

Successful Repair of Type a Aortic Dissection in a Term Pregnancy: A Case Report

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ABSTRACT

Stanford type A acute aortic dissection (AAD) is a very rare complication, with potentially lethal consequences in pregnancy. In fact, pregnancy has been regularly associated with the possibility of aortic dissection in almost half of young women. Herein, we present the case of a 38-year-old woman in her 37th week of pregnancy. The patient's medical history was indicative of G4L2Ab1 (4 gestations, 2 lives, 1 abortion). She developed persistent chronic pain in the neck, chest, and back, without nausea or vomiting while waking in the morning. The computed tomography angiogram was indicative of AAD. The medical decision was to perform a combination of cesarean section under general anesthesia and median sternotomy for the open aortic valve. The term newborn showed an Apgar score of 9-10. The coronary arteries were preserved and the valve was repaired at commissural positions. Dacron supracoronary tube graft was attached to the aortic anastomotic site and subsequently to the aortic arch. The patient was discharged on day three after surgery with a good general condition. Moreover, the results indicated that she and one of her brothers suffered from Marfan syndrome.

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Introduction

Aortic dissection is a major risk factor for maternal mortality and fetal death. The occurrence of this condition during the third trimester of pregnancy might be due to the hyperdynamic state and hormone-induced morphological and biochemical effects on layers of blood vessel walls (1-3). Genetic conditions (Marfan syndrome), anatomic complications (coarctation of the aorta), bicuspid aortic valve, Turner syndrome, and hypertension are associated with aortic dissection (4). This study demonstrates our experience in diagnosing and treating an type A aortic aneurysm and dissection in term pregnant patients.

Case report

A 38-year-old woman in the 37th week of her pregnancy was admitted to the hospital with

persistent chronic pain in the neck, chest, and back. The patient had not experienced nausea or vomiting while waking in the morning. The medical history of the family indicated the sudden death of her brother at the age of 20 years. She was transferred from another city to our hospital, affiliated to Mashhad University of Medical Sciences, Mashhad, Iran.

She presented with 1+ lower extremity edema, and her vital signs were as follows: body temperature of 37°C, respiratory rate of 17/min, pulse rate of 88 bpm, and blood pressure of 130/80 and 140/85 mmHg in the right and left upper extremities, respectively. The patient's physical signs and electrocardiogram (ECG) were normal

The transthoracic echocardiogram (TTE) revealed mild-to-moderate aortic insufficiency and mild tricuspid regurgitation, with a 3.6 cm dilated

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aortic root, a 4.6 cm dilated ascending aorta, and pulmonary artery pressure of 15 mmHg. The dissecting flap arose at the aortic root and terminated in the aortic arch and descending aorta. The left ventricular ejection fraction ranged between 55% and 60%. No evidence of left ventricular hypertrophy was reported. On computed tomography angiography (CTA), the dissection of the flap was commenced from the aortic root to the iliac artery, extending into the aortic valve, the left subclavian artery, and the base of the left carotid.

Following hospital admission and clinical evaluations, the patient was immediately transferred to the operating room. Anesthesia was induced after the insertion of two 16-gauge intravenous catheters and an arterial line in the right radial artery, using 75 µg of fentanyl, 16 mg of etomidate, and 100 mg of succinylcholine, followed by the application of cricoid pressure and a 7.5 mm endotracheal tube was utilized for intubation under general anesthesia with propofol. Central venous catheterization was performed in the right jugular vein. First, After prepare and drape the abdomen was opened by a midline incision for cesarean section. The patient's term infant was delivered with cephalic presentation, an Apgar score of 9-10, and birth weight of 2700 g. After clamping the umbilical cord, 100 µg of fentanyl and 15 mg of midazolam were administered. Following placental expulsion and uterine repair, the patient underwent bilateral tubal ligation, using the Parkland procedure. The present case was hemodynamically stable without any inotropic support.

Cesarean section was followed by thoracic prepare and drape again for aortic surgery. For this purpose, 400 µg of fentanyl, as well as a combination of propofol and atracurium, was administered under sterile conditions. The patient was prepared for sternal incision, heparinization (300 mg), and cannulation of the aortic arch, as well as the right atrium (ACT= 480 s), to establish cardiopulmonary bypass (CPB).

Afterwards, the aorta was incised following hypothermia (at 32°C to 34°C), cardiac arrest, and aortic cross-clamping. The coronary arteries were preserved, along with the valve at the commissural positions. Dacron supracoronary tube graft was attached to the aortic anastomotic site and subsequently to the aortic arch. The patient was separated from CPB after deaeration. Having achieved haemostasis, intrathoracic packing around the aorta's sutures was performed by applying sterile gauze and surgical hemostatic powder.

The pericardial, retrosternal, and thoracic (both left and right) drainage tubes were inserted prior to sternal closure. Afterwards, the patient

was transferred to the intensive care unit and extubated after 24 h. The gauze packs were removed three days following mediastinal irrigation. Surgical haemostasis was then completed and the sternum was re-approximated. The patient was transferred to the cardiovascular ward and discharged with a good general condition within two and five days, respectively.

Discussion

Marfan syndrome and coarctation of the aorta expose pregnant women to a higher risk of aortic dissection. Pregnancy is speculated to be correlated with the incidence of aortic dissection in almost half of young women. Moreover, Noonan syndrome is expected to be another underlying cause of aortic dissection, which in turn leads to the excision of the intima layer, ingress of blood into the media layer, and signs of aortic rupture (5).

With respect to the occurrence of AAD, recent investigations among females have revealed an overall incidence of 0.4 cases per 100,000 population. Also, pre-hospital mortality of AAD has been estimated at 53% each year. Besides, Marfan syndrome has been involved in up to 50% of the reported cases (6, 7). On the contrary, in a previous study, two out of 346 patients, recruited from the International Registry of Acute Aortic Dissection, had aortic dissection during pregnancy (8).

In the present case, given the sudden death of the patient's brother, all family members underwent analysis of the aortic root; the results showed dilation of the aortic arch in the younger brother. Moreover, it was revealed that the patient and one of her brothers had Marfan syndrome.

Overall, patients with aortic dissection often complain of severe chest pain (stabbing and ripping). In the present case, syncope, nausea, and vomiting were reported. Bronchospasm is also likely to occur owing to the irritation of the vagus nerve from the intimal tearing, and diastolic murmur would be indicative of aortic insufficiency (9).

According to statistics, the mortality rate of aortic dissection increases 1-3% due to every hour of delay in treatment after the onset of symptoms. The mortality rate continues to increase by 25%, 70%, and 80% on days 1, 7, and 14, respectively (10). Aortography, TTE, and CTA are assumed as the standard tests for the evaluation of aneurysm and aortic dissection (10, 11).

In the present case, the term pregnant woman was seemingly healthy. She underwent work-ups (ECG and CTA of the thorax), following the onset of aortic dissection signs. Emergency cesarean section was performed prior to sternotomy. Sternotomy was carried out to overcome hypothermia and cardiac arrest, yielding favorable outcomes.

In general, after confirming the diagnosis of AAD, appropriate surgical intervention is preferable. Besides, emergency cesarean section, associated with spontaneous aortic repair, is recommended for pregnant women beyond 32 weeks of gestation (12). Due to severe chest and back pain, as well as syncope during pregnancy, early diagnostic measures should be taken and treatment should be applied, based on the type of dissection and gestational age (13-15).

Conclusion

This presentation showed the importance of medical evaluation of pregnant patient's by a multidisciplinary team leading to an adequate and timely surgical procedure to prevent fatal maternal and fetus complications

Conflict of Interest

The authors declare no conflict of interest.

References

1. Manalo-Estrella P, Barker AE. Histopathologic findings in human aortic media associated with pregnancy. *Arch Pathol.* 1967; 83:336-41.
2. Konishi Y, Tatsuta N, Kumuda K, Minami K, Matsuda K, Yamasato A, et al. Dissecting aneurism during pregnancy and the puerperium. *Jpn Circ J.* 1980; 44:726-33.
3. Shihata M, Pretorius V, MacArthur R. Repair of an type A aortic dissection combined with an emergency cesarean section in a pregnant woman. *Interact Cardiovasc Thorac Surg.* 2008; 7:938-40.
4. Pitt MP, Bonser RS. The natural history of thoracic aortic aneurysm disease: an overview. *J Card Surg.* 1997; 12:270-8.
5. Cunningham GF, Leveno JK, Bloon LS, Sponf YC. *Williams's obstetrics.* 24th ed. New York: MCGraw-Hill Companies Inc; 2014. P. 992.
6. Thalmann M, Sodeck GH, Domanovits H, Grassberger M, Loewe C, Grimm M, et al. Acute type A aortic dissection and pregnancy: a population-based study. *Eur J Cardiothorac Surg.* 2011; 39:e159-63.
7. Immer FF, Bansi AG, Immer-Bansi AS, McDougall J, Zehr KJ, Schaff HV, et al. Aortic dissection in pregnancy: analysis of risk factors and outcome. *Ann Thorac Surg.* 2003; 76:309-14.
8. Nienaber CA, Fattori R, Mehta RH, Richartz BM, Evangelista A, Petzsch M, et al. Gender-related differences in acute aortic dissection. *Circulation.* 2004; 109:3014-21.
9. Kim TE, Smith DD. Thoracic aortic dissection in an 18-year-old woman with no risk factors. *J Emerg Med.* 2010; 38:e41-4.
10. Chen K, Varon J, Wenker OC, Judge DK, Fromm RE Jr, Sternbach GL. Acute thoracic aortic dissection: the basics. *J Emerg Med.* 1997; 15:859-67.
11. Cheitlin MD, Armstrong WF, Aurigemma GP, Beller GA, Bierman FZ, Davis JL, et al. ACC/AHA/ ASE 2003 guideline update for the clinical application of echocardiography: summary article. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (ACC/AHA/ASE Committee to Update the 1997 Guidelines for the Clinical Application of Echocardiography). *J Am Soc Echocardiogr.* 2003; 16:1091-110.
12. Zeegbregts CJ, Schepens MA, Hameeteman TM, Morshuis WJ, de la Rivi`ere AB. Acute aortic dissection complicating pregnancy. *Ann Thorac Surg.* 1997; 64:1345-8.
13. Kinney-Ham L, Nguyen HB, Steele R, Walters EL. Acute aortic dissection in third trimester pregnancy without risk factors. *West J Emerg Med.* 2011; 12:571-4.
14. Kohli E, Jwayyed S, Giorgio G, Bhalla MC. Acute type A aortic dissection in a 36-week pregnant patient. *Case Rep Emerg Med.* 2013; 2013:390670.
15. Lewis S, Ryder I, Lovell AT. Peripartum presentation of an acute aortic dissection. *Br J Anaesth.* 2005; 94:496-9.