

CASE REPORT

INTERMEDIATE

HEART CARE TEAM/MULTIDISCIPLINARY TEAM LIVE

# Infective Endocarditis in a Third Trimester Pregnant Woman Team Work Is the Best Option



Roxana Botea, MD,<sup>a</sup> Jean Porterie, MD,<sup>b</sup> Bertrand Marcheix, MD, PhD,<sup>b</sup> Franck-Olivier Breleur, MD,<sup>b</sup> Yoan Lavie-Badie, MD<sup>a</sup>

ABSTRACT

Infective endocarditis in pregnancy may have a misleading presentation and carries a high-risk of complications for both the mother and her infant. When urgent valve surgery is required, the fetal risk relative to cardiopulmonary bypass is challenging requiring a multidisciplinary management. We report the case of a pregnant woman with infective endocarditis on a bicuspid aortic valve who was successfully treated by a 2-step strategy including cardiac surgery. **(Level of Difficulty: Intermediate.)** (J Am Coll Cardiol Case Rep 2020;2:521-5) © 2020 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

A 40-year-old woman with a 33-week intra-uterine pregnancy was admitted complaining about fever, dyspnea, and joint pain. Her blood pressure was 110/90 mm Hg, heart rate 110 beats/min, and SaO<sub>2</sub> 96% on air, on admission. In the past few weeks, she had dental procedures without antibiotic prophylaxis. Her past medical history included an asymptomatic mild aortic regurgitation (AR) on a type 0 bicuspid aortic valve.

LEARNING OBJECTIVES

- To assess the benefit-risk balance of heart surgery in a pregnant woman.
- To understand the key role of multidisciplinary teams in this complex situation.

QUESTION 1: WHAT ARE THE DIFFERENTIAL DIAGNOSES OF FEVER DURING PREGNANCY?

Answer 1: Fever is common during pregnancy and has several causes: obstetrical-like chorioamnionitis, infectious-like pyelonephritis, pneumonia, listeriosis, or a viral infection.

In the absence of gynecological signs, a listeriosis infection was suspected, blood cultures were drawn, and amoxicillin was started orally (3 g/day). The patient was discharged.

One week later, given the persisting fever, the worsening of her dyspnea, and the positive blood cultures with *Streptococcus oralis*, the patient was readmitted. Clinical exam was consistent with acute pulmonary edema. A transthoracic echocardiogram

From the <sup>a</sup>Department of Cardiology, Rangueil University Hospital, Toulouse, France; and the <sup>b</sup>Department of Cardiovascular Surgery, Rangueil University Hospital, Toulouse, France. Dr. Marcheix has served as a proctor for Edwards Lifesciences and Medtronic. Dr. Lavie-Badie has served as a proctor for Abbott Vascular; and as a consultant for GE Healthcare. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose. The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the JACC: Case Reports [author instructions page](#).

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**ABBREVIATIONS  
AND ACRONYMS****AR** = aortic regurgitation**IE** = infective endocarditis**MRI** = magnetic resonance  
imaging

identified severe AR (effective regurgitant orifice area 0.3 cm<sup>2</sup>, regurgitant volume 58 ml) and a large 20-mm vegetation on the ventricular side of the right cusp of a type 0 bicuspid aortic valve, lateral Sievers phenotype (Video 1).

**QUESTION 2: HOW DOES THIS INFORMATION  
REFINE THE DIFFERENTIAL DIAGNOSIS?**

Answer 2: The blood cultures results were not consistent with listeriosis. The most likely diagnosis at this stage was IE, as the positivity of blood cultures to a typical germ involved in IE, as well as the presence of valvular vegetations, allowed us to retain 2 major criteria of the modified Duke criteria (1).

IE during pregnancy is rare but can be higher in congenital heart disease (0.1%) (2,3). During pregnancy, it carries a high risk for both mother and fetus, with a respective mortality rate ranging from 11% to 33% and 14% to 29%, respectively (2-4).

**QUESTION 3: WHAT ADDITIONAL  
INVESTIGATIONS DO YOU PROPOSE TO  
COMPLETE YOUR DIAGNOSIS?**

Answer 3: With regard to the use of imaging techniques during pregnancy, we initially focused on

ultrasound and magnetic resonance methods to limit the risk of fetal irradiation.

According to the guidelines, a transesophageal echocardiogram is mandatory after positive transthoracic echocardiography as soon as possible in patients at high risk for complications (5). It showed an annular abscess at the level of the posterior commissure, near the mitroaortic curtain, and confirmed the severity of the AR (Figures 1 and 2, Videos 2, 3, 4, and 5).

Cerebrovascular imaging may be considered in all patients with left-sided IE (5); therefore, cerebral magnetic resonance imaging (MRI) was performed and detected 2 mycotic intracranial aneurysms, the largest of which was 6 mm, in the right frontal lobe (Figure 3). Ultrasound examination showed an appropriate image for a gestational-age fetus in vertex presentation, and fetal heart monitoring was normal.

**QUESTION 4: WHICH ANTIBIOTIC  
TREATMENT DO YOU OPT FOR?**

Answer 4: According to the guidelines, IE during pregnancy should be treated in the same way as in the nonpregnant patient (2). For the Streptococcus infection, amoxicillin can be given safely during pregnancy, with a definite fetal risk being associated with aminoglycosides.

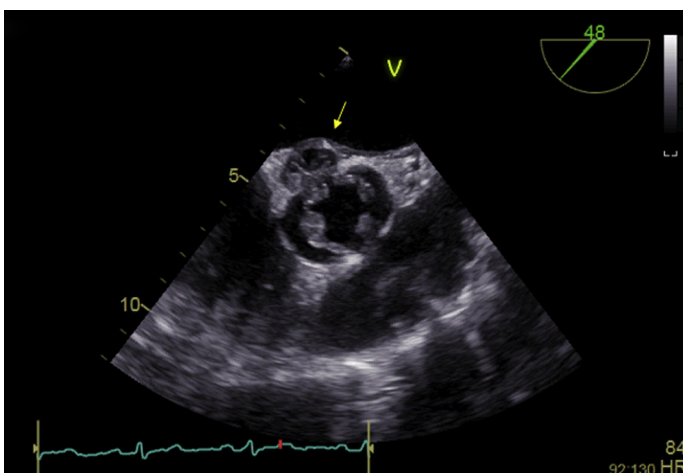
As recommended in the current endocarditis guidelines (5,6), we started intravenous amoxicillin (12 g/day), which aimed to be active against penicillin-susceptible *S. oralis* strains (minimum inhibitory concentration <0.125 mg/dl).

**QUESTION 5: CONCERNING A POTENTIAL  
SURGICAL MANAGEMENT, IS THERE AN  
INDICATION, AND WHAT ARE THE RISKS  
INCURRED BY THE FETUS AND THE MOTHER?**

Answer 5: In IE, about one-half of patients (6) have an indication for surgery, which is particularly challenging during pregnancy. Because of acute heart failure owing to acute AR and the embolic risk, an early surgery was mandatory in our case (5).

Regarding the fetal risk, mortality during surgery with cardiopulmonary bypass remains high (20%), so the fetus should be delivered prior to surgery whenever possible (2).

The mother was exposed to a high risk of bleeding related to the intracranial mycotic aneurysms (mortality rate of about 60%) (7). An endovascular

**FIGURE 1** Deterged Abscess of the Mitro-Aortic Curtain: Short-Axis View

Transesophageal echocardiography, short axis at 48°, showing at the base of the great vessels a bicuspid aortic valve, lateral type 0 Sievers phenotype, and perianular abscess (arrow).

treatment was initially planned, but in this case an aneurysm embolization was precluded due to their distal localization (Figure 3). As a second cerebral MRI showed no increase in the aneurysm's diameters and no bleeding, we decided in favor of the surgery.

Afterwards, the multidisciplinary endocarditis and pregnancy team favored a 2-step urgent management, given the poor hemodynamic tolerance of the severe acute infectious endocarditis and the fetal risk.

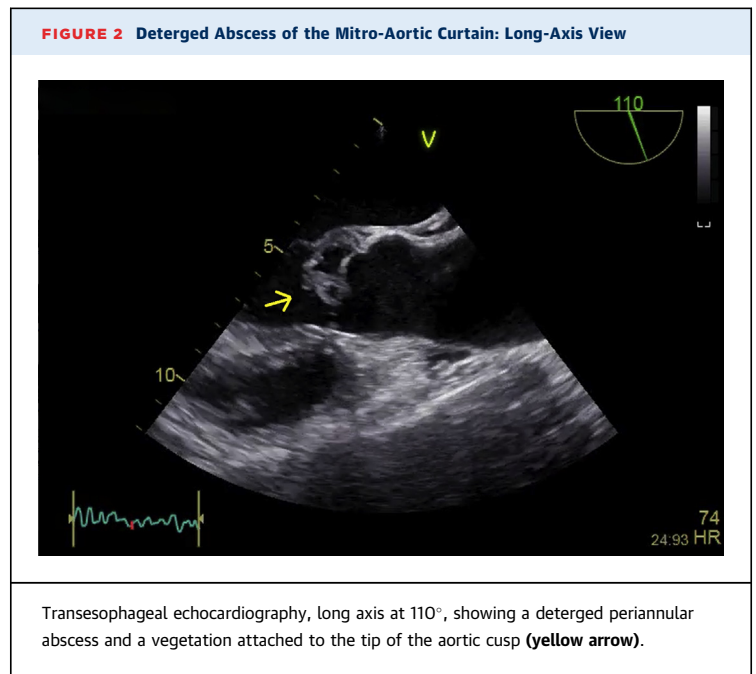
First, 3 days after readmission, the patient underwent a caesarean surgery, delivering a 1.8-kg female infant. We initially preferred an epidural anesthesia, which, unfortunately, provided only a 1-sided block. The bilateral sensory level was achieved neither by replacing the catheter nor by redosing the anesthetic and so we finally used a general anesthesia. The procedure was uneventful. The newborn experienced a respiratory distress syndrome, evolving favorably in the first few hours after adapted management. Antibiotic therapy was started promptly, and stopped few days later, because of the child's negative blood cultures.

After cesarean delivery, a complete assessment of the extension of endocarditis was carried out with electrocardiography-gated thoracic, abdominal, and pelvic computed tomography, finding the periannular abscess (Figures 4A, 4B, and 5) and a splenic infarction. Coronary arteries were patent.

Second, 4 days after the delivery, the patient underwent surgical aortic valve replacement, with a gynecological team ready in case an emergency hysterectomy was needed. The intraoperative findings confirmed the preoperative multimodality imaging assessment. After excision of all the infected tissues and repair of the native aortic annulus with an autologous pericardial patch, a biological prosthesis was implanted. At the end of the intervention, a gynecological examination confirmed the absence of uterine bleeding.

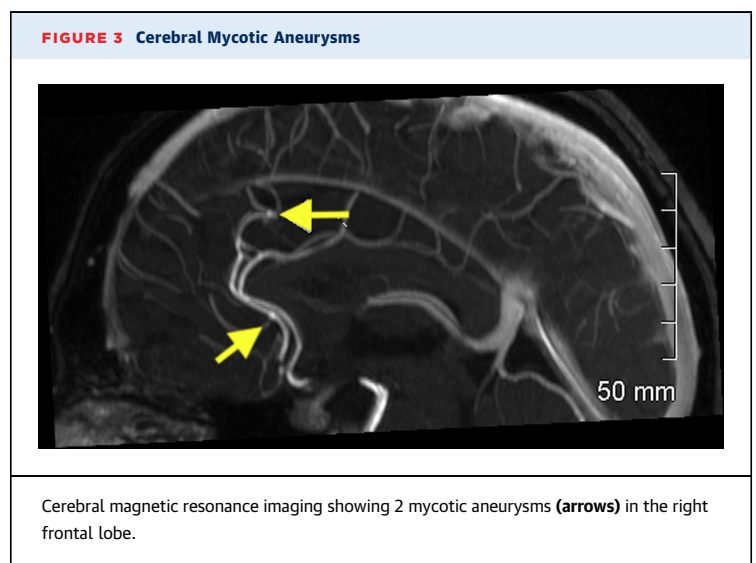
Concerning the antibiotic therapy given to the mother in the postoperative setting, we initially continued the amoxicillin regimen (12 g/day), and switched afterward to ceftriaxone 2 g/day, given the penicillin-susceptible strains involved. The entire therapy was administrated intravenously. Owing to the fact that the excided valve bacterial culture was negative, we decided in favor of a 4-week duration regimen, counting from the first day of effective antibiotic therapy, proven by the first negative blood culture, in the preoperative setting.

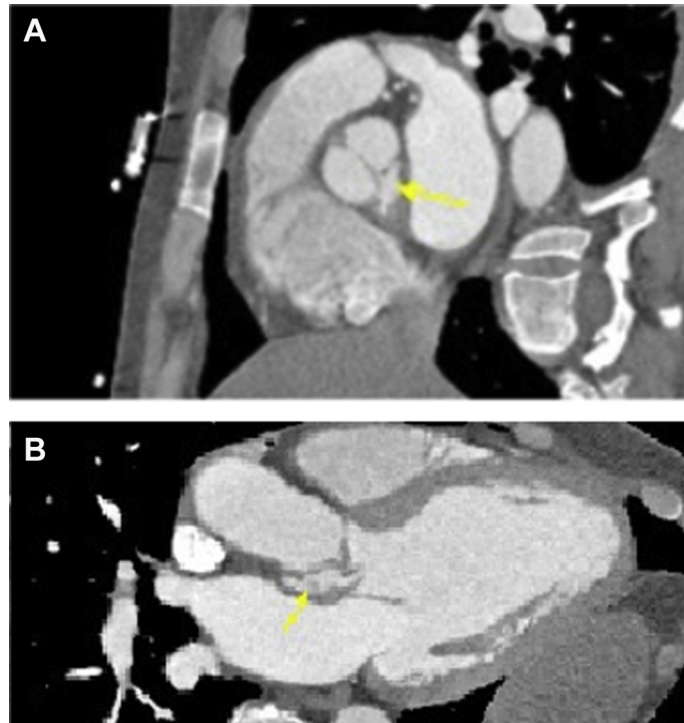
The choice between a mechanical and a biological prosthesis took into account the fact that anti-coagulation was contraindicated for at least 8 weeks



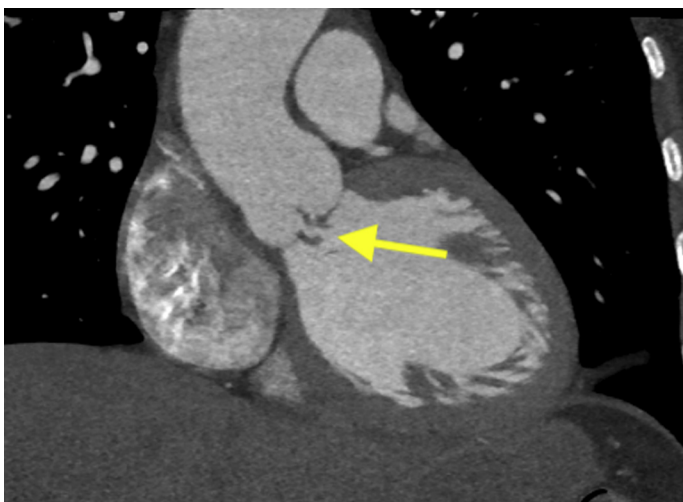
(cerebral bleeding). So, even though our patient was young, the choice favored the bioprosthesis. The patient was extubated 1 day after the surgery, followed by a normal neurological exam. The antibiotic therapy was switched to ceftriaxone 2 g/day, administered parenterally, which was continued for 1 month.

The patient was transferred to the gynecological ward 10 days after the surgery and was discharged on day 19. At the 6-month follow-up visit, both the patient and the baby were in good clinical conditions. After discharge, a cardiology follow-up consultation was scheduled at 1 month after the surgery and then



**FIGURE 4** Periannular Aortic Abscess: Cardiac CT

Cardiac computed tomography showing the periannular aortic abscess localized near the mitroaortic curtain, viewed in (A) short axis and (B) long axis (arrows).

**FIGURE 5** Aortic Cusp Perforation: Cardiac CT

Cardiac computed tomography showing right cusp perforation (arrow).

at 6 months. The echocardiography showed a normal functioning aortic prosthesis.

At the end of the 4-week antibiotic therapy, the patient also had a control cerebral MRI, which showed a clear reduction of the diameters of both the ischemic and the hemorrhagic lesions and also the resolution of the mycotic aneurysms. No new lesions were found, which was reassuring. In view of the favorable evolution, we decided to stop the follow-up by cerebral MRI as long as the clinical status was to remain stable.

**QUESTION 6: THE PATIENT HAD RECEIVED DENTAL CARE SHORTLY BEFORE HER IE. SHOULD SHE HAVE RECEIVED ANTIBIOTIC PROPHYLAXIS?**

Answer 6: According to the guidelines (6), peri-procedural prophylactic antibiotics are recommended only for high-risk patients with cyanotic noncorrected or palliated congenital heart disease, with a cardiac prosthesis, or with history of IE. In consequence, antibiotic prophylaxis was not mandatory in this case.

## PERSPECTIVES

Given the inherent maternal and fetal risk, the decision making in favor of a cardiac surgery in IE during pregnancy is challenging. Urgent surgery can be mandatory in case of cardiogenic shock or refractory heart failure due to acute valvular regurgitation, uncontrolled infection or recurrent embolic events. In this case, the fetus should be

delivered prior to surgery whenever possible. Management in an expert center by a multidisciplinary team is mandatory to achieve optimal results.

**ADDRESS FOR CORRESPONDENCE:** Dr. Roxana Botea, Department of Cardiology, Rangueil University Hospital, 1 Avenue Jean Poulhès, TSA 50032, 31059 Toulouse Cedex, France. E-mail: [roxana2288@gmail.com](mailto:roxana2288@gmail.com).

## REFERENCES

1. Li JS, Sexton DJ, Mick N, et al. Proposed modifications to the Duke criteria for the diagnosis of infective endocarditis. *Clin Infect Dis* 2000;30:633-8.
2. Regitz-Zagrosek V, Roos-Hesselink JW, Bauersachs J, et al. 2018 ESC Guidelines for the management of cardiovascular diseases during pregnancy. *Eur Heart J* 2018;39:3165-241.
3. Campuzano K, Roqué H, Bolnick A, Leo MV, Campbell WA. Bacterial endocarditis complicating pregnancy: case report and systematic review of the literature. *Arch Gynecol Obstet* 2003;268:251-5.
4. Vizzardi E, De Cicco G, Zanini G, et al. Infectious endocarditis during pregnancy, problems in the decision-making process: a case report. *Cases J* 2009;2:6537.
5. Baddour LM, Wilson WR, Bayer AS, et al. Infective endocarditis in adults: diagnosis, antimicrobial therapy, and management of complications. *Circulation* 2015;132:1435-86.
6. Habib G, Lancellotti P, Antunes MJ, et al. 2015 ESC Guidelines for the management of infective endocarditis: the Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC). Endorsed by: European Association for Cardio-Thoracic Surgery (EACTS), the European Association of Nuclear Medicine (EANM). *Eur Heart J* 2015;36:3075-128.
7. Wilson WR, Bower TC, Creager MA, et al. Vascular graft infections, mycotic aneurysms, and endovascular infections: a scientific statement from the American Heart Association. *Circulation* 2016;134:e412-60.

**KEY WORDS** bicuspid aortic valve, cardiac surgery, infective endocarditis, pregnancy

**APPENDIX** For supplemental videos, please see the online version of this paper.

