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Case report - Ascending aortic dissection associated with pregnancy

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Abstract
Aortic dissection associated with pregnancy is a rare but extremely urgent condition with a potentially fatal outcome for both mother and fetus. From the group of cardiovascular risks of maternal mortality, it ranks third. According to the localization of the aortic flow, the difference is type A, ascending aorta and type B, descending aorta. Some women have increased risk factors for the development of aortic dissection associated with pregnancy, and such a condition can be combined with the term aortopathy, but the majority of patients are not even recognized as a potential risk for the development of aortopathy and the development of a potentially fatal outcome. The approach to a patient with aortopathy requires a multidisciplinary approach, with the timing of pregnancy planning when the most optimal conditions for the same are established.

Keywords: Pregnancy, aortic dissection

Introduction
Aortic dissection in pregnancy is a rare condition, occurring in only 0.0004% of pregnancies [1]. Patients with severe aorthropopathy have a higher risk of pregnancy-related aortic dissection, but in most cases such conditions are recognized only when aortic dissection occurs, because most of these patients are not recognized as at risk. Aortic dissection is rarely associated with pregnancy, except in isolated cases of women with Marfan syndrome, Loeys-Dietz syndrome, nonsyndromic hereditary thoracic aortic disease (HTAD), vascular Ehlers-Danlos syndrome, Turner syndrome, bicuspid aortic valve (BAV) with aneurysm, and other aortopathies when the risk of aortic dissection associated with pregnancy increases [2]. Women with aortopathies, who are planning pregnancy, are approached in a multidisciplinary manner, and are advised to delay pregnancy or repair aneurysmal loci. In the majority of cases, patients with aortic dissection associated with pregnancy are not recognized as being at risk. Aortopathy refers to disorders of the aorta, aneurysmal changes and aortic dissection. Aortic dissection associated with pregnancy represents a high risk because it can lead to a lethal outcome for both mother and fetus, and refers to the period from conception to 12 weeks after delivery [3]. The third cause of maternal mortality is cardiovascular disease. Pregnancy increases the risk of aortic dissection 4- to 25-fold [1]. Physiological hormonal and cardiovascular changes dominant throughout pregnancy lead to changes including increased blood volume, cardiac output, and maternal heart rate, with decreased arterial blood pressure and systemic vascular resistance. Changes progress from the beginning of pregnancy with a special peak in the third trimester of pregnancy. Estrogen and progesterone blood levels rise as the pregnancy progresses through the weeks, which may link the sensitivity of estrogen receptors on the aorta to high hormone levels [4]. Hormonal exposure of receptors to high levels of estrogen generates structural modifications in the aortic wall, causing an increase in aortic diameter [5]. Aortic dissection associated with pregnancy is divided into type A, ascending aorta, and type B, descending aorta. 60% of type A dissection occurs in the third trimester, and 40-50% in the postpartum period [6].

Case presentation
Patient H.A. 20 years old, is hospitalized at the cardiovascular surgery department due to suspected aortic dissection in the thirty-first week of pregnancy. A gynecological ultrasound examination did not register the heartbeat of the fetus, but as the patient's general condition

worsened with a picture of hemodynamic shock with accompanying urgent diagnostic treatment, a diagnosis of Stanford Dissection was made, it was decided to undergo cardiac surgery and cesarean section. In the earlier medical history, the patient mentioned kidney problems in childhood, without accompanying medical documentation.

Discussion

The study by Braverman *et al*. examined the clinical features, aortic imaging characteristics, and outcomes of women with pregnancy-related acute aortic dissection listed in the International Registry of Acute Aortic Dissection (IRAD). It covered the period from 1998 to 2019 with a total of 9707 women who had aortic dissection during pregnancy or in the postpartum period (up to 12 weeks after delivery). 3341 women were included in the IRAD, and pregnancy/postpartum aortic dissection status was available for 2788 women (83%), of whom 29 experienced acute aortic dissection during pregnancy or postpartum. Acute dissection of the ascending aorta occurred in 13 women (45%). The time of aortic dissection was available in 27 women. Fifteen had aortic dissection during pregnancy (4 in the first trimester; 11 in the third trimester). Twelve women had a postpartum aortic dissection at a mean (SD) interval of 12.5 (14) days postpartum. Of 11 women with known timing of ascending aortic dissection, 7 dissections (64%) occurred in the third trimester and 4 dissections (36%) occurred postpartum, whereas 8 of 16 type B dissections (50%) occurred postpartum. Treatment strategies were reported for all women. All 13 with ascending aorta dissection underwent surgery [5]. In the study by Sawlani *et al*., it was found that 0.1% of all cases of aortic dissection are cases related to pregnancy, i.e. in the period from 1998 to 2008. of more than 10 million pregnancies and 41,000 aortic dissections, 44 were pregnancy-related [1]. In the majority of published studies, aortic dissection associated with pregnancy is dominated by the dissecting ascending aorta, and AD repair refers to type A. If the pregnancy is < 28 weeks of gestation, the priority is the mother's life, in the other weeks of gestation, the plan is to save both the life of the mother and the life of the fetus. The study by Zhu *et al*. showed 14.3% maternal mortality, with no fetal mortality in patients who underwent a strategy that prioritized pregnancy completion, 16.7% maternal mortality, and 33% fetal mortality in patients who underwent both delivery and aortic repair, and the highest fetal mortality of 66.7% and 16.7% maternal mortality in the strategy in which aortic repair is first approached [7]. By reviewing the literature, we come across the information that out of 90 cardiovascular causes of death in the Netherlands, 20 are caused by aortic dissection related to pregnancy, and among these patients, 18% had connective tissue disease, and 41% had hypertensive disorders during pregnancy [8]. From the study by Braverman *et al*., the mortality rate is 3%, i.e. one patient out of a total of 29 followed [6].

Conclusion

Aortic dissection associated with pregnancy is a rare and potentially fatal condition, and the incidence rate is higher in young women, < 35 years of age. Of the total number of registered cases of aortic dissection, 19% of cases refer to AD associated with pregnancy and the postpartum period (up to 12 weeks after delivery). In practice, AD type A is more common, the condition when we talk about dilation and dissection of the ascending aorta. Management of the patient with aortopathy is crucial in reducing the mortality of pregnant women from pregnancy-related AD. It is extremely important for a positive pregnancy outcome to recognize a patient at risk for developing AD, and to approach the treatment of the primary problem and the planning of a potential pregnancy in a multidisciplinary manner.

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