

# Type A Aortic Dissection during in pregnancy: Can We Succeed? Fend-Off & Don't Avert

Mohammed Idhrees<sup>1</sup>, Matti Jubouri<sup>2</sup>, Mohamad Bashir<sup>3</sup>, and Bashi Velayudhan<sup>1</sup>

<sup>1</sup>SRM Institutes for Medical Science Vadapalani

<sup>2</sup>Hull York Medical School

<sup>3</sup>Velindre University NHS Trust

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## Abstract

Type A aortic dissection (TAAD) is a life-threatening clinical emergency requiring timely surgical intervention. Concomitant with pregnancy at any stage, it adds an additional level of complexity which mandates careful planning for the management strategy that will yield the optimal outcomes. It is life-threatening pathology to both the mother and foetus, with mortality rates of up to 30% and 50% reported, respectively. Safe imaging modalities that do not expose the foetus to radiation and contrast are recommended to reach an accurate diagnosis. In addition, meticulous multi-disciplinary team planning is pivotal to ensure optimal outcomes are achieved through careful choice of surgical technique as well as strict control of medications. Although TAAD in pregnancy is associated with high mortality and morbidity to both the mother and her foetus, success in the treatment of this small subset of patients can certainly be achieved.

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Idhrees Mohammed MS MCh FAIS <sup>1</sup>, Matti Jubouri<sup>2</sup>, Mohamad Bashir MD PhD MRCS <sup>1,3</sup>, Bashi Velayudhan MBBS MS MCh <sup>1</sup>

1. Institute of Cardiac and Aortic Disorders (ICAD), SRM Institutes for Medical Science (SIMS Hospital), Chennai, Tamil Nadu, India.
2. Hull York Medical School, University of York, York, UK
3. Vascular & Endovascular Surgery, Velindre University NHS Trust, Health Education & Improvement Wales (HEIW), Cardiff, UK

## Correspondence:

Idhrees Mohammed MS MCh FAIS

Institute of Cardiac and Aortic Disorders (ICAD)

SRM Institutes for Medical Science (SIMS Hospital)

Chennai

Tamil Nadu

India

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## Commentary

We read with great interest Ayati et al. [1] recent review article abating on a rare occurrence of type A aortic dissection (TAAD) during 8 week gestational phase in a primigravid. Its unequivocal that there is an unmet clinical need in aortic practice on this entity. TAAD during pregnancy is a life-threatening event for both the mother and the unborn baby. Furthermore, pregnancy has been recognized as an independent risk factor for TAAD, postulated to be due to physiological changes that cause hyperdynamic circulation. The authors are to be commended on their comprehensive literature search and methodology as well as their detailed approach to describing the relationship between aortic dissection and pregnancy and to summarising its predisposing factors, imaging modalities, surgical treatment and techniques, medication challenges and future directions.

The challenges faced when dealing with TAAD in pregnancy are multifaceted and require an individualised and tailored approach. Despite this, challenges in implementing management strategies in the form of operative techniques and cardiopulmonary bypass (CPB) use place the foetus at a significant and must be approached with great caution. The general consensus is not to operate or avoid surgery in the first trimester. But if the patient is unstable, the risk has to be explained and then mother to undergo central aortic repair. Few authors even advise termination of pregnancy and central aortic repair [2].

In agreement with Ayani et al. [1], the choice of imaging modality is one to be taken with care and consideration of the foetus's health. However, imaging-posed additional radiation exposure and teratogenicity of the contrast material, such as iodinated- or Gadolinium-based contrast media, must be avoided [3][4]. Thus, we recommend an existential ultrasonography and MRI and in line with what is recommended radiological methods in the literature for any pregnant woman [4].

The choice of treatment for TAAD depends on the extent of the disease, this is almost always surgical [5]. Despite the evolution of surgical techniques as well as pre- and post-operative care, the surgical mortality rate for TAAD still remains highly variable depending on the technique used. There is a substantial debate as to limit surgical extent to saving the patient with limited aortic approach versus the more aggressive extended approach. If only the ascending is pathological, the surgeon can perform a hemiarch replacement, however, if the aortic arch is contemplated in the pathology, the surgical approach changes to whether or not to adopt the frozen elephant trunk (FET) technique. Both of the above procedures involve the use of cardiopulmonary bypass (CPB) and both can be combined with a Bentall or David procedure to replace or repair the aortic valve [6][7][11]. In the case that the aortic valve needs to be replaced, the choice of prosthetic valve, whether mechanical or biological, needs to be taken with care on a case-by-case basis [1].

The other dilemma that compounds the scenario is the question of when to deliver the foetus as essentially this varies around the age of the foetus, with some authors such as Zeebregts et al. [8] suggesting the option of concomitant delivery between 28 and 32 gestational weeks should foetal maturity have occurred. The European Society of Cardiology recommend delivery from 26 gestational weeks when foetal maturity

is likely to have been reached [9]. On the other hand, Yates et al [10] reported their series of 11 pregnant patients (19 gestational weeks, range 16-21 weeks) who underwent emergency cardiac surgery. The authors succeeded with no maternal mortality but reported a foetal mortality rate of 27% (3/11) within 1 week of surgery with the remaining 8 babies born at full-term.

Initiating CPB requires alterations in the coagulation factors, complement cascade activation and hypothermia, which can have detrimental effects on the placenta and, in turn, the foetus [1]. A 2018 meta-analysis combined data from 10 studies on maternal and foetal outcome after open heart surgery during pregnancy. The pooled results showed 11.2% and 33.1% rates of maternal and pregnancy loss, respectively [12]. The 33.1% foetal mortality rate is in line with that found in Weiss et al. (30%) [13], however, here the authors reported a lower maternal mortality rate of 6%. In addition, Weiss et al. [13] showed that aortic dissection is associated with the highest mortality amongst the causes for cardiac surgery during pregnancy. Although Ayani et al. [1] summarised intraoperative measures, particularly concerning CPB, this does not indicate that any surgical approach can be diligently considered as safe or risk-averse, as life-threatening risks do exist on both the mother and her foetus. Ayani et al. [1] rightly stressed on the importance of carefully coordinating medications, namely hypertension drugs and anticoagulants, as this can have a serious impact on outcomes for both patients (mother and foetus). However, this is not without limitations, especially in the peri-operative period. Alas, beta-blockers have been shown in several studies to have untoward effects in pregnancy, such as intrauterine growth restriction and foetal bradycardia [9]. A study on celiprolol, however, had a decrease of arterial events (20%) in a randomized control trial compared with control (50%), but this has not been demonstrated in patients with aortic disease [14].

In conclusion, TAAD in pregnancy adds an extra level of complexity to an already complex process. Yet, optimal outcomes can be achieved with planning involving accurate diagnosis, safe imaging, modern surgical techniques, and tight medication control. There is no easy answer to such scenarios, but we remain dutiful in promoting patient-centred and tailored care to achieve optimal results.

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