Simultaneous stenting of the left main coronary stem and internal carotid artery in a hemodynamically unstable patient

Istovremeno rešavanje stenoze glavnog stabla leve koronarne arterije i unutrašnje karotidne arterije stentovima kod hemodinamski nestabilnog bolesnika

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Abstract

Introduction. Combined endovascular interventions on carotid and coronary arteries are rare. Stenting of the unprotected coronary left main stem is a high risk procedure. We presented hemodynamically unstable patient with combined carotid artery and left main stem coronary artery stenting.

Case report. A 78-year-old female patient was admitted to our institution for right carotid endarterectomy. The patient had 80% stenosis of the right carotid artery and occlusion of the left carotid artery. Coronary angiography revealed 70% ostial left main stenosis, occlusion of the right coronary artery and the left circumflex artery, and 80% stenosis of the left anterior descending artery. Simultaneous carotid artery endarterectomy and coronary artery bypass grafting were considered. Due to high perioperative risk, surgery was rejected, and the patient was treated endovascularly with stenting of arteries occluded. The procedure was completed without complications and the patient was hemodynamically stabilised. Conclusion. This report illustrates simultaneous coronary and carotid stenting as a successful lifesaving procedure.

Key words: coronary disease; carotid artery diseases; stents; treatment outcome.

Introduction

Simultaneous endovascular interventions on carotid and other extracarotid arteries still do not count into routine procedures, although few reports favor them as feasible, relatively safe and cost-effective. Left main (LM) stem percutaneous coronary intervention (PCI) is for itself a procedure with elevated risk. In the era of drug eluting stents, it is performed more often, especially in those patients who are at high surgical risk. We reported a case of combined stenting of internal carotid artery and LM stem coronary artery being only the second case reported in literature up till now.

Case report

A 78-year-old female patient was admitted to our institution for right carotid endarterectomy. The patients cardiovascular risk factors included hypertension, diabetes
(treated with oral hypoglycemics) and hyperlipidemia (type IIb). Her cerebrovascular symptoms were dizziness and vertigo, and she had stable angina. The patient had no previous history of myocardial infarctions or cerebrovascular insults. Her physical and neurological examinations were unremarkable. Color Doppler sonography of the neck arteries revealed 80% stenosis of the right internal carotid artery and occlusion of the left internal carotid artery. During hospitalization, the patient developed symptoms of unstable angina (with 3 mm ST segment depression and negative T wave in D1, D2, aVL and all precordial leads) and underwent coronary angiography which revealed diffuse coronary atheromatosis, with 70% ostial LM coronary artery stenosis, occlusion of the right coronary artery and left circumflex artery, and 80% stenosis of the medial left anterior descending (LAD) artery (Figures 1–3).

Echocardiographic control showed that the left ventricular ejection fraction was 40%–45%, with wall hypertrophy and akinesia of basal and mid third of the inferior and the entire posterior wall of the left ventricle, and also moderate mitral regurgitation into mildly enlarged left atrium. Brain computerized tomography findings included old infarct lesions of cortex and subcortical white brain matter localized temporally left, in temporal operculum and frontally precen- trally right, and also involutive changes such as cortical re-duction and diffuse scarcity of deep white matter periven- tricularly. The patient was treated with ACE inhibitors, beta blockers, statins and aspirin, and after the patient developed unstable angina, intravenous infusion of unfractionated hepa-rin and nitroglycerin were added.

In later course, the patient became hemodynamically unstable, hypotensive (80/50 mmHg) and received adequate inotropic support (dopamine 5.6 µg/kg/min). Because of contralateral occlusion of internal carotid artery and concomitant high degree LM coronary artery stenosis, simultaneous carotid artery endarterectomy and coronary artery by-pass grafting (CABG) were considered. Due to unacceptably high perioperative risk and hemodynamic instability (with an in-hospital onset), surgery was rejected, and the patient underwent simultaneous stenting of the right internal carotid artery and the LM stem coronary artery and medial LAD.

After the patient was premedicated with loading dose of clopidogrel (8 × 75 mg) and after ACT was measured and found to be in working range, PCI was performed using the right femoral approach (6F femoral sheath, guiding catheter 3.75 6F Launcher Medtronic, ATW floppy guide wire – Cordis J&J) LM trunk was directly stented with Tsunami-Terumo 4 mm × 17 mm bare metal stent at 16 ATM, and then the mid LAD artery was directly stented with Tsunami-Terumo 3.5 mm × 16 mm BMS at 16 ATM. LM stem was afterwards post-dilated with NC Sprinter 4.5 mm × 15 mm balloon at 20 ATM (Figures 4 and 5).
After PCI, stenting of the right internal carotid artery was done. After canulating the right internal carotid artery (JR coronary diagnostic catheter, Storq guide-wire – Cordis J&J, guiding sheath 8F 90 cm), distal protection (EPI Filter, Boston Scientific) was placed into the right internal carotid artery, which was then directly stented with carotid stent (Wallstent 9 mm × 40 mm, Boston Scientific), and post-dilated with carotid balloon 7 mm × 20 mm (Amia, Cordis J&J) (Figures 6 and 7).

Intra-aortic balloon pump was not applied during the procedure for several reasons: although the patient was hypotensive, there were no signs or symptoms of pulmonary oedema (as in late stage cardiogenic shock), left ventricular systolic function was relatively preserved, and the patient adequately responded to inotropic therapy. In our case, intra-aortic balloon pump insertion would require bilateral femoral artery puncture, and by that increase the possibility of bleeding complications.

The procedure was completed without complications. After the procedure the patient regained hemodynamic stability and after adequate hydration, the inotropic drug was withdrawn. The patient was released from the Institute after two days in good general condition, and on 1 month and 3-month control her condition remained unchanged.
Discussion

Main indications for carotid artery stenting are surgically unapproachable lesions (beyond the level of C2 or subclavian), carotid stenosis caused by radiation, and previous ipsilateral neck dissection, previous carotid endarterectomy (restenosis) 4. A high incidence of significant coronary disease is detected among patients who undergo carotid stenting 5. Long term outcome of carotid stenting is dependent on coronary artery disease presence. Adverse cardiovascular events and total mortality are more frequent in patients with concomitant coronary and carotid disease, although adverse neurological events are equally present in patients with simultaneous coronary disease and in patients with isolated carotid disease 6. In patients who undergo carotid stenting, coronary artery disease is an independent mortality predictor. On the other hand, stroke is a devastating complication of CABG. It increases mortality and morbidity of surgical procedure, prolongs hospitalization and dramatically decreases postoperative life quality. Although CABG-related stroke is multicausal, extracranial carotid disease is the most important and the most frequent cause. Simultaneous surgical approach is the most widely applied strategy for treating patient with concomitant coronary and carotid disease, although in present day no treatment consensus exists. A new therapeutic strategy with promising results, consisting of hybrid revascularization by carotid artery stenting (CAS), immediately followed by on-pump CABG has been recently proposed for patients with coexisting carotid artery disease and percutaneously unsolvable coronary artery disease 7.

Carotid artery stenting in patients who also have coronary artery disease is feasible, safe, and shows good results with a prospective follow-up 8,9. Carotid artery stenting combined with simultaneous interventions on other central arteries can be applied with high rate of success and with relatively few complications 10. Advantages of this simultaneous approach compared with phase stenting include: higher comfort of the patient, and reduced incidence of complications related to puncture site, because femoral puncture is performed only once, and also cost-effectiveness because there is no need for repeated hospitalization 1. Results of recently published multicentric, prospective, unrandomised study on 659 patients with coexistent coronary and carotid artery disease, strongly favor endovascular approach in treating these patients 11. Adverse event rate (death, stroke or myocardial infarction) within thirty days was significantly lower among patients treated endovascularly in comparison with patients undergoing surgical or hybrid procedures. Nevertheless, experience in simultaneous percutaneous management of coronary and carotid disease remains limited in this study (35 patients).

Conclusion

One of the important conclusions of this paper is that simultaneous endovascular coronary and carotid procedures are burdened by higher incidence of bleeding and acute renal failure; therefore simultaneous percutaneous treatment should be limited to unstable clinical presentation, refractory to medical therapy. In our case, considering contralateral occlusion of the internal carotid artery and hemodynamic instability caused by severe form of coronary disease, applied combined endovascular procedure was fully justified.

References


Received on August 27, 2010.
Revised on October 4, 2010.
Accepted on November 5, 2010.