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Original Article

Spontaneous type B aortic dissection in antepartum gemellary pregnancy and endovascular repair

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Abstract: Background: It has been found that 50% of all aortic dissections can be attributable to pregnancy in women younger than 45 years of age. An estimated 30% of cases are type B, with half occurring in the antepartum period. To date type B aortic dissection has rarely been reported in gemellary pregnancies. Case: A 24-year-old primigravida at 36 weeks of gemellary gestation presented symptoms of severe and persistent chest pain for 1 day, before suffering the acute type B aortic dissection. The primigravida was treated with immediate cesarean section and endovacular stent graft placement. Conclusion: Aortic dissection is a rare complication of pregnancy, especially in gemellary pregnancies. Pregnancy is considered an independent risk factor for aortic dissection and endovascular repair may be an ideal option for the treatment of complicated type B aortic dissection during pregnancy, with reduced maternal and fetal mortality.

Keywords: Aortic dissection, antepartum, pregnancy, endovascular repair

Introduction

Aortic dissection during pregnancy is an enormous challenge for emergency obstetrics [1]. The International Registry of Acute Aortic Dissection has reported a 0.2% increased risk of aortic dissection in the peripartum period [2], in the third trimester in particular [3]. The possible risk factors established to date include connective tissue disease (e.g. Marfan's syndrome) [4], systemic hypertension and congenital heart diseases [5], bicuspid aortic valve, cocaine abuse, hypertension, trauma, aging, heavy smoking in patients with chronic lung disease and generalized atherosclerosis [6].

The pathogenesis of aortic dissection during pregnancy is yet unclear. It has been shown that the physiologic, cardiovascular, and hormonal changes may result in an increase of shearing stress on the aortic wall, accompanied by weakening of some of its elements, and hence predisposes the pregnant patients to aortic dissection, especially during the trimester [7]. Pregnancy is thus speculated as an independent risk factor for aortic dissection [8].

Aortic dissection during pregnancy is prone to a high risk of maternal and fetal death and an optimal treatment strategy is clearly needed. Medicine, endovascular repair and surgical treatment constitute conventional strategies in treatment of type B dissections. Pregnancy nevertheless complicates the treatment because there are two lives at risk. Endovascular stent-graft repair could exclude primary tear and redirect flow through the true lumen, restoring distal perfusion without a morbid open operation. In this work, we reported a case of type B aortic dissection in the third trimester of gemellary pregnancy in a primigravida without any identifiable risk factors, who was treated by cesarean section and then endovascular repair. Both the mother and the neonate survived and recovered well. We therefore hypothesized that endovascular therapy may represents an ideal option in the management of dissection in the third trimester of gemellary pregnancy.

Case report

A 24-year-old Han Chinese primigravida at 36 weeks of gemellary gestation was referred to our emergency department, with the symptom

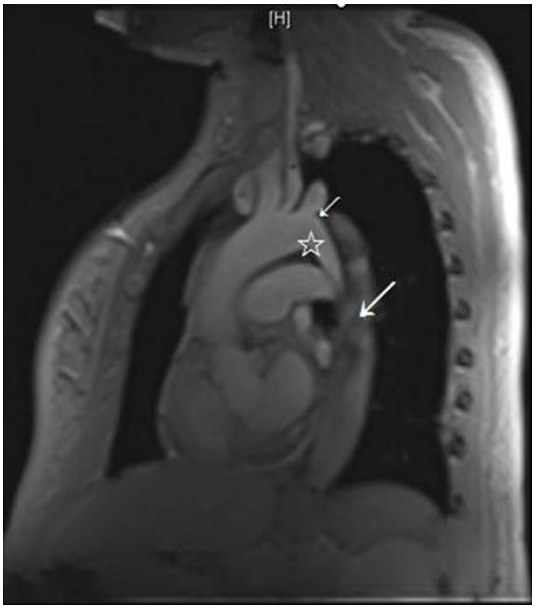

Figure 1. MRI angiogram revealing a complicated type B aortic dissection, contained rupture projecting posteriorly (short arrow), with true (asterisk) and false (long arrow) lumens.

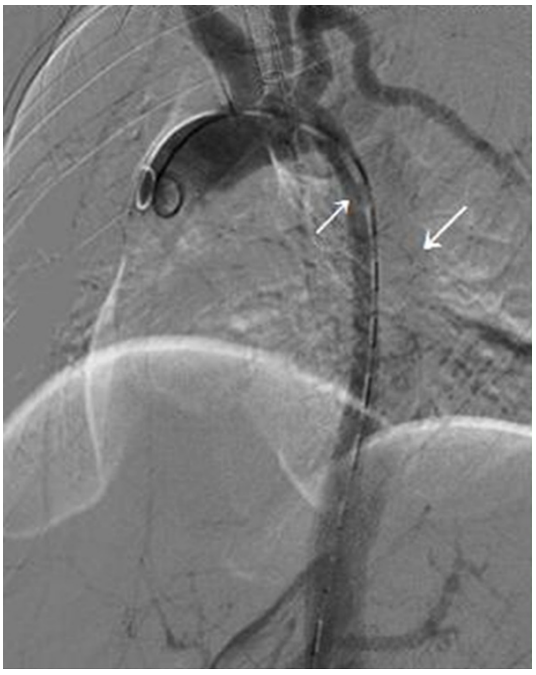

Figure 2. Initial aortogram revealing a proximal tear just distal to the left subclavian artery, with true (short arrow) and false (long arrow) lumens.

of severe and persistent chest pain for 1 day. The self-reported symptoms at the time of admission included sharp and tearing persistent chest pain subsequently radiated to the back, nausea and vomiting, but diaphoresis and dyspnea were not reported. The non-smoking woman without any prior surgeries had a normal medical history and there was no hypertension and diabetes during gestation.

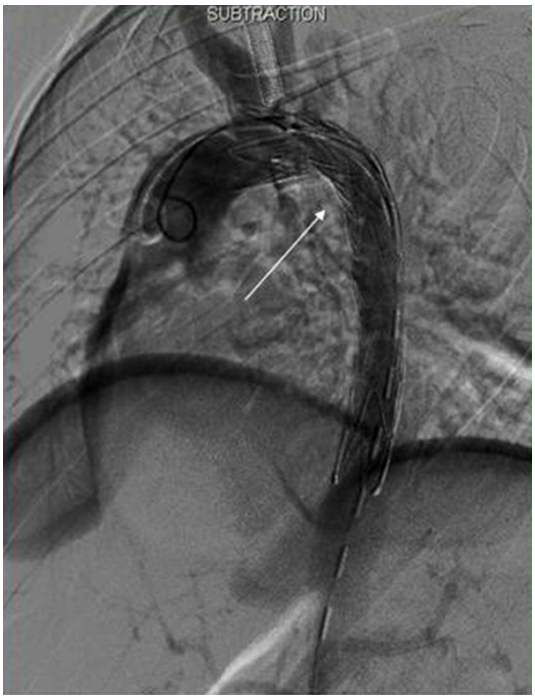

Figure 3. Post-stent aortogram revealing stent in place (arrows) with satisfactory exclusion of the rupture and rapid flow into the true lumen of the aorta.

The baseline characteristics were as follows: blood pressure-157/95 mmHg on both arms, pulse rate-88 beats/min with normal heart sounds, respiration rate-18 breaths/min, clear lung sounds, and normal temperature. Other physical examinations did not show any remarkable features except for mild bilateral ankle edema. Fetal heart rate was continuously monitored and remains normal throughout. Obstetric ultrasonography showed a double live fetus at 36 weeks with normal amniotic membrane and placenta.

Laboratory examinations showed normality in total blood count, blood chemistry, coagulation test results and arterial blood gases. Proteinuria (+2 on the dipstick) was seen in urine analysis. ECG was normal. In order to avoid the influence of X-ray on the fetus, we chose to use transthoracic echocardiography, and there was an indication of aortic dissection. The magnetic reso-

nance angiography (MRA) was used to check the thoracic-abdominal aorta and revealed aortic dissection from arc and to the descending aorta (**Figure 1**), indicating type B aortic dissection.

The patient was transferred to the intensive care unit of cardiovascular surgery. The blood pressure was maintained at 130/80 mmHg with continuous injection of nicardipine, and esmolol (10 ug/kg/min) was administrated to stabilize the heart rate at 70 beats/min. Due to the persistent and severe chest pain using analgesic, we decided to proceed with an immediate cesarean section and endovascular repair for aortic dissection. Primary cesarean delivery was performed under lumbar-spinal anesthesia to deliver two 2450/2000 g female neonates, with Apgar scores of 9 at 1 min and 10 at 5 min. After successful delivery, the patient was given general anesthesia and endovascular repair. Initial aortogram revealed a proximal entry tear distal to the left subclavian artery (**Figure 2**). A 16 cm long coated stent was successfully implanted without complications (**Figure 3**). A thoracic-abdominal computed tomography angiogram (CTA) scan was performed 5 days after operation, and revealed satisfactory exclusion of the rupture and rapid flow into the true lumen of the aorta. After 10 days the patient was discharged with sound physical health and normal blood pressure. The two neonates were also in healthy condition. After 6 months follow-up, both mother and babies remain healthy.

Comment

Aortic dissection is rare but fatal during pregnancy. Marfan syndrome is the most common underlying stimuli responsible a large part for the development of aortic dissection [9]. Recent research has focused on pregnancy which has been identified as an independent risk factor for aortic dissection. In Sweden, it is estimated that the incidence of aortic dissection was 11.7-fold higher in pregnant women compared to nonpregnant women [10]. In this case, dissection of the aorta developed spontaneously in the absence of the aforementioned risk factors. We thus think that gemellary pregnancy may independently cause the incident aortic dissection. According to a systematic literature review, we found that most English publications concerned aortic dissection and pregnancy and only a few on aortic dissection with general pregnancy, suggesting high incident aortic dissection during singleton pregnancy relative to gemellary pregnancy. The possible reason is the widely different ratio of the singleton pregnancy and gemellary pregnancy (1:89). We speculated that there was no clear relationship between the occurrence of aortic dissection and the number of fetus. The speculation, however, needs further research to test.

It is generally recommended that aortic dissection be surgically repaired before 28 weeks of singleton gestation, and that the pregnancy should be continued. However, when the fetus is beyond 32 weeks, cesarean delivery followed by aortic repair should be considered. For gestation between 28 and 32 weeks, aortic repair should be used and cesarean delivery is reserved for cases with fetal distress [11]. As our patient was experiencing gemellary pregnancy at 36 weeks, we worried that the fetus were not mature due to the severity of aortic dissection; the patient and fetus would be in serious danger if the operation was not immediately performed. The treatment for uncomplicated type B dissections has been classified as an aggressive medical management. In terms of complicated type B dissections including rupture, end organ ischemia, aneurysmal aortic expansion, dissection extension, and continued pain, the traditional open surgical intervention is frequently used. Nevertheless, the endovascular repair has advantages over open operation in reducing reperfusion time, maternal and fetal deaths. A large patient-safety review revealed that effective dose of radiation for emergency endovascular repairs, including preoperative computed tomography, endovascular stent-graft repair, and 1 year postoperative surveillance, had a mean total of 47.2 mSv (mGy) [12]. The small true lumen of descending aorta and slow blood flow in our patient resulted in persistent pain, so we performed primary cesarean section followed by endovascular repair. Satisfactory recovery has been seen in both mother and neonate.

Aortic dissection is less common complication of pregnancy, especially gemellary pregnancy. The data in the present report suggested that pregnancy may represent an independent risk

factor for aortic dissection. In addition, endovascular repair may be a promising option for the treatment of complicated type B aortic dissection during pregnancy, with reduced maternal and fetal mortality.

Disclosure of conflict of interest

None.

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