Simultaneous coronary artery bypass grafting and carotid endarterectomy in an awake Jehova’s witness patient without endotracheal intubation

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Abstract

Complex surgical procedures are associated with a major risk of peri-operative bleeding. Jehova’s witnesses (JW) necessitate a tailored strategy warranting the optimal surgical management, in observance to their religion principles. In this report, we present a JW female patient, who underwent combined coronary artery bypass grafting and carotid endarterectomy, with neither endotracheal intubation nor general anaesthesia. Patient had previously undergone bilateral endarterectomy and required a reoperation on the left side. She was also scheduled for revascularization of left anterior descending coronary artery. After an extensive evaluation of all the possible operative strategies, we planned to perform CABG via a mid-line sternotomy, followed by CEA, in the awake patient. There were no intra-operative complications. Hb level, monitored by blood gases controls, maintained above 10 g/dl. The post-operative course was uneventful. In this patient, for the first time, a high-risk CABG procedure and a high-risk CEA were carried out simultaneously, in the awake setting. This approach represented a meeting point between surgical requirements and specific patient’s needs. We believe it could be a safe alternative management applicable to high risk candidates to combined carotid and coronary artery surgery, presenting with bleeding-related issues.

Keywords: Jehowa witness; Awake surgery; Coronary artery bypass; Carotid endarterectomy

1. Introduction

Appropriate therapy is not the only determinant of high quality care. The conformity to patient’s firm beliefs is also relevant [1].

Complex surgical procedures are associated with a major risk of peri-operative bleeding.

Jehova’s witnesses (JWs), necessitate a tailored strategy warranting the optimal surgical management, in observance to their religion principles [2].

The application in cardiac surgery of epidural anaesthesia [3,4] represents an appealing alternative, in order to meet patients’ requirements.

In this report, we present a JW female patient, who underwent coronary artery bypass grafting (CABG) and carotid endarterectomy (CEA), with neither endotracheal intubation nor general anaesthesia.

2. Clinical case

A 65-year-old JW female patient, with hypertension, hypercholesterolemia, and familiar history of ischemic heart disease, presented with atherosclerotic disease involving coronary arteries, supra-aortic branches and renal arteries.

Patient had previously undergone bilateral endarterectomy. Eco Duplex scanning evaluation showed a critical re-stenosis of the left internal carotid artery, requiring a re-operation on the left side. Brain magnetic resonance (MR) showed ischemic lesions on corona radiata and basal nuclei area.

Angiography documented a triple-vessel coronary artery disease, with moderate stenosis of the left main coronary artery and a critical stenosis of the right renal artery (80%). Left ventricle systolic function was slightly depressed (50% ejection fraction).

The patient, who referred a transient ischemic attack 6 months before, presented with angina at rest. Anti-platelet therapy was replaced by calciparine 10 days before surgery, because of persistent unstable angina. Hemoglobin (Hb) level at the admittance was 12.8 g/dl.

After an extensive evaluation, we planned to perform CABG via a mid-line sternotomy followed by CEA, in the
awake patient. The patient was affected by a triple-vessel disease. Because of the necessity to reduce as much as possible, the anemization related to the operation we decide to schedule the patient for an hybrid coronary procedure: a single CABG (left internal mammary artery on left anterior descending coronary artery), followed by percutaneous procedure on the left coronary vessels at a later date.

The evening before surgery, the epidural catheter was inserted at T2-T3 level and advanced 3 cm inside the thoracic epidural space and the sensory and motor block was assessed by a lidocaine test dose (1.5%, 3 ml).

On the day of surgery, the test dose was repeated. A light sedation and analgesia were achieved with infusion of remifentanyl (0.005 mcg/kg per min).

The epidural anesthesia was administered as a slow bolus (ropivacaine 1%, 6 ml + lidocaine 2%, 3 ml and fentanyl 50 mcg, 1 ml; total volume 10 ml). The somatosensory block level (T1-T8) was assessed by pin-prick test and temperature method at repeated intervals.

Neither analgesic nor other sedative medications have been administered during the whole procedure. Patient was conscious and co-operating. An O2 support by nasal prongs was maintained.

A complete median sternotomy was performed. A wide opening of the left pleura did not provoke any respiratory distress as reported by other authors [4]. Left internal mammary artery (LIMA) was dissected. Heparin (150 International Units IU/kg) was administered. The pericardium was opened and the left descending coronary artery (LAD) course identified. LAD was stabilized with Genzyme Immobilizer® (Genzyme Products, Fall River, MA) and incised. The anastomosis was performed on beating heart. At the end of the procedure, heparin was reversed with protamine. Sternotomy was closed. The whole procedure was optimally tolerated by the patient.

A closed blood cell-salvage circuit uninterruptedly connected to the patient (complying with GW patients necessary formalities) was precautionary at disposal in order to face up possible blood losses. Nevertheless both the intra-operative and post-operative blood losses were trivial.

During the CABG performance, the epidural anaesthesia was administered with repeated bolus of ropivacaine 0.25% (total 5 ml). The patient appeared comfortable and symptom-free. Neither hemodynamic instability nor neurologic impairment were recorded.

After completion of the cardiac surgery procedure, epidural anaesthesia was continued by elastomeric infusion (ropivacaine 0.1%, 250 mg with morphine 7 mg and saline solution 250 ml, at 5 ml/h infusion rate). Left deep cervical plexus block was achieved with 20 ml of ropivacaine 0.5%. Superficial plexus block was achieved with a solution of bupivacaine 0.25% and lidocaine 0.5%, by multiple subcutaneous infiltrations, in the convergence area between external jugular vein and posterior border of sternocleidomastoid muscle. After carotideal tripod exposure and isolation, systemic heparinization was re-established (5000 IU). The internal carotid artery was clamped and longitudinally incised at the level of the patch of the previous operation. Re-endarterectomy was performed, upon positioning of an endoluminal shunt, and arteriotomy was closed with a Gore-Tex patch. The carotid artery was declamped (carotid clamp time was 24 min) and cervicotomy closed, upon suction drainage placement.

There were no intra-operative complications. The patient left the operative room in stable hemodynamic conditions, calm and spontaneously breathing. Respiratory function was unimpaired during the whole procedure.

The post-operative course was uneventful. Protrombin time (PT) and PTT were assessed daily. Neurologic monitoring was repeated every 4-6 h. The epidural catheter was removed on the fourth post-operative day. Patient was discharged home on the VI post-operative day.

3. Discussion

In presence of coexisting critical carotid and coronary arteries disease, the policy currently adopted at our institution consists in treating both districts at one stage, under general anaesthesia. CEA is carried out first. Neck wound closure is delayed after completion of CABG and heparin reversal, to allow inspection of the CEA site avoiding neck hematoma. Finally, sternotomy and neck wound are closed at the same time.

Patients who do not necessitate urgent revascularization are scheduled for a multidisciplinary staged approach, possibly with prior percutaneous angioplasty and stenting of the carotid lesion. This is not applicable to unstable patients because of the necessity of a 1 month interval of anti-platelet therapy between the two procedures.

In patients with critical carotid stenoses, isolated CABG is associated with an increased risk of peri-operative cerebral adverse events. [5] In simultaneous coronary and carotid surgery, the conventional timing is justified by the protective effect of a prior CEA.

When feasible, coronary artery bypass surgery is performed on beating heart. Bleeding risk is reduced and a lower rate of post-operative stroke due to the avoidance of cardiopulmonary bypass (CPB) has also been reported [6].

In this report, we present a high risk surgical candidate with peculiar issues:

(1) The recurrence of angina at rest made the patient not suitable to a staged approach.
(2) The previous endarterectomy represented an adjunctive contraindication to an angioplasty procedure and, at the same time, was a risk factor for bleeding.
(3) Neurological symptoms imposed not to delay the carotid lesion treatment for the risk of stroke for isolated CABG.
(4) The refuse of the patient to blood and blood-products transfusion.
(5) A manifest preference for awake surgery expressed by the patient, due to a previous positive experience during first carotid surgery.

For these reasons, the traditional surgical timing was modified. In order to abolish the bleeding risk at the CEA site related to heparin administration, and to take advantage of the reduced neurological risk associated to beating heart technique, we decided to postpone...
the carotid procedure after off-pump CABG completion and heparin neutralization.

Conventional anaesthetic management was also abandoned. The reversal of the traditional timing required a strict neurological monitoring. The patient had already experienced an awake carotid surgery and felt comfortable with the procedure. In order to carefully monitor neurological status during CABG, we decided to perform the whole surgery without general anaesthesia and intubation. This approach allowed a constant neurologic monitoring both before and during CEA [7].

In adjunct, high thoracic epidural anaesthesia protects the heart by sympatholysis. Beneficial effects on perioperative stress response (reduced post-operative heart rate and lower plasma epinephrine levels), as well as on myocardial ischemia, have already been shown. Moreover neither cardiac output nor perfusion pressure are jeopardized [8].

As a result, patient anaemization, secondary to either intrathoracic and neck bleeding, was minimized. Hb levels, which were constantly monitored by repeated blood gases controls, maintained above 10 g/dl during the whole procedure.

The operative strategy adopted in this patient was innovative both for the surgical timing and the anaesthesiological management. High thoracic epidural anaesthesia has been recently introduced at our institution in association to general anaesthesia in selected coronary artery surgery. In this patient, for the first time, a high risk CABG procedure and a high risk CEA were carried out simultaneously, in the awake setting.

This approach represented a meeting point between surgical requirements and specific patient’s needs. We believe it could be a safe alternative management applicable to high risk candidates, presenting with bleeding-related issues.

References