

# World Journal of *Clinical Cases*

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# Combined cesarean delivery and repair of acute aortic dissection at 34 weeks of pregnancy during COVID-19 outbreak: A case report

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## Abstract

### BACKGROUND

Since the outbreak of the coronavirus disease 2019 (COVID-19) pandemic, the exclusion of a patient from COVID-19 should be performed before surgery. However, patients with type A acute aortic dissection (AAD) during pregnancy can seriously endanger the health of either the mother or fetus that requires emergency surgical treatment without the test for COVID-19.

### CASE SUMMARY

A 38-year-old woman without Marfan syndrome was admitted to the hospital because of chest pain in the 34<sup>th</sup> week of gestation. She has diagnosed as having a Stanford type-A AAD involving an aortic arch and descending aorta *via* aortic computed tomographic angiography. The patient was transferred to the isolated negative pressure operating room in one hour and underwent cesarean delivery and ascending aorta replacement. All medical staff adopted third-level medical protection measures throughout the patient transfer and surgical procedure. After surgery, the patient was transferred to the isolated negative pressure intensive care unit ward. The nucleic acid test and anti-COVID-19 immunoglobulin (Ig) G and IgM were performed and were negative. The patient and infant were discharged without complication nine days later and recovered uneventfully.

### CONCLUSION

The results indicated that the procedure that we used is feasible in patients with a

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combined cesarean delivery and surgery for Stanford type-A AAD during the COVID-19 outbreak, which was mainly attributed to rapid multidisciplinary consultation, collaboration, and quick decision-making.

**Key Words:** Acute aortic dissection; Pregnancy; COVID-19 outbreak; Case report

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**Core Tip:** The findings indicated that the procedure described is viable in patients with combined cesarean delivery and Stanford type-A acute aortic dissection surgery during the coronavirus disease 2019 outbreak. In this case, a reasonable operation plan, practical procedures, and close cooperation among all departments were the keys to successful management.

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## INTRODUCTION

More than 25% of patients with Stanford type A acute aortic dissection (AAD) are initially misdiagnosed, and the mortality rate approaches 50% in patients who do not receive appropriate treatment within 48 h[1]. Although AAD rarely presents in women younger than 40 years of age, the risk increases when they become pregnant[2]. Reports have also indicated that timely, well-defined surgical management during pregnancy does not differ significantly from standard procedures and has a favorable outcome for both the mother and infant[3]. Since the outbreak of the coronavirus disease 2019 (COVID-19) pandemic, the exclusion of a patient from COVID-19 should be performed before surgery. However, patients with type A AAD during pregnancy can seriously endanger the health of either the mother or fetus that requires emergency surgical treatment without the test for COVID-19. We describe here a case of type A AAD during advanced pregnancy during the COVID-19 outbreak.

## CASE PRESENTATION

### Chief complaints

A 38-year-old woman (gravida 3, para 2) at 34 wk of gestation had an acute onset of chest and upper abdominal pain with transient syncope and intermittent bloody stools and was referred to a local community hospital. The pain continued for 24 h, and since the patient's condition could not be relieved, she was transferred to the Emergency Department of Anzhen Hospital.

### History of present illness

The patient had no history of present illness.

### History of past illness

The patient had no history of hypertension, coronary disease, diabetes mellitus, or previous trauma surgery.

### Personal and family history

The patient had no family history of AAD.

### Physical examination

On the day of admission (May 13, 2020), the patient had a blood pressure of 140/70 mmHg, heart rate of 90 bpm, respiratory rate of 20 breaths/min, oxygen saturation of



98% indoors, and temperature of 36.5 °C. Clinical examination was normal. On arrival, the patient had no history of contact with COVID-19 cases. Since the surgical repair would be operated immediately, the exclusion of a patient from COVID-19 was not performed, including nucleic acid tests and computed tomography (CT) scan of the lungs. Moreover, the fetal heart rate was standard and was monitored continuously through heart rate monitoring or fetal ultrasound.

### **Laboratory examinations**

No abnormality was found.

### **Imaging examinations**

Transthoracic echocardiography revealed an AAD, and then a type-A AAD was diagnosed through CT (Figure 1). The intimal tear originated at the proximal thoracic aorta level, and the dissection extended into the aortic arch and the iliac artery except for the coronary arteries. The aorta valve was a bicuspid aortic valve, and there was minimal aortic insufficiency. The aortic root and ascending aorta presented with dilatation of up to 46 mm, but the descending aorta had regular dimensions. Furthermore, the right renal artery was located in the true lumen.

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## **FINAL DIAGNOSIS**

The patient was confirmed to have type A AAD in the 34<sup>th</sup> gestational week, and the fetus was stable without intrauterine distress. A simultaneous operation was decided to perform, with a combined cesarean delivery of the infant and surgical management of the patient's aortic dissection. All medical staff adopted third-level medical protection measures throughout the patient transfer and surgical procedure (Figure 2), including medical-degree mask (N95), disposable surgical cap, properly wearing disposable protective clothing, disposable shoe covers, and disposable latex gloves, and medical-degree goggles[4,5]. The multidisciplinary team consisted of cardiothoracic surgeons, anesthesiologists, obstetricians, neonatologists, cardiac perfusionists, and experienced nurses[6].

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## **TREATMENT**

### ***Procedure for anesthesia, cesarean delivery, and aortic dissection***

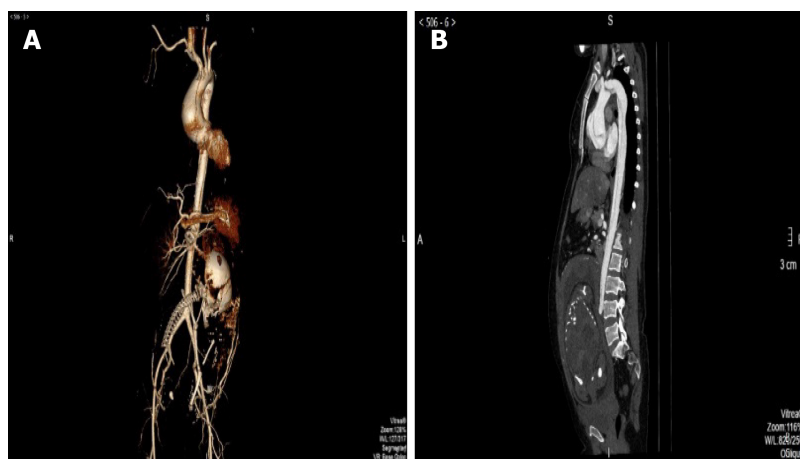
When the patient arrived in the operating room, sodium nitroprusside was used to maintain her blood pressure below 150/90 mmHg. A rapid-sequence induction of general anesthesia was conducted while the patient was in the left uterine displacement position, and then endotracheal intubation was performed successfully. At the same time of intubation, cesarean delivery was performed by the obstetrician. One and half hours after arriving at the emergency department, a cesarean section was operated, and a live-born 2670-g female infant was delivered 5 min later. The 1-, 5-, and 10-min Apgar scores were 10, 10, and 10, respectively. Uterine compression sutures with intrauterine balloon tamponade were performed. The estimated total blood loss was 150 mL. During this period, blood pressure was controlled at 110-150/60-90 mmHg. After adequate hemostasis by obstetricians, the patient was heparinized fully and operated on for aortic dissection. After cardiopulmonary bypass was initiated, the aortotomy revealed the intimal breakage being located in the ascending aorta. Then, an ascending aorta replacement was performed (Figure 3). The procedure was uneventful with cardiopulmonary bypass and aortic cross-clamp of 133 min and 59 min. No blood products were transfused during the operation. After surgery, the patient was transferred to the isolated negative pressure intensive care unit ward. The nucleic acid test and anti-COVID-19 immunoglobulin (Ig) G and IgM were performed and were negative.

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## **OUTCOME AND FOLLOW-UP**

The patient was discharged without complications nine days later.





**Figure 1** Preoperative imaging diagnosis of the patient with type A acute aortic dissection during advanced pregnancy. A: Three-dimensional computed tomography angiography indicating a pregnant patient with aortic dissection; B: Curved planar reconstruction of computed tomography angiography showing a type A aortic dissection, with the entry located in the ascending aorta, and extending to the iliac arteries.

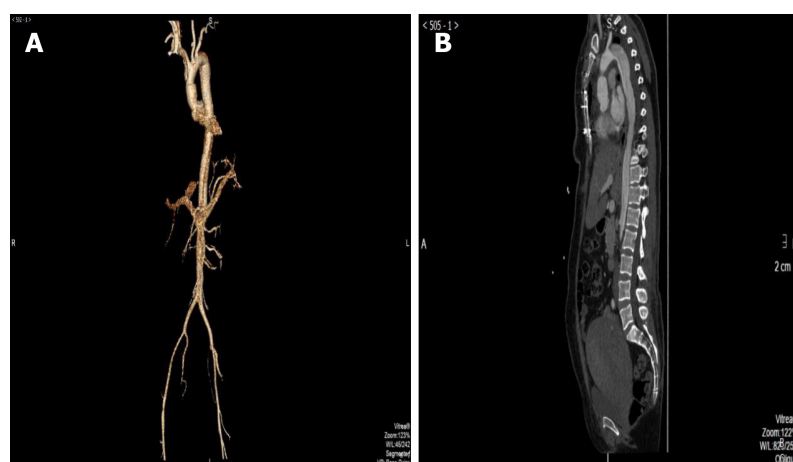


**Figure 2** Third-level medical protection measures throughout surgical procedure, including medical-degree mask (N95), disposable surgical cap, properly wearing disposable protective clothing, disposable shoe covers, and disposable latex gloves, and medical-degree goggles.

## DISCUSSION

In our case, the decision to perform the cesarean section before aortic surgery would provide the mother with the best chance of survival and a less negative influence on the fetus. In the operating room, we tried to strike a delicate balance between minimizing the risk of aortic rupture and maintaining the fetus's needs using a general anesthetic and vasoactive drugs, such as nicardipine and phenylephrine. Despite all this, the fetus had to be delivered as quickly as possible. After delivery of the fetus, uterine contractions and oxytocin injection would result in a sudden increase in the circulating blood volume and elevation of the acute blood pressure leading to aortic rupture. Because the main reason for postpartum hemorrhage is uterine atony, intrauterine balloon tamponade was performed to prevent severe bleeding. Acceptable blood loss occurred during the cesarean delivery, which proved the correctness of our decision.

Despite the strong infectivity of COVID-19, many patients are confused about a timely diagnosis[7]. According to the patient who would not be excluded from COVID-19, our third-level medical protection measures were feasible and effective to avoid cross-infection in the hospital.



**Figure 3** Postoperative images of the patient. A: Three-dimensional computed tomography angiography; B: Multiplanar reconstruction of computed tomography angiography showing post ascending aorta replacement without anastomotic leakage.

## CONCLUSION

The findings indicated that the procedure described is viable in patients with combined cesarean delivery and Stanford type-A AAD surgery during the COVID-19 outbreak. In this case, a reasonable operation plan, practical procedures, and close cooperation among all departments were the keys to successful management.

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