CARDIAC SURGERY

TAKAYASU'S ARTERITIS AND CARDIAC SURGERY: AN ANAESTHETIC CHALLENGE

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Abstract

Takayasu's arteritis (TA) is a rare inflammatory vascular disease, which causes a chronic progressive pan-endarteritis involving the aorta and its main branches, leading to persistent and uncontrolled hypertension and symptoms related to ischemia such as claudication, visual disturbances, stroke and transient ischemic attack. Limited information is available concerning anaesthetic management. We present the successful anaesthetic management of a 55 years old woman with TA scheduled for mitral valve replacement, tricuspid valve annuloplasty and coronary artery bypass grafting (CABG). The choice of anaesthetic technique took into consideration mainly the maintenance of blood pressure in the intraoperative and postoperative periods. According to our monitoring records, we can say that our choice enabled a safe and stable anaesthetic procedure.

INTRODUCTION

Atrioventricular septal defects (AVSD) are a group of commTakayasu's arteritis (TA) is a rare inflammatory vascular disease, with a specific preference for young Asian women.^{1,2} It is a chronic progressive pan-endarteritis involving the aorta and its main branches, leading to a varying degree of narrowing, occlusion, or dilatation.^{3,4} The involvement of the principal arteries results in persistent and uncontrolled hypertension and symptoms related to ischemia such as claudication, visual disturbances, stroke and transient ischemic attack.⁵⁻⁷ There may also be difficulties in the monitoring of arterial blood pressure, blood pressure difference > 30 mm Hg between arms, asymmetric pulses and diminished/absent pulses in upper extremities.^{6,7} TA is also known as aortic arch syndrome, pulseless disease, occlusive thromboaortopathy, young female arteritis, idiopathic aortitis, reversed coarctation, and Martorell syndrome.^{1,6} Clinical and pathological studies on TA resulted in the classification of four different types of arterial lesions, depending on the vascular branches affected.⁸ Diagnosis is confirmed by angiography showing stenosis and dilatation of the aorta and its branches.⁶ The aetiology of this disease has not been defined.⁹

The involvement of the vascular system results in multiorgan dysfunction. These multiorgan dysfunctions, associated with severe uncontrolled hypertension and stenosis of major blood vessels¹, makes anaesthesia for patients with TA complicated. Furthermore, surgery on these patients are also a challenge. Surgical procedures for TA are recommended at a time of quiescent disease to avoid complications such as increased bleeding, friable tissue, increased risk of thrombosis and infection.⁹

Limited information is available concerning anaesthetic management. Previous descriptions of the anaesthetic management of patients with this disease have been limited to isolated case reports in the anaesthetic literature, mostly in women undergoing cesarean delivery.³

We present the successful anaesthetic management of a 55 years old woman with TA scheduled for mitral valve replacement, tricuspid valve annuloplasty and coronary artery bypass grafting (CABG).

CASE REPORT

Female patient, 55 years old, 50kg, proposed for complex cardiothoracic surgery. The patient was being studied for suspected TA, presenting with occlusive thromboaortopathy of several thoracic and abdominal aortic vessels. Additionally, the patient was a heavy smoker and presented Chronic Obstructive Pulmonary Disease (COPD), dyslipidemia, osteoporosis and pancreatic atrophy. The patient was under treatment with lepicortinol, dipeptidyl peptidase iv inhibitor, furosemide, acetylsalicylic acid and salbutamol.

The pre-operative evaluation revealed mitral murmur grade IV/VI on cardiac auscultation and cardiac insufficiency class III New York Heart Association (NYHA). Pre-operative exams showed: severe rheumatic mitral valvulopathy; 40% stenosis on right carotid artery and 50-70% on left carotid artery; 40% stenosis of Anterior





Figure 1

Toracic CT showing occlusion of the left subclavian.

descending artery, 40-50% stenosis of circumflex artery, 75% ostial stenosis of right coronary artery with 75% ostial stenosis; occlusion of the brachiocephalic trunk, occlusion of the left subclavian (figure 1), infra-renal aorta with diffuse atheromatous and right common iliac artery with 90% stenosis in the middle portion. The patient also revealed moderate obstructive ventilatory changes on spirometry. No other relevant findings were discovered.

At the pre-induction period, the patient's blood pressure differential between superior and inferior limbs was meaningful (45% to 70% higher in the inferior limbs).

It was decided to use the right femoral artery for the arterial catheterization for invasive arterial pressure monitoring, since superior limbs where not an option due to the marked blood pressure differential and left femoral artery could be a surgical option. Standard ASA (American Society of Anaesthesiologists) monitoring was used, alongside with invasive arterial monitoring, central venous pressure monitoring, cerebral oximetry (INVOS[®]) and anaesthesia-depth monitoring (Bispectral index – BIS[®]).

The induction was achieved with fentanil, 0.2mg ev, midazolam ev 10mg, propofol 50mg and rocuronium 50mg. The patient maintained hemodynamic stability during induction. Maintenance of anaesthesia was achieved with remifentanil and propofol perfusion during the extra-corporal circulation period and desflurane throughout the rest of the time. The surgical procedure involving mitral valve replacement, tricuspid valve annuloplasty and CABG was performed with cardioplegia and extra-corporal circulation (during 2 hours and 7 minutes). The hemodynamic, respiratory and renal function were adequately regulated throughout the surgery. The hydric balance was 1.586,18 ml and the urinary output was 5.4 ml/kg/h with no need for diuretics. There was the need for intravenous doses of nitroglycerine, norepinephrine and dobutamine, according to invasive arterial monitoring (figure 2) and cerebral oximetry values.

The patient required intravenous dobutamine at a dose of 0.4 mcg/kg/hour on the first day. The patient was extubated on the 1st postoperative day and stayed three days in the intensive care unit.

Despite no pre-operative renal disease and remaining stable throughout the perioperative period, the patient revealed acute renal failure, needing hemofiltration until the fifth day post-op (PO). The patient was still in the hospital at the time the article was written, due to surgical complications, including mitral regurgitation and endocarditis. Nevertheless, the patient is progressing well. The patient continued her usual medical treatment and her clinical and angiographic studies maintained stable. During the perioperative period, the patient complied with the corticosteroid replacement protocol and re-started her usual dosage as soon as possible.

DISCUSSION

We report the anaesthetic management of a patient with Takayasu arteritis.

Patients with Takayasu's arteritis show a chronic progressive pan-endarteritis involving the aorta and its main branches. This patient suffered from severe hypertension and organ ischemia.

The surgery should be deferred during the active phase of the disease to avoid complications. We cannot assure that the post-operative endocarditis and acute renal failure were not related to a less controlled disease



than we concluded with preoperative assessment. Furthermore, although we could not find in the literature any correlation between TA and an higher incidence of endocarditis, this patient had several risks factors for developing an infectious endocarditis, such as: mitral valve disease, arterial hypertension and corticoid therapy.¹⁰

Surgery for TA has also a higher risk of bleeding and thrombosis associated with the surgical interventions if performed in an active phase. Additionally, surgical treatment is reported to be more challenging in these patients due to the diffuse nature of the disease and involvement of adjacent aortic walls.

General anaesthesia may be associated with hypertensive episodes that can lead to cerebral haemorrhage and infarction or cardiac dysfunction in a patient with TA. Cerebrovascular ischemia occurs in about one-third of the patients and hence maintenance of cerebral perfusion pressure is of greatest importance, not allowing the values of cerebral oximetry to be less than 50% or decrease more than 20% of the basal. Consequently, the anaesthetic management of these patients has the primary goal of maintaining adequate tissue perfusion and hemodynamic stability. Therefore, it is essential to keep a proper monitoring of arterial pressure and oximetry, including cerebral oximetry. Accurate blood pressure is always a cause for concern for the anaesthetist, even more, if the patient has TA. The choice of artery regarding invasive arterial lines is still controversial. In this case, the vessels of the lower limbs were not affected and, due to this fact and the possible need for surgical access to the left femoral artery, the femoral artery was chosen.

The choice of anaesthetic technique took into consideration all these characteristics, mainly the maintenance of blood pressure in the intraoperative and postoperative periods. Despite few complications on the post-operative period, nothing indicated their relationship with anesthetic technique. According to our monitoring records, we are able to say that our choice enabled a safe and stable anesthetic procedure.

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