may have a significant impact on the outcome of the procedure^{4,5}. Different centers have a

preference for performing one procedure as the initial one over the other and this depends upon the individual expertise of the vascular surgeon and the cardiac surgeon. Our center has proceeded with CEA first in the CEA + CABG procedure. These four cases have shown very good results from cardiovascular standpoint with this approach. No doubt, this was in large part because of normal left ventricular systolic function of all four patients. The morbidity/mortality would have been much higher in the presence of compromised systolic function. The option of using cardiopulmonary bypass (CPB) for both CEA and CABG or just CABG is also an institutional preference. Bonacchi et al have reported on better results with using CPB only during myocardial revascularization⁶. Patient in our report underwent CPB during CABG only. Bulat et al have also shown comparable results of CEA + CABG with on-pump and off-pump technique as well⁷. There are two published papers of CEA + CABG from Pakistan so far^{8,9}. However, none of the papers has reported such detailed perioperative account of the individual patients as our report. The overall hospital stay for all four patients was also no different than isolated CABG at our institution and the overall cost was less with the combined procedure as compared to separate procedures.

CONCLUSION

In experienced centers, combined CEA + CABG for patients with significant carotid and coronary artery disease can have comparable results to either procedure alone. Careful assessment of cardiovascular status is important to decide on the best possible strategy.

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