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Simultaneous coronary and carotid revascularisation

Jiří Ničovský [a,b,*], *Jiří Ondrášek* [a], *Pavel Piler* [a,b], *Robert Wágner* [a,b], *Tomáš Ostřížek* [a], *Vladimír Horváth* [a,b], *Petr Němec* [a,b]

[a] *Centrum kardiovaskulární a transplantační chirurgie, Pekařská 53, 656 91 Brno, Czech Republic*
[b] *Mezinárodní centrum klinického výzkumu, Fakultní nenocnice u sv. Anny v Brně, Pekařská 53, 656 91 Brno, Czech Republic*

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ABSTRACT

Introduction: Coronary artery disease is the most frequent cardiovascular disease at all. Combination of coronary and carotid artery disease due to multisystem atherosclerosis is an indicator of impaired prognosis. Patients with existing coronary artery disease who undergo carotid endarterectomy (CEA) are at high risk of developing perioperative myocardial infarction. There is also increased risk of perioperative stroke in patients with severe carotid artery stenosis who undergo coronary artery bypass grafting (CABG). There is possibility to perform simultaneous CEA/CABG in selected cases to prevent these severe complications.
Materials and methods: During 5 years period, between January 2010 and December 2014, 54 patients (46 males, 8 females, mean age 70.3 years, range 52–85) underwent simultaneous CEA/CABG surgery for significant coexisting carotid and coronary artery disease in our institution. Demographic and clinical characteristics of the patients as well as a history of previous myocardial infarction, hypertension, diabetes mellitus, hyperlipidaemia, peripheral arterial disease and smoking were recorded. Carotid pathology was diagnosed by ultrasound scan and CT angiography. The combined procedures were performed with the patients under general anesthesia. The CEA was completed first, and than CABG was performed.
Results: The mean postoperative hospital stay was 14.5 days (range 7–95 days). We recorded one death due to colon necrosis in our group of patients. The hospitalization mortality was 1.9%. There was no perioperative myocardial infarction. One patient with symptomatic unilateral carotid stenosis developed reversible ischemic neurologic deficit. One patient required intraaortic balloon counterpulsation as a result of postoperative heart failure. We observed impaired wound heeling in 5 patients. Other perioperative morbidity included atrial fibrilation in 17 patients, transient delirium in 15 patients and postoperative hemopericardium in 1 patient.
Conclusion: According to our experiences and results, the simultaneous performance of CEA and CABG in patients with severe coexisting carotid artery disease who require coronary revascularization has proved to be a safe and efficacious operative strategy in these high-risk patients.

* *Corresponding author at*: Centrum kardiovaskulární a transplantační chirurgie, Pekařská 53, 656 91 Brno, Czech Republic. Tel.: +420 605 514 385.
E-mail address: Nicovskyj@seznam.cz (J. Ničovský).
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Introduction

One of the most severe complication after CABG is a perioperative stroke that impacts length of hospital stay, overall cost and patient survival. The incidence of perioperative stroke has been well documented at approximately 2% of all cardiac operations [1]. The etiology of perioperative stroke is multi-factorial including embolic debris from the aorta, hypotension during cardiopulmonary bypass (CPB) induced by reduction of blood supply of brain or severe carotid artery stenosis. Intracranial hemorrhagia because of high level of anticoagulation during CPB is rare. The incidence of significant carotid artery disease in patients requiring CABG is between 3% and 12% [2]. Combination of coronary artery disease and severe carotid artery stenosis is an indicator of impaired prognosis. There is up to 14% risk of perioperative stroke in patients with severe carotid stenosis who undergo CABG [3,4]. There are several therapeutic strategies for patients with concomitant carotid and coronary artery disease: CABG alone, staged CEA and CABG or simultaneous procedure of both. Our approach to this type of high risk patients is to perform simultaneous carotid and coronary operations under single anesthesia. This report presents an analysis of our experience with this type of procedure.

Materials and methods

During 5 years period, from January 2010 to December 2014, 54 patients underwent combined CEA/CABG for significant coexisting carotid and coronary artery disease. All patients were operated on electively. The mean age was 70.3 ± 7.8 (range 52–85). Forty-six patients were men and eight were women. The records of those consecutive patients were retrospectively reviewed for demographic information, clinical and angiographic data and operative characteristics. The distribution of important demographic and clinical characteristics is shown in Table 1.

Carotid artery stenosis was examined using carotid ultrasound scan and CT angiography. Stenosis more than 70% was considered as hemodynamically significant. The indication for simultaneous procedure were symptomatic carotid artery stenosis, asymptomatic stenosis with contralateral disease (severe stenosis or occlusion) or asymptomatic unilateral stenosis with ulcerated, unstable lesion. Angiography data are presented in Table 2.

The operation was performed during a single general anesthesia by one surgical team. The CEA was completed first (Picture 1). An intraluminal carotid shunt was used in all but one patient with internal carotid kinking. The arteriotomy was closed using a direct suture without any patch in all patients. The neck incision was left open until heparin reversal after CPB. After completion of the CEA standard CABG was performed with CPB in 51 patients (94.5%) and without CPB in 3 (5.5%). The reason for off pump technique was severe atherosclerosis of ascending aorta. In those patients operated on with CPB, the antegrade cold crystalloid or blood cardioplegia was used for myocardial protection. The mean systemic arterial pressure was maintained between 50 and 70 mmHg.

Table 1 – Demographic and clinical characteristics.

Gender	Male	46 (85.0%)
	Female	8 (15.0%)
Mean age ± SD (range)		70.3 ± 7.8 (52–85)
Hypertension		52 (96.0%)
Diabetes mellitus		25 (46.0%)
Hyperlipidaemia		46 (85.0%)
Smoking		26 (48.0%)
Previous myocardial infarction		22 (40.0%)
Left ventricular function (ejection fraction)	Normal (>50%)	35 (65.0%)
	Depressed (30–50%)	16 (29.5%)
	Severely depressed (<30%)	3 (5.5%)
Neurological history	Asymptomatic	45 (83.5%)
	Symptomatic	9 (16.5%)
Renal impairment		11 (20.0%)
Peripheral artery disease		17 (31.5%)

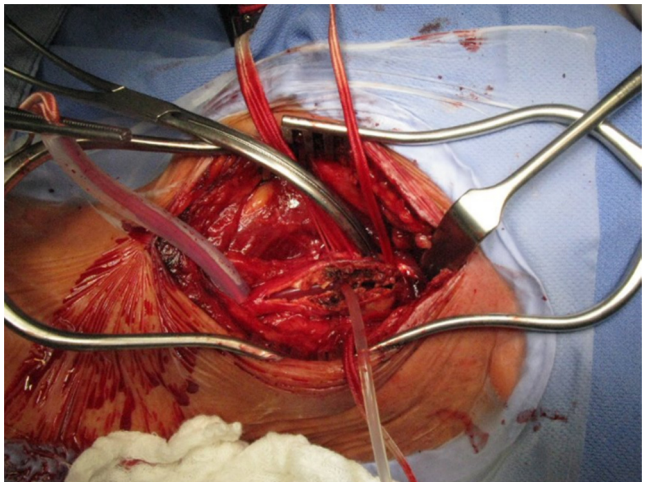
Table 2 – Angiographic data.

Coronary artery disease	One vessel disease	4 (7.5%)
	Two vessels disease	16 (29.5%)
	Three vessels disease	34 (63.0%)
	Left main	27 (50.0%)
Carotid artery disease	Unilateral stenosis (>70%)	22 (40.5%)
	Bilateral stenosis (>70%)	28 (52.0%)
	Unilateral stenosis (>70%) with contralateral occlusion	4 (7.5%)

After completion of the cardiac operation, heparin was reversed and all wounds were closed simultaneously. The average number of coronary anastomoses was 2.7. In ten patients additional procedures were performed (Table 3).

Results

The mean postoperative hospital stay was 14.5 days (range 7–95 days). One patient died on 40th postoperative day due to colon necrosis and peritonitis. One patient with symptomatic unilateral carotid stenosis developed reversible



Picture 1 – Opened carotid artery with severe ulcerated lesion, intraluminal shunt is inserted.