CERVICAL PLEXUS BLOCK FOR CAROTID ENDARTERECTOMY FOLLOWED BY GENERAL ANESTHESIA FOR ABDOMINAL AORTIC SURGERY

- A Case Report -

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Abstract

The aim of this clinical report is to describe the use of sequential regional and general anesthesia for concomitant carotid and abdominal aortic surgery. We performed, in a 70-year-old man, a cervical plexus block for carotid endarterectomy (CEA) followed immediately by general anesthesia for resection of an abdominal aortic aneurysm. This anesthetic approach provided adequate surgical conditions. Intraoperative neurological status and cardiovascular parameters were stable and postoperative course was uneventful.

Sequential regional and general anesthesia may be an alternative to general anesthesia for concomitant carotid and abdominal aortic surgery. This approach offers an adequate neurological monitoring during the CEA phase of the combined surgery and the opportunity to postpone the aortic surgery should the CEA be associated with a non-reversible neurological deficit.

Key words: Cervical plexus block; carotid endarterectomy; abdominal aortic aneurysm; combined carotid and aortic surgery.

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Introduction

Combined carotid endarterectomy (CEA) and abdominal aortic surgery under general anesthesia has been reported in patients with coexisting severe carotid and aortic diseases[1,2,3]. However, CEA may be complicated by decreased brain perfusion during carotid clamping and by cerebral emboli related to plaque dislodgement[4]. These events could be undetected in patients under general anesthesia and aggravated when CEA is immediately followed by an abdominal aortic surgery.

Cervical plexus block is a regional anesthesia technique currently used for isolated CEA[5,6,7]. The advantages of regional anesthesia in carotid surgery are efficient neurological monitoring in awaken patient and avoidance of the routine use of an intra-luminal shunt. In an attempt to improve neurological monitoring in a patient undergoing combined CEA and resection of an abdominal aortic aneurysm, we report the use of a cervical plexus block for carotid surgery followed by general anesthesia for aortic surgery.

Case Report

A 70 year-old man weighing 100 kg with a history of diabetes, arterial hypertension and repeated transient ischemic attacks was admitted to Hotel Dieu de France hospital for further evaluation.

Detailed angiographic studies showed a 90% left internal carotid stenosis and an infrarenal aortic aneurysm with a diameter of 6 cm. Cardiac catheterization revealed no surgical coronary lesions and normal left ventricular wall motion with an ejection fraction of 50%. The patient was schedueld for combined left CEA and abdominal aortic aneurysm resection. The “combined” surgical approach was chosen by the medical team because of it’s feasibility and safety[1,2,3], and because it offer a single-stage treatment to the patient.

Regular medication, including atenolol and insulin, was continued up to the morning of surgery. Hydroxycine 1 mg/kg was given as premedication. Baseline heart rate and blood pressure were 65 beats/min

and 140/70 mmHg.

In the operating room, a 16-gauge peripheral venous line and a 20-gauge right radial arterial line were inserted under local anesthesia. Monitoring was completed with pulse oxymetry and continuous electrocardiography with a multi-lead dual-channel oscilloscope and computerized ST-segment analysis.

A left deep and superficial cervical plexus block was performed by using a total of 30 mL of 1.5% lidocaine. To perform the deep cervical plexus block, the transverse processes of C2, C3 and C4 were located by drawing a line from the mastoid to the tubercle of Chassaignac and moving down the line 2 cm for each transverse process. Two-inch needles were placed at these processes and 7 ml of lidocaine solution were injected in each needle to block C2, C3 and C4 nerve roots. The superficial cervical plexus was anesthetized along the posterior border of the sternocleidomastoid muscle with 10 ml of the same local anesthetic solution.

The patient was breathing spontaneously with oxygen delivered by a nasal probe. The left carotid artery was exposed and a clamping test procedure showed good tolerance with no changes in mental status or motor response. Carotid endarterectomy was completed without an intra-luminal shunt.

During the 70-min surgical procedure the patient received 2 mg of midazolam and was fully cooperative. His neurological status, determined by continuous observation of his responsiveness and motor ability, stayed normal. Arterial blood pressure, heart rate and ST-segment changes remained within 10% of their initial values.

Immediately after the end of carotid endarterectomy, general anesthesia was induced with etomidate 0.3 mg/kg, fentanyl 2μg/kg and pancuronium 0.1 mg/kg. The trachea was intubated and the patient was mechanically ventilated. A pulmonary artery catheter was placed via the right internal jugular vein. A bladder catheter and a rectal temperature probe were inserted. Anesthesia was maintained with an intravenous infusion of midazolam 0.1 mg/kg and fentanyl 2 μg/kg per hour.

The surgical exposure technique was median laparotomy. Aortic repair was achieved by resection of the aneurysm and placement of a bifurcated prosthetic graft. The duration of aortic clamping was 75 min. Hemodynamic parameters and urine output were kept within normal limits by fluid loading and vasoactive drugs. No neurological monitoring was available during the aortic phase of the combined surgery.

At the end of the surgical procedure, the patient was admitted to the ICU. He was weaned from mechanical ventilation and the trachea was extubated during the following four hours. Physical examination revealed an intact neurological status. Postoperatively the patient had no surgical, cardiac or neurological complications. He was discharged from the ICU on the second postoperative day and from the hospital on the tenth day.

Discussion

The use of regional anesthesia for CEA followed immediately by general anesthesia for cardiac surgery has been cited in a single case report[8]. This sequential anesthesia approach has not been previously described for combined CEA and major abdominal aortic surgery. In our case, the sequential use of cervical block and general anesthesia for concomitant CEA and aortic aneurysm resection was successful and well tolerated by the patient. It also provided adequate surgical conditions, hemodynamic stability and efficient neurological monitoring during the CEA phase of the combined surgery.

Several studies cited the value of direct assessment of central nervous system function and the ability to determine the need for intra-luminal shunting as major advantages of regional anesthesia for CEA[6,7]. Although neurological function under general anesthesia can be monitored by such methods as electroencephalogram, somatosensory evoked potentials and transcranial Doppler ultrasound[9,10], these techniques are not always available and direct evaluation of neurological function in awake patients is a reliable alternative. Even more, a conscious patient during CEA allows the surgeon to assess the need of an intra-luminal shunting. Placement of shunts has associated morbidity and

also may make removal of the carotid plaque more difficult[11].

Although large carotid surgery trials did not show an effect of regional anesthesia on outcomes, these trials did not include patients with combined carotid and major vascular surgery[12]. Patients undergoing concomitant CEA and abdominal aortic surgery are still at risk of perioperative neurological complications[1,13]. If both surgical procedures are achieved under general anesthesia, a neurological insult during carotid surgery may be undetected and aggravated by the hemodynamic and metabolic modifications during aortic surgery. The sequential anesthesia approach described in this case provides the opportunity to postpone the aortic surgery should the CEA be associated with a non- reversible neurological deficit or other unexpected complications.

The anesthesia approach for combined CEA and abdominal aortic surgery described in this case carried some risks. First, carotid surgery under regional anesthesia may be associated with anxiety or residual pain. These conditions increase myocardial oxygen consumption and may lead to cardiac ischemia in patients with severe coronary stenosis. Second, deep cervical plexus block may be complicated by a hematoma of the neck and by an intravascular or intrathecal injection of the local anesthetic[14]. None of these complications was observed in our patient. Third, the patient was kept awake during CEA, but there was no follow-up neurological monitoring during aortic surgery where neurological deterioration could have happened. If somatosensory evoked potentials or transcranial Doppler ultrasound were used from the beginning, the patient would have been neurologically monitored for both procedures. Unfortunately, these techniques are not available in our institution.

In conclusion, the combination of cervical plexus block for carotid surgery followed by general anesthesia for aortic surgery was safe and efficient in a patient undergoing concomitant CEA and abdominal aortic aneurysm resection. This sequential anesthesia approach may be an interesting alternative to general anesthesia, allowing better neurological monitoring in patients with severe carotid and aortic diseases and providing the opportunity to postpone the aortic surgery should the CEA be associated with a non-reversible neurological deficit. Larger studies

are needed to identify the disadvantages and the benefits of sequential regional and general anesthesia for combined carotid and abdominal aortic surgery.

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