

## Correspondence

## Aortic dissection in the third trimester pregnancy without risk factors



Aortic dissection in pregnancy is rare but life-threatening conditions, which occur most commonly in the third trimester and are often secondary to genetic, anatomic or cardiovascular problems, such as Marfan syndrome, Loeys-Dietz syndrome, Turner syndrome, vascular Ehlers-Danlos syndrome, chronic hypertension, or other congenital heart diseases [1–3]. Two main types of aortic dissection, including Stanford type A (DeBakey I and DeBakey II), which involves the ascending part of the aorta and Stanford type B (DeBakey IIIa and DeBakey IIIb) which does not [4–6]. Sudden onset of severe, tearing chest pain, vomiting and possible syncope or cardiopulmonary arrest is the typical clinical presentation. Treacherous diagnosis of aortic dissection might result in maternal–fetal death. The following case will be shared to emphasize the importance of awareness of this rare medical condition and prompt diagnosis of aortic dissection, especially for pregnant women, because the diagnosis is often overlooked, with misdiagnosis occurring in 85% of patients presenting with acute aortic dissection [4].

A pregnant 34 + weeks woman without any medical disease visiting the emergency department presented with severe chest and upper abdominal pain with vomiting. Vital signs were relatively stable except mild tachycardia (heart beat 105/min). Tenderness over the anterior chest wall and upper abdomen, radiated to the back was observed. Laboratory tests showed leucocytosis (white blood cell count 12450/ml). Fetal monitor showed a normal and reactive fetal heart beat and no obvious uterine contraction. Serial abdominal ultrasonography and obstetric ultrasonography showed negative finding. Since persisted chest and upper abdominal pain, which did not respond to painkillers, computed tomography (CT) scan of the chest and abdomen was conducted and results showed type A aortic dissection (Fig. 1). Emergent Cesarean section and aortic grafting was performed. Both mother and baby were discharged smoothly after treatment.

To provide the better understanding of aortic dissection during pregnancy, we used the following strategy to target this topic. Based on our search of PubMed (1970–November 2018; search terms: “pregnancy” and “aortic dissection”; <https://www.ncbi.nlm.nih.gov/pubmed/?term=aortic+dissection%2C+pregnancy>), there are many articles (779 reports) focusing on this topic [1–3,5,6], suggesting that although the current case report is rare, it is worthy of our attention.

First, it is well-known that ultrasound is the most powerful and acceptable tool to evaluate the pregnant women, partly because of no radiation exposure and partly because of convenience and cost-effectiveness [7,8]; however, it needs the experience of technicians or doctors. High technics as well as a better approach, for example, the use of transesophageal echocardiography (TEE) may be a better

choice in the current case. In fact, TEE is the gold standard for diagnosing aortic aneurysm or dissection [1]. In the current case, the patient received the bedside ultrasound examination, but no conclusion was made. It can be explained partly by only abdominal ultrasound, which failed to evaluate the thoracic part, and partly by no known risk factors predisposing her to aortic dissection (omission). However, due to the lack of immediate access of TEE, CT scan may be an alternative, even though radiation exposure cannot be avoided. CT scan of the aorta could provide valuable information for the surgical planning of treatment, similar to our current reported case. It is reported that most diagnostic radiation procedures will lead to a fetal absorbed dose of less than 1 mGy for imaging beyond the abdomen/pelvis and less than 10 mGy for direct or nuclear medicine imaging [9]. The benefits to the mother in the diagnosis of potentially fatal condition, such aortic dissection in the current case far outweigh the small, unquantified risk to the fetus [10]. In fact, reluctance to image pregnant women is dangerous and is a contributing factor to maternal death and subsequent fetal

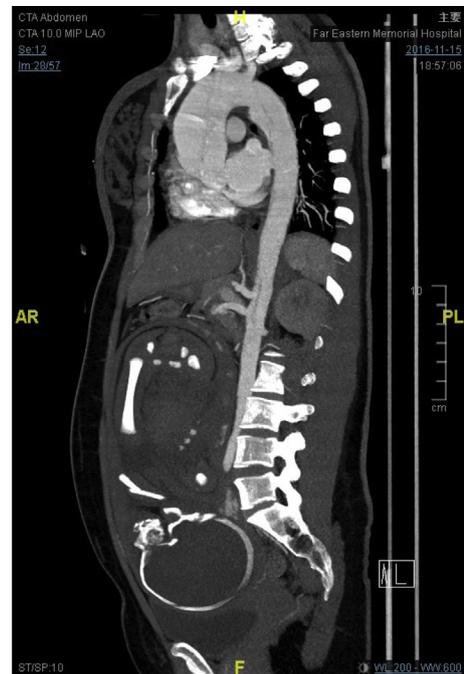


Fig. 1. Computed tomography demonstrates type A aortic dissection in ascending aorta (lateral view).

death. All hint the importance to maintain a broad differential diagnosis (awareness of aortic dissection) and utilize the necessary clinical tools to further direct patient care and necessary intervention with obtaining the better outcome of this complicated disease.

Second, the pathophysiology of aortic dissection is significantly different between general population and pregnant women. The former is often associated with hypertension and atherosclerosis but the latter is often secondary to inherited form of connective tissue disorders, cardiovascular deformities, and vascular inflammatory change precipitating to aortopathy [2]. Although many pregnant women with aortic dissection have an underlying problem, some does not, just like a current report. However, pregnancy itself confers a significantly increasing risk of aortic dissection, partly because of hemodynamic change, such as increased blood volume, increased stroke volume, heart rate, cardiac output, left ventricular mass, gravid uterus related to increasing outflow resistance of vessels, and hormone change. In addition, hemodynamic stress is much more severe in the third trimester and immediate postpartum period, which provides a good explanation why the majority of the aortic dissections occur at that time [3].

Dr. Rajagopalan and colleagues conducted a literature review to identify publications related to aortic dissection in pregnancy between 2003 and 2013 and the results showed the followings specific to the pregnancy, including (1) mean age of 32.5 years (standard deviation of 4.5 years); (2) occurrence in the third trimester (58.6%, n = 44) with median gestational age of 32 weeks; (3) the most common type of Stanford type A aortic dissection (77.3%, n = 58); (4) the mean aortic root size of type A and B of 53 mm and 42 mm, respectively in antepartum period and 61 mm, and 60 mm, respectively in postpartum period; (5) half of cases without predisposing factor (50.7%, n = 38); (6) maternal death of type A and B of 21% (n = 12) and 23% (n = 4), respectively; (7) fetal death of type A and B of 10.3% (n = 8) and 35% (n = 6), respectively; and (8) urgent aortic repair of type A and B of 88% (n = 51) and 53% (n = 9), respectively [2]. Patients presenting with type A aortic dissection is often managed by direct surgical repair, which can be performed at any trimester [11,12]. Immediate delivery (often cesarean section) should be based on the possibility of fetal survival. In the current case, the patient presented a typical disease course, and she was managed by cesarean section (more than 34 weeks of gestation) and surgical repair (type A aortic dissection) simultaneously, suggesting that knowledge about the disease, such as aortic dissection, is much more critical for the patient's care.

## Conclusions

Chest pain and upper abdominal pain, especially radiation to the back in the pregnant women, should be always kept in mind to consider the urgent and life-threatening but curable diseases, even though they are totally free of risk factors. The catastrophic situation can be minimized by doctor's awareness and an appropriate use of diagnostic tools, even though these are invasive procedures and/or need acceptable radiation exposure.

## Conflicts of interest

The authors declare that they have no competing interests.

## References

- [1] Easo J, Horst M, Schmuck B, Thomas RP, Saupe S, Book M, et al. Retrograde type a dissection in a 24th gestational week pregnant patient – the importance of interdisciplinary interaction to a successful outcome. *J Cardiothorac Surg* 2018;13:36.
- [2] Rajagopalan S, Nwazota N, Chandrasekhar S. Outcomes in pregnant women with acute aortic dissections: a review of the literature from 2003 to 2013. *Int J Obstet Anesth* 2014;23:348–56.
- [3] Yuan SM. Postpartum aortic dissection. *Taiwan J Obstet Gynecol* 2013;52:318–22.
- [4] Nienaber CA, Clough RE, Sakalihan N, Suzuki T, Gibbs R, Mussa F, et al. Aortic dissection. *Nat Rev Dis Prim* 2016;2:16053.
- [5] Patel PA, Fernando RJ, Augoustides JG, Yoon J, Gutsche JT, Feinman JW, et al. Acute type-B aortic dissection in pregnancy: therapeutic challenges in a multidisciplinary setting. *J Cardiothorac Vasc Anesth* 2017;31:2268–76.
- [6] Patel PA, Fernando RJ, MacKay EJ, Yoon J, Gutsche JT, Patel S, et al. Acute type A aortic dissection in pregnancy—diagnostic and therapeutic challenges in a multidisciplinary setting. *J Cardiothorac Vasc Anesth* 2018;32:1991–7.
- [7] Yazawa H, Takiguchi K, Ito F, Fujimori K. Uterine rupture at 33rd week of gestation after laparoscopic myomectomy with signs of fetal distress. A case report and review of literature. *Taiwan J Obstet Gynecol* 2018;57:304–10.
- [8] Feng B, Zhai J, Cai Y. Effect of twin pregnancy chorionic properties on maternal and fetal outcomes. *Taiwan J Obstet Gynecol* 2018;57:351–4.
- [9] Lowe SA. Diagnostic radiography in pregnancy: risks and reality. *Aust N Z J Obstet Gynaecol* 2004;44:191–6.
- [10] Hodson K, Waugh J, Nelson-Piercy C. Exposure to diagnostic radiation and risk of childhood cancer: overstated risks raise unnecessary concern. *Evid Based Med* 2011;16:170–1.
- [11] 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.
- [12] Barrus A, Afshar S, Sani S, LaBounty TG, Padilla C, Farber MK, et al. Acute type A aortic dissection and successful surgical repair in a woman at 21 weeks gestational pregnancy with maternal and fetal survival: a case report. *J Cardiothorac Vasc Anesth* 2018;32:1487–93.

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