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Combined Carotid Endarterectomy and off Pump Coronary Artery Bypass Grafting : A Case Report

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Summary:
A 64 years male presented as a case of triple vessel coronary artery disease with bilateral asymptomatic carotid lesion. He underwent combined right carotid endarterectomy (CEA) and off pump coronary artery bypass grafting (OPCAB) with excellent outcome.

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Introduction:

There are few areas in cardio-vascular surgery more controversial than the issue of combined carotid endarterectomy (CEA) and coronary artery bypass grafting (CBG). Although indications for both operations have been elucidated and techniques have been standardized, the results varies between centers[1].

Carotid artery disease is an important risk factor for stoke (CVA) after CABG[1,2]. Hemodynamically significant carotid artery stenosis are associated with as many as 30% of the stroke arising after CABG[1,2].

Presence or absence of a carotid bruit is poorly predictive of high grade stenosis even in the setting of known symptomatic carotid artery disease[3].

Carotid duplex Ultrasonogrpahy is currently the most widely used technique for preoperative screening to detected important carotid artery disease in patients undergoing CABG. If the preoperative carotid duplex study demonstrates high grade (>70%) stenosis and the patient's hemodynamic state is stable with no critically stenotic coronary arteries, CEA and CABG procedures are staged, performing the CEA first. If the patient is hemodynamically unstable, or if there is high grade left main coronary artery or proximal LAD disease, a combined CEA and CABG procedure is performed(4). This approach is justified because prophylactic CEA has been shown to be superior to conservative therapy for preventing stroke in symptomatic or asymptomatic patients with high grade carotid stenosis[5].

When a combined procedure is performed, CEA is done before cardiopulmonary bypass (CPB) is established[4].

Publications have shown CABG is safe and effective in patients with significant left main CAD when using off-pump (OPCAB) CABG techniques[6,7].

Case report:

A 64 years old male was admitted in the cardiac surgery ward of the National Heart Foundation Hospital with complains of chest pain on exertion and dyspnoea for 6 months. He was a known patient of hypertension and diabeties mellitus. He had also a history inferior MI, 15 years back.

On physical examination the patient was found anxious looking and of average built. All peripheral pulses were palpable and of moderate volume. On auscultation there was bilateral carotid bruit. Hematological and biological parameters were within normal limits. ETT was positive. Echocardiographic

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evaluation revealed anterior septal and apical wall moderately hypokinetic; inferior and basal posterior walls were echogenic and akinetic. Ejection fraction 50%. Duplex study of neck arteries revealed 70-75% right ICA and 35-40% left ICA lesion with flow disturbance.

Coronary angiogram showed left main coronary artery 60%, left anterior descending (LAD) 75%, diagonal (D) 50%, left circumflex (LCx) 90%, obtuse marginal (OM) 70%, right coronary artery (RCA) 100% stenosis. D and OM were narrow calibre, diffusedly diseased vessels.

Our final diagnosis was significant left main with triple vessel CAD and bilateral asymptomatic carotid artery lesion.

Combined right CEA and OPCAB grafting was planned.

We started midline sternotomy and harvesting of GSV as bypass conduit simultaneously. Then the right sided carotid endarterectomy was performed using CCA to ICA intravascular shunt. The distal CCA, bifurcation, proximal ICA and ECA origins were made clean of atheromatous plaques. Arteriotomy was closed using PTFE patch. After establishing satisfactory ICA/ECA flow and ensuring proper hemostasis, the neck wound was loosely approximated over a sponge.

Then OPCAB to LAD and PDA was performed. Due to diffusely diseased and narrow calibre, OM and D were not graftable. At the same time the LIMA with unsatisfactory flow was not used as a conduit.

Post operative recovery was smooth and unremarkable. On the 7th post-operative day stitches were removed, healing was by 1st intention.

At routine follow-up at 1 and 3 months, the patient was found in satisfactory condition. He was hemodynamically stable and without any chest pain or neurological symptoms.

Discussion :

Next to operative mortality, an irreversible perioperative cerebrovascular accident is the most dreaded perioperative complication of myocardial revascularisation, primarily because of the devastating consequences to the patient, and also because of the significantly increased cost of hospital and posthospital care[9]. In their study Puskas et a[9] noted 2.2% stroke after CABG. The stroke was associated with significantly more in hospital morbidity, longer length of stay and almost twice the hospital cost. Patients in that study who suffered a perioperative stroke has a 23% hospital mortality rate[9]. The most common cause of perioperative stroke is atherosclerotic or thrombotic embolic debris from the heart or major vessels. From a surgical point of view, of all the potential causes of perioperative stroke, carotid stenosis is the one artomatic situation about which the surgeon can routinely take action to remove the pathology.

Early studies related the presence of carotid stenosis to development of perioperative neurologic injuries using auscultatory evidence of carotid disease as the method of diagnosis. A number of investigators studied the relationship between carotid bruits and perioperative stroke[1,2,3]. Unfortunately carotid bruit are not reliable indicators of ICA stenosis, nor are they discriminatory as to the degree of carotid stenosis. Much better definition of the degree of stenosis obtained with noninvasive carotid testing using Doppler ultrasound techniques. the accuracy and reliability of these methods to quantify the degree of stenosis and provide visual images of the stenosis has made these methods the initial and in most of the cases sole method of choice is evaluating patients suspected of having carotid occlusive disease[10]. In our protocol of evaluation of CAD patients, it has because a standard and routine non-invasive procedure.

It is well established from the NASCET and ACAS trials that the long-term stroke risk of medical therapy is far higher than the risk of carotid endarterectomy in patients who have high grade carotid stenosis [5,10]. Therefore, if one was to improve the overall morbidity and mortality of patients with combined cardiac and carotid disease, one must certainly approach these patients with CEA in addition to CABG.

There continues to be a dilemma regarding the best means of surgical management of significant carotid artery disease in patients requiring coronary artery bypass surgery.

Most surgeons advocating a sequential operative approach to patients with severe combined disease usually do the CEA initially if the patient is hemodynamically stable and not ischaemic. However, the risk of a perioperative coronary ischaemic event remains a real threat.

Some cardiac surgeons have opted to perform an initial CABG followed by CEA for patients with unstable angina and asymptomatic carotid lesion. The principal risk with this approach is the potential for postoperative stroke.

Currently concomitant carotid and coronary bypass operations for virtually all patients with severe combined disease is advocated. The strategy of performing both operative procedures during one anesthetic is based upon the premise that only such an approach in patients with severe combined disease can minimize cardiac events that frequently complicate isolated CABG. Moreover, doing the two operative procedures together is more cost effective in terms of number of anesthesia and additional hospital stay.[10,11]

Recent publications have shown CABG is safe and effective in patient with critical left main stem stenosis when using OPCAB techniques[6,7]. It has been shown that the requirement for iinotropic support, prolonged length of stay, incidence of stroke and chest infection were significantly reduced in patients receiving OPCAB coronary surgery[6].

Taking all these into consideration we planned to perform combined CEA and OPCABG in our case. We followed the standard protocol and were meticulous in performing all steps of surgery. Postoperative management of our patient was not difficult from those patients having isolated CABG. We maintained a good coronary and cerebral perfusion pressure in the early postoperative hours.

Standard anticoagulation protocol consisting of aspirin within 6 hours of surgery was followed. Additional heparin was used because of prosthetic carotid patch.

Post operative period was smooth and unremarkable.

Conclusion :

The case is probably first time reported in Bangladesh. Symptomatic or asymptomatic high grade carotid lesion along with CAD are usual and frequent findings now-a-days, Non-invasive carotid evaluation, using duplex ultrasonography as a screening modality is an well established and time tested investigation. At the same time excellent randomized trials have established the safety and efficacy of CEA as the most appropriate treatment for both symptomatic or asymptomatic high grade carotid stenosis. A number of randomized studies have demonstrated the advantage of concomitant CEA and CABG over staged procedures. OPCAB procedure is also established as a safe, effective and patient friendly procedure. Considering all these we planned combined CEA and OPCAB coronary revascularisation. After this first successful case, we were confident to perform this procedure more in future.

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