Chronic type B aortic dissection in a pregnant patient managed by simultaneous thoracic endovascular aortic repair and cesarean section in the hybrid operating room

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We present the case of a 50-year-old gravida with a chronic Stanford type B aortic dissection with false lumen aneurysm and discuss a literature-based treatment strategy. She underwent oocyte donation in the United States and was seen in week 15 of gestation. We chose a strategy of "watchful waiting" at a constant aortic diameter of 52 mm on magnetic resonance imaging. In week 32 + 6 days, cesarean delivery was induced in a hybrid operating room with subsequent thoracic endovascular aortic repair to reduce the risk of early dilation and rupture during the nursing period. One year later, she cared for her healthy baby with stable aortic diameters. (J Vasc Surg Cases 2016;2:25-7.)

Stanford type B aortic dissection (TBAD) in pregnant women is rare; 50% of aortic dissections afflicting women younger than 40 years are pregnancy associated.[1-4] The International Registry of Acute Aortic Dissection reported a 0.2% risk of TBAD during pregnancy and the peripartum period, particularly in the third trimester and post partum. In general, aortic dissection is more common in connective tissue disease or as the result of trauma. TBAD accounts for a minority of these cases (11%-21%).[2] Chronic aortic dissection in pregnant women has not yet been reported, and current guidelines for the treatment of aortic dissection do not provide recommendations for this challenging clinical situation.[5] According to these guidelines, thoracic endovascular aortic repair (TEVAR) is indicated for false lumen aneurysm with a maximum diameter of 55 mm or more. Increased risks of aneurysmal dilation and arterial rupture during pregnancy are well known.[6] We therefore anticipated an increase of these risks in chronic TBAD and pregnancy because of the hemodynamic and endocrine changes during pregnancy and the lactation period. The patient consented to publication of the report.

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CASE REPORT

We saw the 50-year-old gravida (3, para: 2) in week 15 of her gestation with a known chronic TBAD of hypertensive origin from the left subclavian artery to the common iliac artery with a false lumen aneurysm of 52 mm (Figs 1 and 2). A connective tissue disorder (Marfan syndrome, Loeys-Dietz syndrome, and familial aortic aneurysm) had been excluded through genetic testing. The medical history included arterial hypertension, obesity (body mass index, 38.3), and stent grafting of the right renal artery for dissection-related renal malperfusion. On that occasion in 2008, the TBAD was first identified. In 2013, 6 months before delivery, false lumen dilation was noted with aneurysmal dilation of 4.9 cm. Because of the high risk of pregnancy-related complications, the regional ethics committee had advised against pregnancy. After unsuccessful attempts of in vitro fertilization and intracytoplasmic sperm injection, the patient became pregnant as a result of oocyte donation despite this recommendation.

An interdisciplinary team of vascular surgeons, obstetricians, neonatologists, and anesthesiologists discussed the case, and to best balance and reduce the risks of mother and child, they recommended "watchful waiting" under optimized antihypertensive therapy and repeated native magnetic resonance imaging until a gestational state of safe delivery. Further, an accompanying emergency plan was established. It included preparations for an emergency cesarean section and TEVAR in our hybrid operating room in case of a rupture. After delivery of the child, TEVAR was planned to meet the risks of further dilation and rupture during the lactation period.

The patient was treated with a quadruple antihypertensive therapy (α-methyldopa, enalapril, metoprolol, amlodipine). She developed gestational diabetes with insulin substitution with fetal macrosomia. Repeated magnetic resonance scans showed an unchanged diameter of 52 mm (20, 25, 27, and 30 weeks of gestation). From week 23 on, inpatient observation was chosen.

In week 32 + 6 days, elective early cesarean section was performed with peridural anesthesia in a hybrid operating room with a fixed imaging system. The delivery was uneventful and followed by

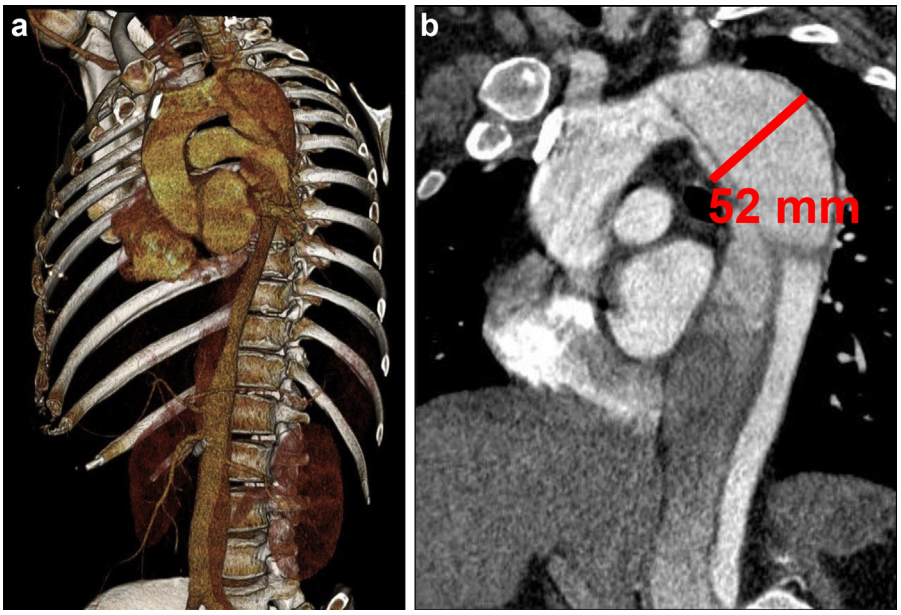

Fig 1. a, Volume rendering of preoperative magnetic resonance image showing the aortic dissection from the left subclavian artery to the common iliac artery with a false lumen aneurysm. **b,** Multiplanar reconstruction of preoperative magnetic resonance image showing the aortic dissection with a false lumen aneurysm with a maximum diameter of 52 mm.

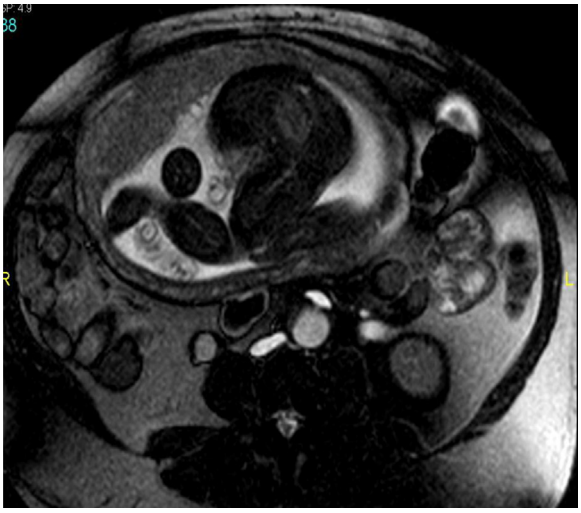

Fig 2. Preoperative magnetic resonance image showing the aortic dissection and pregnancy.

TEVAR performed with a Cook Zenith thoracic endograft (Cook Medical, Bloomington, Ind) covering the large proximal entry tear. The left subclavian artery was covered without revascularization according to in-house guidelines (Fig 3), which recommend carotid subclavian artery revascularization only if two or more vascular territories are covered according to Czerny et al.[7]

Postoperatively, the patient was monitored for 24 hours in the intensive care unit. She recovered well without complications, was transferred to a peripheral ward on the third day, and was discharged on postoperative day 6. An antiplatelet agent (acetylsalicylic acid, 100 mg) was used. Follow-up examinations (by ultrasound at 1 month and computed tomography at 3 months and 1 year after TEVAR) revealed a patent aortic stent graft with complete false lumen thrombosis throughout the stented segment of the aorta (Fig 3).

DISCUSSION

During pregnancy, the risk for acute dissection increases in the last trimester and during the postpartum period. However, published records of TBAD in pregnant women are scarce, and current guidelines of TBAD do not refer to this rare condition.[1-4] The median age for TBAD is 63 years for men and 67 years for women.[8] Therefore, chronic TBAD as reported here is extremely rare and has not been reported yet. Only a few case reports refer to acute TBAD in pregnancy.[1-3] Studies on the treatment of pregnancy-associated TBAD with best medical treatment or open surgery reported high mortality rates of 30.8% to 42.8% for both.[2] With the increasing age of motherhood, more cases of this constellation may be expected in the future.

The etiology of acute pregnancy-associated dissection is marked by multiple factors. Physiologic, cardiovascular, and hormonal influences during pregnancy lead to a weakening of the aortic wall and increased shear stress, which predispose the aortic media to dissection.[1] The physiologic and cardiovascular effects of TBAD in pregnancy are increased plasma volume, increased heart rate, and inotropy with ventricular hypertrophy, whereas hormonal influences are reduced mucopolysaccharides with

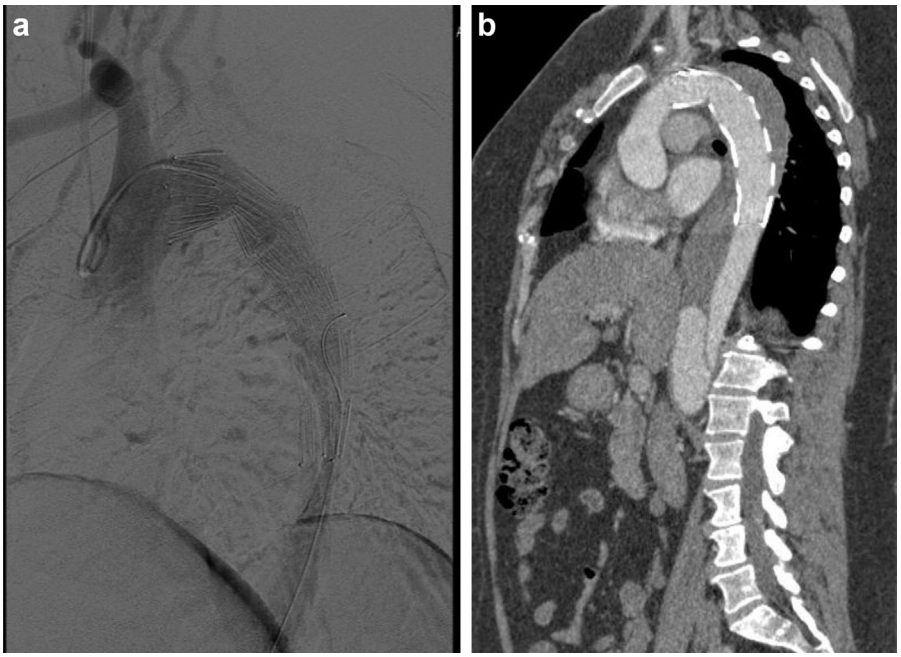

Fig 3. a, Postoperative angiography of thoracic endovascular aortic repair (TEVAR) with overstenting of the left subclavian artery. **b,** Postoperative magnetic resonance image of TEVAR without endoleaks and successful exclusion of the aneurysm.

fragmentation of the reticulum and reduction of elastic fibers.[1,2]

The aortic rupture risk of chronic TBAD during pregnancy and in the postpartum period is unknown but probably increases in the last trimester and postpartum period because of endocrine and hemodynamic changes. Although our patient was not symptomatic and had an aortic diameter <55 mm, we assumed a significant risk of rupture and chose the described strategy of watchful waiting, optimized antihypertensive therapy, early hospitalization, premature delivery, and prophylactic TEVAR. The patient did well and remains asymptomatic for the chronic TBAD with false lumen thrombosis and stable aortic diameters.

CONCLUSIONS

The strategy of watchful waiting, optimized antihypertensive therapy, early hospitalization, premature delivery, and prophylactic TEVAR in chronic TBAD proved feasible in this first reported case.

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