Aortic surgery for pregnant women

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Abstract

Background: Women with aortopathy face potential risks during pregnancy and the postpartum period. Methods: We review recent articles related to pregnancy and aortic surgery. Results: Aortic surgery accounts for significant morbidity and mortality in both mother and fetus, although some successful cases have been reported. Prophylactic repair for a high-risk patent also has a limited clinical effect. Conclusions: Currently, medical treatments are limited for pregnant women with aortopathy. Such women should be counseled against the risk of pregnancy and about the heritable nature of the disease prior to pregnancy.

Keywords: aortopathy, pregnancy, cardiopulmonary bypass, prophylactic repair,

1. Introduction

We published a paper titled "Successful surgical treatment of ruptured thoracic aortic aneurysm in pregnancy" in Asian Cardiovascular Thoracic Annals as an Epub article on September 22, 2014 [1], in which we reported a 31-year-old woman who was 38 weeks pregnant. Chest computed tomography revealed a large thoracic aneurysm with extravasation. The patient successfully underwent an emergency cesarean section, and the aneurysm was successfully replaced with a Dacron graft under deep hypothermic circulatory arrest. Herein, we review studies related to aortic surgery for pregnant women that have been published since our report. Studies published between September 2014 and June 2016 on PubMed in English are surveyed.

2.1 Emergency open repair

A 29-year-old woman with familial thoracic aortic aneurysm and dissection underwent concomitant cesarean section and aortic surgery [2]. The surgery was performed in the 26th week of pregnancy with delivery of a live premature infant via a cesarean section and a full recovery of the patient.

Chen et al. reported the case of a 26-year-old pregnant woman with ruptured aneurysm of sinus of Valsalva [3]. The diagnosis was confirmed in the 18th week of pregnancy without apparent heart failure. After an uncomplicated full-term pregnancy, she gave birth by a cesarean section. Fifty days postpartum, she underwent surgical repair of the ruptured aneurysm and concomitant atrioventricular septal defects.

Yam et al. reported a 35-year-old woman in the 36th week of pregnancy who underwent a Bentall procedure for acute aortic dissection following a successful emergency cesarean section [4]. The mother and newborn were discharged home. Two cases also underwent a cesarean section with concomitant total hysterectomy followed by aortic repair for acute aortic dissection [5].

2.2 Emergency endograft procedure

A woman with Marfan syndrome in the 25th week of pregnancy underwent emergency intervention for an acute descending aortic dissection by means of endovascular repair as bridge to a continuation of pregnancy and definitive repair of the dissection [6]. The patient successfully underwent elective cesarean section in the 31st week. One week later, she underwent descending thoracic aortic repair with stent graft explant and reconstruction with a Dacron graft.

A 30-year-old woman in the 31st week of pregnancy underwent endovascular aortic repair for pseudoaneurysm at the site of a previous injury [7]. However, persistent fetal bradycardia after the repair necessitated urgent cesarean section. The mother and neonate remained well.

Chahwala et al. encountered a 37-year-oldwoman in the 22nd week of pregnancy with a saccular descending thoracic aortic aneurysm measuring 5.1 × 2.3 cm [8]. After considering that a conventional technique using of ionizing radiation and intravenous administration of contrast material would pose a significant hazard to the fetus, they undertook endovascular repair under intravascular ultrasound.

2.3 Elective open repair

Preterm delivery represents a feasible option for a pregnant woman with Marfan syndrome. Naud et al. reported such a case in the 26th week of gestation followed by successful subsequent aortic repair for rapid aortic dilatation [9].

Yates et al. presented 11cases of aortic surgery among pregnant patients [10]. All patients underwent surgery under cardiopulmonary bypass at 36°C with pulsatile perfusion in the second trimester when possible to allow completion of organogenesis and minimize hemodynamic compromise. There were no maternal deaths, and eight healthy babies were born, although three pregnancies resulted in intrauterine demise within 1 week of the surgery. The authors concluded that with appropriate maternal and fetal monitoring, close attention to cardiopulmonary bypass, pulsatile perfusion, near-normothermia, and avoidance of vasoconstrictors, risks to both mother and fetus may be minimized.

2.4 Prophylactic open repair

Braverman et al. treated three patients with Loeys-Dietz syndrome [11], who underwent elective aortic root replacement for aneurysmal diseases before pregnancy. Despite careful observation, two of the three women experienced acute aortic dissection in the postpartum period. The authors concluded that their cases highlighted a high risk for pregnancy following aortic root replacement for Loeys-Dietz syndrome.

3. Discussion

Pregnancy induces hemodynamic changes, such as increased blood volume and hyper-dynamic circulation, which may increase the risk of aortic rupture. Patients with aortopathy face potential risks during pregnancy and the postpartum period. In particular, an emergency operation accounts

for significant morbidity and mortality to both mother and fetus, although some successful cases, as discussed herein, have been reported.

Cesarean section is the first choice for delivery and aortopathy should be repaired in emergency cases. Palliative or bridge treatment of endovascular surgery is also an option for selected patients. Elective open repair for a pregnant patient requires prudent cardiopulmonary bypass and anesthesia focused on maintenance of intraoperative hemodynamic stability with appropriate maternal and fetal monitoring. Prophylactic repair does not always produce successful clinical results, although such cases are limited. The Task Force on the Management of Cardiovascular Diseases during Pregnancy of the European Society of Cardiology suggests that prior to pregnancy, women with aortopathy should be counseled against the risk of pregnancy and about the heritable nature of the disease [12].

4. Limitations

Case-reports are main materials in this study, and most cases ended with recover of mother and newborn. Successful cases tend to be reported, but unsuccessful ones might not be apparent. Therefore, it is difficult to conclude a general prognosis of pregnant women with aortopathy.

5. Conclusions

Currently, medical treatment is limited for pregnant women with aortopathy. Such women face potential risks during pregnancy and the postpartum period. Aortic surgery accounts for significant morbidity and mortality in both mother and fetus, although some successful cases have been reported. Prophylactic repair for a high-risk patent also has a limited clinical effect. Women with aortopathy should be counseled against the risk of pregnancy and about the heritable nature of the disease prior to pregnancy.

6. Conflict of Interest

None declared.

7. References

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