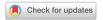


### Editorial



# Pregnancy in Patients with Pulmonary Arterial Hypertension "To Deliver, or Not to Deliver: That Is the Question"

Jae-Hyeong Park 📵, MD, PhD

Department of Cardiology in Internal Medicine, Chungnam National University, School of Medicine, Chungnam National University Hospital, Daejeon, Korea

▶ See the article "Pulmonary Arterial Hypertension and Pregnancy: Single Center Experience in Current Era of Targeted Therapy" in volume 49 on page 545.

"To be, or not to be: that is the question."
William Shakespeare, Hamlet, Act III, Scene I

This famous phrase is a soliloquy of Prince Hamlet in the William Shakespeare's play Hamlet. Many PAH patients are young women and they always have the possibility of being pregnant. If we meet a young pregnant woman patient with pulmonary arterial hypertension (PAH), we will have severe mental anguish in the determination of the termination or the maintenance of the pregnancy. We must consider maternal and fetal outcomes in case of pregnancy in PAH patients. Because there are high mortality rates of mother and fetus associated with pregnancy in PAH, 1-3) current treatment guidelines recommend the avoidance of pregnancy in PAH patients clearly and strongly.<sup>4-6</sup>) The reported maternal death rate was about 30% to 56% in these previous studies, and the major causes of deaths are right ventricular failure and stroke through intracardiac shunts. Moreover, the fetal death rate was about 11% to 28% usually from premature birth and growth retardation.<sup>3)</sup> However, these data resulted from previous studies more than 20 years ago. Thus, we need more recent data reflecting current PAH treatment. In this current issue, Lim et al.7 reported their data about the clinical outcome of 10 pregnancies in 9 PAH patients. Fortunately, the authors reported there was no maternal or fetal mortality with their multidisciplinary team approach. However, there were severe cardiac events in two mothers despite careful treatment.

All pregnant PAH patients should be counseled to terminate the pregnancy seriously, especially in patients with worsening right heart failure or with other high risk features. Therapeutic abortion is recommended before 22 weeks of gestation. Early planned terminations in PAH patients are usually safe. However, if patients want to continue their pregnancies, these patients should be managed by a multidisciplinary team including PAH specialists, cardiologists, anesthesiologists and neonatologists. Because calcium channel blockers, phosphodiesterase type 5 inhibitors, and prostaglandin and its analogues are reported safe during pregnancy, and current guidelines recommended that pregnant PAH patients should be treated with PAH-specific agents except endothelin-receptor antagonists. In this current study, 90% of them were treated with PAH-specific treatment including sildenafil and treprostinil. These pregnant patients should be closely monitored including monthly follow-up visits in the first and second trimester. They are recommended to have

## OPEN ACCESS

**Received:** Feb 17, 2019 **Accepted:** Feb 22, 2019

#### Correspondence to

#### Jae-Hyeong Park, MD, PhD

Department of Cardiology, Internal Medicine, School of Medicine, Chungnam National University, Chungnam National University Hospital, 282 Munhwa-ro, Jung-gu, Daejeon 35015. Korea.

E-mail: jaehpark@cnu.ac.kr

**Copyright** © 2019. The Korean Society of Cardiology

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (https://creativecommons.org/licenses/by-nc/4.0) which permits unrestricted noncommercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

#### ORCID iDs

Jae-Hyeong Park (D) https://orcid.org/0000-0001-7035-286X

#### **Conflict of Interest**

The author has no financial conflicts of interest.

The contents of the report are the author's own views and do not necessarily reflect the views of the *Korean Circulation Journal*.

https://e-kcj.org 555



a weekly clinic visit in their third trimester. The cesarean section with epidural or spinal-epidural anesthesia is the preferred method of delivery. Because the clinical course of PAH can be worsened during the postpartum period, these patients should be monitored intensively.

Editorial members were seriously concerned that this paper might give misconceptions that female patients with PAH may be pregnant safely. However, we decided to accept this paper to give information to readers this valuable experience reflecting current treatment status. Thus, this data should only be applied in PAH patients with unavoidable pregnancy.

#### REFERENCES

- Weiss BM, Zemp L, Seifert B, Hess OM. Outcome of pulmonary vascular disease in pregnancy: a systematic overview from 1978 through 1996. J Am Coll Cardiol 1998;31:1650-7.
   PUBMED | CROSSREF
- Bonnin M, Mercier FJ, Sitbon O, et al. Severe pulmonary hypertension during pregnancy: mode of delivery and anesthetic management of 15 consecutive cases. *Anesthesiology* 2005;102:1133-7.
   PUBMED | CROSSREF
- 3. Gleicher N, Midwall J, Hochberger D, Jaffin H. Eisenmenger's syndrome and pregnancy. *Obstet Gynecol Surv* 1979;34:721-41.

#### PUBMED | CROSSREF

- 4. Galiè N, Humbert M, Vachiery JL, et al. 2015 ESC/ERS Guidelines for the diagnosis and treatment of pulmonary hypertension: The Joint Task Force for the Diagnosis and Treatment of Pulmonary Hypertension of the European Society of Cardiology (ESC) and the European Respiratory Society (ERS): Endorsed by: Association for European Paediatric and Congenital Cardiology (AEPC), International Society for Heart and Lung Transplantation (ISHLT). Eur Heart J 2016;37:67-119.
  PUBMED | CROSSREF
- European Society of Gynecology (ESG)Association for European Paediatric Cardiology (AEPC)German Society for Gender Medicine (DGesGM) ESC Guidelines on the management of cardiovascular diseases during pregnancy: the Task Force on the Management of Cardiovascular Diseases during Pregnancy of the European Society of Cardiology (ESC). Eur Heart J 2011;32:3147-97.
   PUBMED | CROSSREF
- 6. Hemnes AR, Kiely DG, Cockrill BA, et al. Statement on pregnancy in pulmonary hypertension from the Pulmonary Vascular Research Institute. *Pulm Circ* 2015;5:435-65.
- Lim K, Chang SA, Oh SY, et al. Pulmonary arterial hypertension and pregnancy: Single center experience in current era of targeted therapy. *Korean Circ J* 2019;49:545-54.
   CROSSREF
- 8. Jaïs X, Olsson KM, Barbera JA, et al. Pregnancy outcomes in pulmonary arterial hypertension in the modern management era. *Eur Respir J* 2012;40:881-5.

  PUBMED | CROSSREF
- Kiely DG, Condliffe R, Webster V, et al. Improved survival in pregnancy and pulmonary hypertension using a multiprofessional approach. *BJOG* 2010;117:565-74.
   PUBMED | CROSSREF
- Bildirici I, Shumway JB. Intravenous and inhaled epoprostenol for primary pulmonary hypertension during pregnancy and delivery. *Obstet Gynecol* 2004;103:1102-5.
   PUBMED | CROSSREF