Echocardiography diagnosis of pregnancy with aortic dissection: a case report

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Case report

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Abstract

Background: We report a case of 34 weeks + gestation with aortic dissection to explore the diagnosis and treatment of this type of pregnant woman and to reduce maternal mortality.

Case presentation: This report describes the clinical manifestations of a case of late pregnancy with acute aortic dissection (Stanford A Type). Echocardiography was used to detect the location of the rupture, the extent of exfoliation, the true and false lumen, the presence or absence of thrombus in the false lumen, the degree of aortic regurgitation, etc. After the diagnosis, the patients received surgical treatment as soon as possible. The detection rate and type diagnosis accuracy of ultrasonography for pregnancy complicated with aortic dissection are reliable. The location of the intimal rupture by ultrasound was consistent with the intraoperative findings, and there were no recent complications in the mother and newborn.

Conclusion: The third trimester of pregnancy with aortic dissection is dangerous. As a simple, safe and non-invasive method, echocardiography has high clinical value in the diagnosis of pregnant patients with aortic dissection.

Background

Aortic dissection during pregnancy is rare, but the disease is dangerous and progresses rapidly. Due to the particularity of pregnant women, aortic dissection is easy to be misdiagnosed. If no timely intervention and treatment is given, maternal and fetal mortality is extremely high. Therefore, active and rapid diagnosis and effective treatment are crucial to save the lives of pregnant women and fetuses.

Case Report

A 35-year-old pregnant Chinese woman, 34 weeks pregnant with G₃P₁, was hospitalized for irregular contractis 2 weeks ago. At 12 o'clock on October 29, 2019, she had a sudden toothache and laceration pain in her chest while eating, which was difficult to relieve, accompanied by nausea. She had a regular prenatal examination, NT 1.1mm, and 4D-ultrasound indicating that the placenta was in a low position, and the lower margin reached the inner cervix, a distance of 9.4mm, and no abnormality was found in the remaining prenatal examination. She was treated with ultrasound(US) immediately to find out the cause of her chest pain.

She had one natural birth, two frozen embryos were transplanted on March 25, 2019.25, and one survived. Denied a history of high blood pressure and diabetes. T:36.9°C, P:79/min, R:26 /min, BP:109/61mmHg, clear consciousness, painful face, abdominal distention, fetal heart rate: 136/min, no obvious contractis, no opening of the official mouth, no rupture of the membrane, fetal position right sacral anterior. White blood cell count: $8.66 \times 10^9/L$, neutrophils classification: 75.8%, D-dimer quantification: 5110.0g/L. Ultrasonic examinations: true and false lumens were found in the ascending

aorta, aortic arch, descending aorta, abdominal aorta and the right common carotid artery, with intimal oscillations, indicating aortic dissection and rupture in the ascending aorta(Fig. 1).

We discussed with other experts and obtained the consent of family members. It was decided to have a caesarean section plus a subtotal hysterectomy, followed by aortic dissection. She had a cesarean section under general anesthesia and gave birth to a live female infant, 1-5-10 min. APGAR score 6-2-8. Then, the newborn was transferred to pediatric treatment. After the placenta was removed, subtotal hysterectomy was performed.

Aortic root plasty, ascending aortic replacement and aortic hemiarch replacement were performed. The aortic dissection rupture was found to be located above the junction of no coronal sinusoids and sinus tubes. No coronal sinusoids and corresponding valve lobes were involved in the aortic root, resulting in aortic valve insufficiency and soft aortic valve, the presence of the noncoronary sinus and the noncoronary leaflets leads to the insufficiency of the aortic valve. Then we performed aortic sinus and valvuloplasty. The involved ascending aorta and the semi-arch of the aorta were removed, 24mm diameter artificial blood vessels were taken to suture the distal aorta. She was treated with anti infection and blood pressure control. Follow-up for 3 months showed that the newborn was generally in good condition, the mother was with no postoperative sequelae or complications.

Discussion

Because of the particularity of pregnant women, the aortic dissection is easily misdiagnosed, if not timely intervention and treatment, pregnant women and fetal mortality is extremely high, untreated acute aortic dissection, pregnant women from symptoms such as chest pain, increased by 1% ~ 3% fatality rate per hour^[1]. Therefore, active and rapid diagnosis and effective treatment are crucial to save the lives of pregnant women and fetuses. The early diagnosis of pregnant women with aortic dissection is particularly difficult due to the complexity and diversity of clinical manifestations and the lack of specificity. The most common symptoms are sudden tearing pain in the precordial area, scapular area, thoracolumbar area and upper abdomen. The pain is characterized by radiation along the direction of the aorta. Imaging examination is of decisive significance in diagnosing aortic dissection. US, Computed tomography(CT), magnetic resonance imaging(MRI) and other examinations can show the location and scope of aortic dissection, as well as the separated intima, true and false lumen and mural thrombus, which can help to make a clear diagnosis. The sensitivity and specificity of Computed tomography angiography(CTA) for the true and false cavities and the location of the rupture were as high as 93% ~ 100% and 87% ~ 100%^[2]. However, in order to minimize the impact of radiation on the fetus during pregnancy, ultrasound or MRI examination is preferred. In this case, we found that the aortic dissection and its classification were A Type by ultrasound, and the diagnosis was made clear in time.

Smok^[3] believes that some genetic factors lead to internal defects in aortic vessel walls, which may be the cause of aortic dissection during pregnancy. In this case, the aorta of the pregnant woman with aortic dissection was widened compared with that of the normal pregnant woman, and the post-onset genetic

test showed that she was a patient with Marfan syndrome. Therefore, for high-risk pregnant women with Marfan syndrome, Turner syndrome, familial aortic aneurysm and other familial genetic diseases, if the aorta was widened, the risk of pregnancy should be discussed before pregnancy. Aortic widths should be monitored regularly during pregnancy. Coulon^[4] proposed that drug therapy and blood pressure monitoring should be performed at aortic width > 4 cm, the pregnancy should be terminated by cesarean section at > 4.5 cm, and at > 5 cm, cardiac surgery should be performed in time. It is suggested that these pregnant women should have echocardiography before pregnancy to evaluate the risk of pregnancy.

The treatment principles recommended by Zeebregts et al. ^[5] are as follows: before 28 weeks of pregnancy, discuss with the pregnant woman whether to continue the pregnancy, and actively perform aortic dissection repair or replacement surgery; Pregnant 28 ~ 32 weeks, according to the fetal situation to decide whether to deliver the fetus, but for the presence of hemodynamic instability and organ ischemia in pregnant women, should be immediately performed aortic surgery; After 32 weeks of gestation, cesarean section and aortic surgery were performed simultaneously. In this case, the patient was 34 weeks + of gestational age. Because of the timely ultrasound diagnosis, we immediately organized a consultation in the whole hospital. It is agreed that the best treatment plan for this patient is to perform cardiac surgery after cesarean section.

Conclusion

We have successfully completed the diagnosis and operation of rare pregnancy with aortic dissection, in which echocardiography plays an important role in diagnosis. If pregnant women suddenly appear chest and back pain, should be timely echocardiography, once diagnosed, should be closely monitored blood pressure and heart rate, according to the classification of dissection and gestational week to determine the operation, the selection of appropriate time for termination of pregnancy and heart surgery are conducive to reducing the maternal and infant mortality.

Abbreviations

US:Ultrasound; CT:Computed tomography; MRI:Magnetic resonance imaging; CTA: Computed tomography angiography.

Declarations

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Availability of data and materials

The datasets during and/or analysed during the current study available from the corresponding author on reasonable request.

Authors' contributions

JW, ALW,CJH and JZ participated in the care of the patient. JW and ALW performed the literature review and drafted the manuscript. JZ, CJH and obtained the image data. All authors read and approved the final manuscript.

Ethics approval and consent to participate

The ethics committee of Zhejiang Provincial People's Hospital had approved the study.

Consent for publication

Written informed consent was obtained from the patients for publication of this study. Copies of the written consent are available for review by the Editor-in-Chief of this journal.

Competing interests

The authors declare that they have no competing interests.

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Figures

Figure 1

Ultrasonic examinations: true and false lumens were found in the ascending aorta, aortic arch, descending aorta, abdominal aorta and the right common carotid artery, with intimal oscillations, indicating aortic dissection and rupture in the ascending aorta