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The outcome of pregnancy in a woman affected by Takayasu arteritis: case report and review of literature

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Summary

Takayasu arteritis (TA) is a chronic non-specific inflammatory vascular disease, of which the cause is not very clear. The disease is more severe in females. Furthermore, during the entire pregnancy, it is of great harm to the mother and child. The formation of blood clots is harmful to the mother and thrombosis is dangerous to the fetus and can lead to its death. Hence, prevention with control of perioperative hemodynamic changes during the pregnancy is an effective method to prevent heart failure, embolism, and thrombosis.

Key words: Takayasu arteritis; Vascular disease; Pregnancy; Fetal death.

Introduction

Idiopathic inflammation of the main arteries (aorta, pulmonary, and coronary) leads to progressive and often occlusive inflammation. Hence, it also known as Takayasu arteritis (TA), pulseless disease, or obliterative inflammation. The cause is not very clear and it often occurred in females. The average age of this disease is about 22 years old. Disease prognosis is poor and the risk during pregnancy is high. The present hospital successfully treated a pregnancy with TA as well as term delivery.

Case Report

This study was conducted in accordance with the declaration of Helsinki and with approval from the Ethics Committee of Capital Medical University Affiliated Beijing Friendship Hospital. Written informed consent was also obtained from the patient. The patient is 27-years-old and her condition during pregnancy is as follows. She had regular menstrual cycles of 7 days / 30 days. The urine HCG test was positive after 40 days of amenorrhea. At six weeks of pregnancy nausea and vomiting occurred. The pregnancy then continued normally; however, upper limb blood pressure could not be determined during pregnancy and lower limb blood pressure is normal. No headache, nausea, and other discomfort, occasional dizziness, fatigue, abdominal pain, vaginal bleeding, and vaginal fluid flow were present in the third trimester of pregnancy. Therefore, the patient was referred to the present hospital. *Past medical history:* suffering from TA since 2000, from optic atrophy since 2003, and had had eye cataract surgery with intraocular lens replacement surgery in 2004. *Obstetrical history:* 27-years-old married, gravida 2 para 2, and drug abortion one time in February 2010. *Admission examination:* body temperature: 36.5°C, pulse: not palpable, breathing: 20 beats / min, blood pressure: 120/80 mmHg (lower limbs), lung breath sounded clear, heart rate of 95 beats / min, aortic valve area and apical with 3 /6 diastolic murmur. *Obstetric ultrasound examination:* Examination of the uterus and pelvis revealed no abnormalities, with cephalic position, and with a fetal heart rate of 150 beats 7 min. and BPD = 8.7 cm, FL = 7.2 cm, AC = 32.5 cm, HC = 30.1cm, and estimated fetal weight of 2,833 g + 414 g. *Echocardiography:* EF value of 0.60, left atrium slightly increased, left ventricular wall was thickened, the systolic pulmonary valve activity was rapid. Lower extremity artery ultrasound suggested: lower limbs arterial intimal thickening, together with the clinical history, TA was diagnosed. *Double venous ultrasound:* suggested double deep venous blood flow, deep vein valve function properly. Previous ophthalmic consultation revealed: double cornea still clear, no light reflex, pupils less clear, optic nerve pale, and capillaries were less clear. **Cerebral artery blood flow:** All the cerebral arteries were abnormal, with stenosis, pulsatility was decreased, and modifications of the flow with irregular contractions cesarean section was therefore decided after combined spinal epidural anesthesia. The dorsalis pedis artery catheter was used for monitoring the blood pressure. The newborn was healthy. Intraoperative blood pressure fluctuations in the 80-150 /40-75 mmHg. Intravenous norepinephrine static was used to maintain blood pressure. Although blood pressure was stable, the patient was kept in ICU for observation. Postoperative recovery was without any septic complications. The patient had normal blood pressure and body temperature. The patient was then discharged.

Discussion

TA is a chronic non-specific inflammatory disease, mainly affecting the aorta and its main branches, such as the brachiocephalic trunk, carotid, vertebral, renal, coronary, and pulmonary arteries [1, 2].

Epidemiology

The disease is more common in Asia, Latin America, North America, and in Europe. The annual incidence rate of

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this disease is 1.2 to 2.6 per million [3]. The disease occurs in women of childbearing age, but in recent years the incidence in male has increased. Male to female ratio is approximately 1:8, with an average age of diagnosis at 29 years of age. Infants and young children to middle-aged patients have also been reported. Furthermore, three out of four patients experience the onset during their adolescence [4, 5].

Etiology and pathogenesis

The etiology and pathogenesis of TA is unclear and involves heredity, infection, cellular and humoral immune mechanism, sex hormones and other factors. At present, genetic factors, immune mechanisms, and infection are object of study. TA is related to other inflammatory disease may be due to the following: Firstly, there are common or related antigens between TA and other inflammatory diseases. Secondly, inflammatory disease may stimulate the immune system therefore leading to an autoimmune mechanism. Thirdly, inflammation may directly damage blood vessels and produce auto-antigen. TA and other coexisting autoimmune diseases indicate that the immune system is abnormal: its unbalance caused by bacteria or viral infection may be accompanied by the morbidity and progress of TA [6].

Clinical characteristics and classification

The clinical feature of TA is not obvious. From the onset of symptoms to the clinical diagnosis, several months or even years on average may be required. More than half of patients suffer from systemic inflammation at first instance, such as fever, dizziness, fatigue, night sweats, and weight loss. After ruling out infections and tumoral diseases, TA should be considered in young women who have an unexplained fever. Earlier diagnosis is difficult, because the early symptoms of TA are non-specific [7]. As the illness progresses, the lesions begin to block blood vessels that cause organ problems and many clinical manifestations such as dizziness, headache, dizziness, fainting, vision loss, hemiplegia, aphasia, tachycardia, vascular murmur, myocardial ischemia, kidney disease, and other manifestations [8]. Not being able to assess the upper pulse, 50% ~ 60% of patients complicate with hypertension. One of the main complications is congestive heart failure, which accounts for about 28%. It is mainly induced by high blood pressure and in few cases it is caused by aortic regurgitation. Angina pectoris or myocardial infarction can appear if the coronary artery is involved. Proximal pulmonary involvement may have similar symptoms as pulmonary embolism. As a late complication, pulmonary hypertension is one of the factors influencing the prognosis [9]. According to clinical manifestations, TA can be divided into five groups [10]: Type I: cerebral ischemic type; Type II: hypertensive type; Type III: limb ischemic type; Type IV: aneurysm type; Type V: cardiopulmonary vascular and visceral vascular type.

The early pathology of TA mainly include active granulomatous inflammation of artery and its branches, and intimal hyperplasia, degeneration in the middle membrane, and fibrosis in the outer membrane occurs in its late stage (hardening) which will result in the occlusion of the aorta and other affected arteries; 85% ~ 96% patients suffering from TA are at the hardening stage after diagnosis. Ischemic symptoms of upper limb are common, but symptoms due to lower limb ischemia are few. Differential blood pressure of bilateral limbs is more than four kPa in the majority of patients. These patients suffer from orthostatic dizziness or fainting. Carotid artery is involved in about a quarter of the patients with retinal disease.

Diagnoses

The diagnosis of TA is mainly based on clinical symptoms, signs, laboratory examination, and radiographic inspection.

The circulating endothelial cells in the blood tested by serological examination can be used as indicator of the active stage. They have good correlations with the blood sedimentation [11]. The rapidly increasing white blood cells and platelets, mild anemia, CRP or ESR may emerge during the acute phase, which is normal in the silent period. IgG, IgM, and aortic antibodies may be increased in some patients, but the specificity of the relationship between these factors and TA is not strong, hence the diagnostic value is insufficient [8].

Currently, angiography is recognized as the gold standard in the diagnosis of TA. Typical angiographic aspects include unsmooth lining surface of the aorta and its branches, expansion after stenosis, aneurysm, artery occlusion or "shape like rat tail" of the thoracic aorta. The comparison of several non-invasive tests showed that ultrasonic, MRI, CT vessel three-dimensional reconstruction can detect thickness changes in the vessels' wall during the early stage of TA. The combination of the angiography and the aforementioned can be found as early-stage TA lesions [12].

Therapies

Early stage of TA, hormone is preferred as the drug treatment. Japan's recommendation is the combined utilization of hormone and small doses of antiplatelet drugs such as aspirin, etc. [1]. The therapy of high-dose glucocorticoid has been approved which can obviously improve systemic symptom, prevent the progress of TA in its systemic inflammatory phase, and reduce blood sedimentation.

The patients with side-effects to hormone therapy also require to immune inhibitors. Cyclophosphamide is effective for some patients. Small doses of methotrexate (about 0.3 mg/kg, once a week) can increase the curative effect of hormone and reduce the dose used of the latter [2]. Preventing infection is conducive to controlling the disease if early infection lesions are found in respiratory system or

other parts of body. Although medications successfully improved symptoms in the majority of patients, more study is required to assess whether long-term complications can be prevented or if survival can be prolonged.

The indications include high blood pressure caused by renal vascular stenosis, patients who cannot take care of themselves on a daily basis due to motor dysfunction, cerebral ischemia, aortic regurgitation, and myocardial ischemia [7]. In recent years, percutaneous transluminal angioplasty (PTA) has been attempted to treat the obstructive vasculopathy of TA. Tyagi *et al.* have treated aortic stenosis with PTA. The pressure gradient of the narrow parts of the vessel and the high blood pressure decreases after the period of expansion in 94% patients. Symptoms are significantly improved in patients successfully treated.

The following aspects should be considered: Firstly, the blood pressure must be closely monitored. If the blood pressure of the brachial artery in patients cannot be measured, the popliteal artery should be utilized. Blood oxygen and ECG should be monitored contemporarily. Secondly, appropriate low epidural block should be adopted. The dosage of local anesthetics should be reduced as much as possible, but effective anesthesia still needs to be achieved because both pain and contractions could stimulate vasospasm. After childbirth, the blood flows to the internal viscera due to reduced abdominal pressure; if returned blood volume decreased dramatically, the blood supply of important organs may be compromised and can lead to loss of consciousness or heart failure. Therefore, it is important to maintain stable blood pressure, avoiding large fluctuations. Thirdly, dexamethasone needs to be preventatively used to strengthen the symptomatic treatment of arterial inflammation. Drugs which can cause the blood vessels to constrict should be avoided. Oxytocin should be directly injected to the corpus uteri and the intravenous route must be avoided. Vaginal delivery is difficult and the cesarean section should be adopted to effect the delivery.

Because the arterial intima involved in these patients often show diffuse or localized thickening, hardening, and rigidity, their lumens include different degrees of narrowing, also according to pathological changes. Thrombosis can easily occur and induce embolism due to the high coagulative properties of blood during later pregnancy; hence all types of embolisms should be considered.

If antibiotics are used to prevent infection after the surgery, breastfeeding after delivery is unfavorable.

Pregnancy is contraindicated in TA patients due to associated serious complications. In this study, the patient had a strong desire to become pregnant and therefore refused its termination. Therefore the full-term pregnancy was maintained under strict monitoring. Natural childbirth was obviously not suitable. In addition, at 36-37 weeks, the cervical conditions and cardiac function of patient were poor, and the success rate of induced labor was low. Strong uterine contractions and pain could have caused vasoconstriction and aggravated the illness. Therefore a cesarean section is relatively safe for both mother and baby.

As the number of reported cases as the present are few, more obstetric experience needs to be attained in order to more effectively treat this vascular disease.

Conclusion

TA is a severe vascular disease. The patients with this kind of disease are advised against pregnancy as it can seriously affect both mother and child. For the patient who insists on pregnancy, precautions should be taken to intensify mother and fetal care throughout pregnancy and perioperative hemodynamic changes should also be assessed; these are effective methods to prevent heart failure, embolism, and thrombosis.

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