

## Case Report

# Takayasu Arteritis, Pregnancy and Delivery: Case Report

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### ABSTRACT

Takayasu arteritis (TA) is a rare chronic inflammatory disease affecting major arterial vessels, the aorta and its branches, as well as peripheral blood vessels. Due to numerous cardiovascular complications, the best management for pregnant patients with TA is controversial and challenging for the anesthesiologist and obstetrician.

In this case report, we describe a 24-year-old primigravida diagnosed with TA. The patient was admitted to our hospital at 29 weeks of pregnancy complaining of our breathlessness, dyspnea, palpitations and fatigue. Upon

physical examination, and following electrocardiogram (EKG), chest X-ray and cardiac ultrasound analyses, the patient was diagnosed with heart failure with preserved left-ventricular ejection fraction (HF-PEF). After a two-week treatment, due to a high risk of cardiac and pulmonary complications, we performed a cesarean section (CS) under general anesthesia (GA).

Patient evaluation, determining the optimal time and mode of delivery and anesthetic planning are essential to ensure a successful outcome in pregnant patients with Takayasu arteritis.

**KEY WORDS:** anesthesia, heart failure, pregnancy, Takayasu arteritis

### INTRODUCTION

TA is a rare inflammatory disease which is far more prevalent in women than in men (8:1)<sup>[1-2]</sup>. The incidence of this disease was found to be the lowest in northern Europe (1.26 cases per million), while the highest incidence was found to be in Asians countries, especially in Japan (1 case in every 3000 autopsies)<sup>[2-3]</sup>.

Panarteritis associated with Takayasu's disease can lead to numerous cardiovascular complications, especially when it is associated with pregnancy. The aim of this case report was to describe the management of pregnant patients with TA and its influence on anesthetic technique.

### CASE REPORT

The patient was a 24-year-old female (60 kg and 162 cm), first pregnancy, with a history of hypertension

since the age of 17, when the diagnosis of TA affecting the major branches of the aortic arch was initially made.

At 11 weeks of pregnancy, severe hypertension was diagnosed, with a 30 mmHg difference in blood pressure (BP) between the left and the right arm (200/120 mmHg and 170/100 mmHg). The patient was started on methyldopa and bisoprolol to control her BP. She also received prednisolone, aspirin and nadroparin.

At 29 weeks of pregnancy, the patient was admitted to the hospital complaining of breathlessness, dyspnea, palpitations and fatigue. She had tachycardia at a rate of 125/min, with a systolic murmur over the aorta, without peripheral edema. The murmur was audible over both carotids and both subclavian arteries.

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Ultrasonography revealed thickening of the left ventricular wall, left ventricular mass index (LVMI) of 131.48 with normal endocavitary dimensions, mitral regurgitation 1+, moderately dilated left atrium, left atrial volume (LAV) of 63 ml; LAV index of 37.8 ml/m<sup>2</sup>, moderate LV diastolic dysfunction of the left ventricle with preserved contractility (LVEF - 63%). There were no changes in the right side of the heart and pleural effusion on the left side.

Chest X-ray showed bilateral infiltrative changes, and functional tests suggested severe bronchial obstruction, forced expiratory volume in 1 second (FEV<sub>1</sub>) - 44.4%. A diagnosis of bronchial asthma was suspected.

Biochemical blood analyses showed significantly elevated levels of N-terminal pro brain natriuretic peptide (NTproBNP), 1898 pg/ml, C-reactive protein (CRP) of 23.7. Leukocyte count and other laboratory values were within normal limits.

Control duplex scan of carotid arteries showed moderately worse scores compared with records at 11 weeks of pregnancy. Diffuse concentric thickening of the intima and media arteria carotis communis (ACC) and arteria carotis interna (ACI) was noted bilaterally, with the most severe stenosis of 65 - 70% on the left ACI. On the left subclavian artery, stenosis was detected with pressure gradient of 30 mmHg. The neurological exam was normal.

Diuretics (furosemide) were added as well as aminophylline and berodual spray for antiobstructive therapy. Bisoprolol was replaced with verapamil hydrochloride.

After two weeks, the patient's clinical condition improved. Due to the high risk of cardiac and pulmonary complications in the advanced stages of pregnancy, we made a decision to perform a CS.

Initially, the delivery was planned under epidural anesthesia (EA). Since the procedure was unsuccessful (we could not identify the epidural space), we reassessed our decision.

Considering that our patient was treated with low molecular weight heparin (nadroparin 0.3 ml/24 hours - 2850 IU) in the last 16 days until 12 hours before surgery, we could not insist on EA, since there was a risk of a haematoma developing. We decided to continue the procedure under GA.

Ranitidine and metoclopramide were administered 30 minutes prior to anesthesia and the patient was preloaded with 500ml Ringer's solution. Anesthesia was induced with propofol (2.5 mg/kg) and rocuronium (0.5 mg/kg) without succinylcholine. During the intubation, the head was kept in a neutral position to prevent blood vessel extension and cerebrovascular complications. Standard monitoring (5-lead electrocardiogram) non-

invasive blood pressure (NIBP), capnography, pulse oximetry and left lateral position were used. During the anesthesia induction, blood pressure decreased from 160/90 mmHg to 140/80 mmHg. Mean arterial pressure (MAP) during the operation ranged from 90 to 115 mmHg. The left and right arm pressure difference was 15 mmHg. During the CS, the patient was given 1500 ml crystalloid. A male infant was delivered, with an Apgar score of 5/6. Oxytocin was given intravenously, a slow bolus of 5 units followed by an infusion of 10 units. After the CS, she received 11 units of erythrocyte resuspension. She was stable in the postoperative period and was discharged 5 days after the delivery.

## DISCUSSION

TA symptoms depend on the distributions of lesions and presence of complications. The four major complications are hypertension, retinopathy, aneurism formation and aortic regurgitation. Depending on the presence of these complications, the disease can be classified into four stages: Stage I - none of these complications are observed; Stage IIa - patient has only one of these complications in a mild form; Stage IIb - patient has only one of these complications, but in a severe form; Stage III - more than one complication is present<sup>[2,4-5]</sup>.

Our patient was classified as having stage IIb. Pregnancy does not interfere with disease progression but may cause exacerbation of complications of the disease<sup>[2,4]</sup>.

Hypertension is the most common complication in patients with TA (33 - 83%)<sup>[4-5]</sup>. It results from reduced elasticity, thickening, fibrosis and vascular occlusion, abnormal function of carotid and aortic baroreceptors, or renovascular changes<sup>[4]</sup>. Advanced pregnancy is associated with an increase in intravascular volume (40 - 50%), and cardiac output (30 - 40%). These changes in patients with TA can lead to elevated systemic vascular resistance (SVR), exacerbation of hypertension and cerebrovascular hemorrhage<sup>[5-6]</sup>. High incidence of restricted intrauterine fetal growth (19.7%), abortions (12.4%) and fetal deaths (8.2%) seem to be related to uncontrolled hypertension and aorta and iliac arteries involvement<sup>[7]</sup>.

Heart failure (HF), occurring in 3.9% of all cases, commonly occurs secondary to unregulated hypertension<sup>[6-7]</sup>. It can also occur if the changes affect coronary arteries, the endocardium or cardiac muscle. Our patient presented us with a dilemma: did she have primary HF or respiratory failure associated with bronchial asthma. Following the criteria for the diagnosis of HF symptoms and signs of the disease, ultrasound changes and significantly elevated values

of NTproBNP, we made a diagnosis of HF with preserved ejection fraction<sup>[8]</sup>.

Delivering the infant in patients with TA should be carefully planned. Vaginal delivery is preferred for patients in stages I and IIa<sup>[2]</sup>. It should be done under epidural analgesia to reduce catecholamine response to stress.

Operative delivery is preferred for patients with specific obstetric indications and those with advanced complications (stages IIb and III)<sup>[1]</sup>. Uncontrolled hypertension is the most common indication for CS<sup>[5]</sup>.

The choice of anesthetic technique depends on each individual case. Regional anesthesia (epidural and combined spinal-epidural anesthesia) for labor and delivery may be advantageous in these patients because of reduced after load and less fluctuation in CO. Consciousness is the best monitoring of cerebral blood flow. Spinal anesthesia should be avoided due to a risk of developing hypotension.

GA involves intubation and extubation, which may be associated with hemodynamic instability and a higher risk of cerebrovascular incidents. MAP should be maintained within +/- 20% of preoperative values<sup>[1]</sup>. Cerebral blood flow in TA patients is often not correlated with MAP values, so the use of electroencephalogram or transcranial doppler is recommended during GA (not available at our clinic)<sup>[2]</sup>. NIBP monitoring is preferred due to a risk of developing complications at the point of blood vessel puncture. Furthermore, BP should regularly be monitored in both arms. BP difference between the left and right arm higher than 15 – 20 mmHg is highly associated with subclavian stenosis. Proximal stenosis can lead to “subclavian steal syndrome” and symptoms of vertebra-basilar insufficiency<sup>[9]</sup>.

The use of invasive haemodynamic monitoring depends on the patient’s condition, planned operative procedure and typical practice at the institution

where the operation is performed. Fluid resuscitation in patients with HF should be monitored using echocardiography or a central venous catheter<sup>[5]</sup>.

## CONCLUSION

Patient evaluation, determining the optimal time and mode of delivery, and anesthetic planning are essential to ensure a successful outcome in pregnant patients with Takayasu arteritis.

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