

Management of Acute Aortic Infective Endocarditis in Pregnancy

Marco Picichè^{1,*}, Eric Charbonneau² and Richard Baillet²

¹Unità Operativa di Cardiocirurgia, Ospedale San Filippo Neri, Roma, Italy

²Service de Chirurgie Cardiaque, Institut Universitaire de Cardiologie et de Pneumologie de Québec, Québec, Canada

Abstract: The reported incidence of infective endocarditis during pregnancy is 0,006% and there are no accepted guidelines. Management is individually based according to gestational age and the status of the mother. A multidisciplinary approach is required. Cardiopulmonary bypass, hypothermia and hyperkalemia may be fatal for the foetus due to vasoconstrictive response of the uteroplacental arteries. Herein, we report a case of successful treatment of acute aortic endocarditis during the second trimester of gestation, with a focus on timing of surgery and technical aspects.

Keywords: Pregnancy, valve, endocarditis, cardiopulmonary bypass.

INTRODUCTION

Cardiac surgery in pregnant women represents an infrequent but complex problem. No large series have been published so far. Reported data on mother and foetus mortality rates are variables, with a maternal mortality rate ranging from 22.1% [1] to 33% [2] and a foetal mortality rate ranging from 14.7% [1] to 29% [2]. The incidence of infective endocarditis during pregnancy has been reported to be 0,006% [1], but there is little in the literature on this topic [3-6]. There are no international guidelines, and management is considered individually, according to gestational age and the general status of the pregnant woman. A multidisciplinary approach is required. Herein, we report a case of successful treatment of aortic valve endocarditis during the second trimester of gestation, with a focus on timing of surgery and technical aspects.

CASE REPORT

A 29 year-old woman was admitted to the emergency department of a peripheral hospital complaining of chills, fatigue, and progressive dyspnea. She was 22 weeks pregnant. She was suffering from morbid obesity and was a Hepatitis C carrier. Her recent history included abundant use of intravenous cocaine. Blood cultures were positive for *Staphylococcus Aureus*, and a treatment with gentamicine (140 mg/d) and cloxacilline (2 gr/d) was instituted.

After admission at our center she was non-cooperative, and aggressive to the point where sedation was necessary. Body temperature was still

high (40 °C) and she presented diffuse cutaneous petechia of recent origin. Haemoglobin content was 8.0 g/dl, white blood cells count was 13,000 /mm³, and C protein was 234.5. The onset of a respiratory distress syndrome required intubation. Two transesophageal echocardiograms (TEE) were performed. The first one showed normal aortic valve function with abnormal thickening of the right coronary leaflet, a circumferential pericardial effusion and a normal left ventricular function. The second one, performed the day after, showed the progression of the leaflet lesion, with a 13 mm vegetation. Total body computed tomography (CT) showed cerebral, spleen and bilateral kidney embolizations. This complex clinical setting, with concern for the risk of fetus death, required a multidisciplinary approach including obstetrics/gynaecologists, infectiologists, neonatologists, cardiologists, anaesthesiologists and cardiac surgeons. A decision was made in favour of valve replacement, not preceded by caesarean section.

Three days after the second TEE, per-operative TEE was suspicious of a small annular abscess and showed a mild to moderate aortic insufficiency. The operation was performed using conventional ascending aorta and right atrium cannulation, at the end of the 23rd week of pregnancy. After aortic cross clamping, cardioplegia was administered through the coronary sinus. A cell saver instead of a pump sucker was used to aspirate cardioplegia coming from the coronary ostia to avoid perfusate hyperkalemia. Temperature during cardiopulmonary bypass (CPB) was kept between 35 °C and 36 °C, taking care to keep perfusion pressure always above 65 mmHg, and with an output of 3 l/min/m². The expected vegetation on the right cusp was found, but not the abscess. An aortic valvular replacement was done with a Carpentier Edwards

*Address correspondence to this author at the Unità Operativa di Cardiocirurgia, Ospedale San Filippo Neri, Via Martinotti 20, 00135, Roma, Italy; Tel: 0039-389-1570208; Fax: 0039-06-86204055; E-mail: marco.piciche@libero.it

Magna bioprosthesis and the patient was easily weaned after 100 minutes of CPB ad 80 minutes of cross-clamping time. The foetal heart was preserved.

Analysis of the aortic valve confirmed active endocarditis with *Staphylococcus Aureus*. Postoperative chest roentgenograms showed progressive regression of bilateral infiltrates. She was extubated within 24 hours. Postoperative trans thoracic echocardiography showed a normal bioprosthesis and LV function with no residual signs of endocarditis. She was then transferred to the department of obstetrics with fragmin, cloxacilline (2 gr/4 hours), and rifampycine (600 mg/day). She was discharged four weeks after surgery (27th week of pregnancy). At that time fetal development was still normal at echography.

Unfortunately, due to a massive cocaine overdose, after 37th weeks of gestation, the foetus was dramatically suffering, and was lost although an emergency caesarean section was performed.

DISCUSSION

Cardiac disease complicates pregnancy in 2% of patients [7], with high predominance of valvular disease. Aortic aneurysms and dissections may also occur, because hormonal changes lead to alteration of arterial wall components, and because pregnancy is characterized by modification of hemodynamic stress, with increased heart rate, cardiac output, and stroke volume. [8, 9]. During pregnancy, infectious endocarditis is rare, but maternal and foetal mortality rates have been reported to be relatively high [1,2]. Although a medical treatment should be favored, in some cases CPB may not be avoided, namely due to systemic embolisation, persistent high fever unresponsive to antibiotics, heart failure with hemodynamic compromises, and important progression of valve lesions. Cardiopulmonary bypass is a major concern for foetus life. Indeed, during normal pregnancy the uteroplacental arteries are maximally dilated due to local production of prostacyclin, while during CPB the nonpulsatile perfusion regimen leads to a vasoconstrictive response, mediated by prostaglandins and by the decreased production of nitric oxide. Furthermore, hypothermia decreases placental blood flow, and may cause foetal bradycardia, hypoxic-ischemic cerebral insult, and even death. Hyperkalemia, favoured by the cardioplegia administration, may directly affect the foetal myocardium [10, 11]. To avoid some of these problems, some authors have adopted pulsatile

perfusion [10], or a beating heart technique for replacement of the infected aortic valve. The latter technique was achieved with continuous simultaneous antegrade and retrograde coronary blood perfusion, after aortic cross-clamping [11]. The decision to perform a caesarean section before surgery is a delicate one. In an observational study on aortic dissections in pregnancy, Immer *et al.* [8] suggested to perform immediate aortic surgery before 30 weeks of gestation, and a caesarean section, immediately followed by aortic replacement, if pregnancy was more advanced. In this case, the woman was 23 weeks pregnant, and obstetrics/gynecologist advice contraindicated caesarean section, despite the nowadays improvements in neonatal premature care.

The choice of a biological valve was due to the drug addicted nature of the mother, considered not capable of warfarin self administration, and also because recommendations for optimal management of anticoagulation for pregnant women with prosthetic heart valves are still conflicting. In fact, if warfarin represents the optimal treatment for the mother, it is not the best anticoagulant option for the foetus because of its potential teratogenicity, especially during the first trimester. On the other hand, unfractionated heparin or low molecular weight heparin are associated with higher maternal morbidity and mortality rates secondary to valve thrombosis [12].

We believe there is a need for international consensus for management of cardiac surgical diseases in pregnancy. Based on the limited evidence from the literature and on our single experience, we deem that (1) medical treatment should be prolonged as long as possible; (2) when surgery may not be avoided, hypothermia should be avoided during CPB; a perfusion pressure of at least 65 mmHg and a perfusion index of 3 l/min/m² should be maintained; (3) a cell saver should be used to recuperate cardioplegia coming from the coronary ostia. If selective antegrade cardioplegia is used, bicaval cannulation with bicaval snaring is required. (4) Alternative techniques, such as a pulsatile perfusion regimen or beating heart valve surgery, although theoretically helpful, do not seem necessary if CPB is conducted as mentioned above; (5) Gestational age is the key factor for decision making and timing of surgery. We think that the limit of 30 weeks suggested by Immer *et al.* [8] in the setting of acute aortic dissection can be considered also in management of acute infective endocarditis: before 30 weeks of gestation, aortic valve replacement should be performed with the foetus in situ, while after 30 weeks,

valve replacement should be performed after caesarean section. In this case the risk of massive uterine hemorrhage due to systemic heparinization should be considered, and whenever possible a delay of 2 or 3 days following caesarean section would be advisable (6) finally, the choice of a biological or mechanical prosthesis should be made case by case, considering the length of gestation, and the respective foetal and maternal risks related to each anticoagulant option.

ABBREVIATIONS

CPB = cardiopulmonary bypass

CT = computed tomography

TEE = trans esophageal echocardiography

REFERENCES

- [1] Campuzano K, Roqué H, Bolnick A, Leo MV, Campbell WA. Bacterial endocarditis complicating pregnancy: case report and systemic review of the literature. *Arch Gynecol Obstet* 2003; 278: 251-5.
<http://dx.doi.org/10.1007/s00404-003-0485-x>
- [2] Montoya ME, Karnath BM, Ahmad M. Endocarditis during pregnancy. *South Med J* 2003; 96: 1156-7.
<http://dx.doi.org/10.1097/01.SMJ.0000054503.18393.1E>
- [3] Mahli A, Izedes S, Coskun D. Cardiac operation during pregnancy: review of factors influencing fetal outcome. *Ann Thorac Surg* 2000; 69: 1622-26.
[http://dx.doi.org/10.1016/S0003-4975\(00\)01178-4](http://dx.doi.org/10.1016/S0003-4975(00)01178-4)
- [4] Vincelj J, Sokol I, Pevec D, Sutlic Z. Infective endocarditis of aortic valve during pregnancy: A case report. *Intern J Cardiol*, article in press.
- [5] Nyawo B, Shoaib RF, Evemy K, Clark SC. Infective endocarditis during pregnancy: case report. *Heart Surgery Forum* 2007; 10(6): E 480-1.
- [6] Aoyagi S, Akasu K, Amako M, Yoshikawa K, Hori H. Infective endocarditis during pregnancy: report of a case. *Ann Thorac Cardiovasc Surg* 2005; 11: 51-4.
- [7] Cox SM, Hankins GDV, Leveno KJ, Cunningham FG. Bacterial endocarditis: a serious pregnancy complication. *J Reprod Med* 1988; 33: 671-4.
- [8] Immer FF, Bansi AG, Immer-Bansi A, McDougall J, Zehr KJ, Schaff HV, *et al.* Aortic dissection in pregnancy: Analysis of risk factors and outcome. *Ann Thorac Surg* 2003; 76: 309-1.
[http://dx.doi.org/10.1016/S0003-4975\(03\)00169-3](http://dx.doi.org/10.1016/S0003-4975(03)00169-3)
- [9] Sullivan J. Valvular heart surgery during pregnancy. *Surg Clin N Am* 1995; 75: 59-75.
- [10] Tripp HF, Stiegel RM, Coyle J. The use of pulsatile perfusion during aortic valve replacement in pregnancy. *Ann Thorac Surg* 1999; 67: 1169-71.
[http://dx.doi.org/10.1016/S0003-4975\(99\)00113-7](http://dx.doi.org/10.1016/S0003-4975(99)00113-7)
- [11] Teharani H, Masroor S, Lombardi P, Rosenkraz E, Salerno T. Beating heart aortic valve replacement in a pregnant patient. *J Card Surg* 2004; 19: 57-58.
<http://dx.doi.org/10.1111/j.0886-0440.2004.02067.x>
- [12] Nassar AH, Hobeika EM, Abd Essamad H, Taher A, Khalil AM, Usta IM. Pregnancy outcome in women with prosthetic heart valves. *Am J Obstet Gynecol* 2004; 191: 1009-13.
<http://dx.doi.org/10.1016/j.ajog.2004.05.064>

Received on 10-08-2013

Accepted on 17-09-2013

Published on 30-11-2013

DOI: <http://dx.doi.org/10.12970/2311-052X.2013.01.01.4>

© 2013 Picichè *et al.*; Licensee Synergy Publishers.

This is an open access article licensed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0/>) which permits unrestricted, non-commercial use, distribution and reproduction in any medium, provided the work is properly cited.