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Case report
Prikaz slučaja
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MECHANICAL VALVE THROMBOSIS DURING PREGNANCY – A CASE REPORT

TROMBOZA MEHANIČKE VALVULE TOKOM TRUDNOĆE – PRIKAZ SLUČAJA

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Summary

Introduction. If young women with congenital heart disease need heart valve surgery, it is necessary to thoroughly consider the choice of the valve and the risks of serious complications during pregnancy. **Case Report.** We report a case of a woman who presented with a pregnancy complicated by mechanical aortic valve thrombosis at the end of the first trimester. After a thorough evaluation by a multidisciplinary team, the patient underwent surgical thrombectomy and normal mechanical valve function was restored. At 36 weeks of gestation, planned cesarean section was performed. The mother and the child remained well during the 5-year follow-up. **Conclusion.** Mechanical heart valves in pregnancy carry a very high risk of complications. An individualized approach is needed in the management of women with mechanical valves, as well as uniform antenatal care in centers that provide complete care from pregnancy planning to delivery.

Key words: Pregnancy Complications; Bicuspid Aortic Valve Disease; Heart Valve Prosthesis; Thrombosis; Risk Factors; Anticoagulants; Thrombectomy; Prenatal Care; Treatment Outcome

Introduction

Pregnancy is a hypercoagulable state and presents a high-risk period for women with mechanical heart valves [1]. Several anticoagulation regimens are recommended to achieve adequate anticoagulation, on the one hand, and to prevent bleeding and teratogenicity, on the other [2]. However, just over half of women with mechanical valves end up pregnant giving live birth without complications, and only one-third of them have pregnancy free from any maternal or fetal complications [3, 4]. We present a woman whose pregnancy was complicated by mechanical aortic valve thrombosis and resulted in a good outcome for both the mother and the baby after surgical thrombectomy.

Case Report

A pregnant woman aged 35 years was admitted to the Intensive Cardiac Care Unit of our center due to suspected mechanical aortic valve thrombosis. At the age of 33, she underwent index procedure and a me-

Sažetak

Uvod. Kada je kod mlade žene sa urođenom srčanom manom indikovana operacija srčanog zaliska, neophodno je detaljno razmotriti izbor valvule i rizike od ozbiljnih komplikacija tokom trudnoće. **Prikaz slučaja.** Predstavljamo slučaj žene čija se trudnoća na kraju prvog trimestra komplikovala trombozom mehaničke aortne valvule. Nakon što je multidisciplinarni tim uradio detaljnu evaluaciju, urađena je hirurška trombektomija i uspostavljena je normalna funkcija veštačkog zaliska. U 36. nedelji gestacije je urađen elektivan carski rez. Tokom petogodišnjeg praćenja i majka i dete su bez tegoba. **Zaključak.** Mehaničke valvule tokom trudnoće nose veoma veliki rizik od komplikacija. Potreban je individualizovan pristup u vođenju trudnoće ženama sa mehaničkim valvulama, ali i jednoobrazna antenatalna zaštita u centrima koji mogu da omoguće kompletno zbrinjavanje od planiranja trudnoće do porođaja.

Ključne reči: komplikacije u trudnoći; bikuspidna bolest aortnog zaliska; mehanički srčani zalistak; tromboza; faktori rizika; antikoagulansi; trombektomija; prenatalna zaštita; ishod lečenja

chanical aortic valve replacement (23 mm St. Jude Medical valve) due to a congenital bicuspid aortic valve. At the time of surgery, she had severe aortic stenosis with concomitant moderate dilatation of the ascending aorta. After isolated valve replacement, she was stable during the follow-up, with a mean gradient of 6.2 mmHg across the prosthesis, and without an increase in aortic diameter measured by echocardiography.

She got pregnant at the age of 35 for the first time and during the 5th week of gestation the acenocoumarol therapy was changed to subcutaneous low molecular weight heparin in a local hospital. She was referred to a tertiary center for expert counseling where a team of cardiologists and obstetricians concluded that the pregnancy was not contraindicated in regard to the cardiac disease, but the maternal risk of cardiac events was significantly increased which was presented to the patient. The coagulation status was followed at a local hospital.

Although she was asymptomatic during the regular checkup at 13 weeks of gestation, physical examination revealed an aortic systolic murmur. Transtho-

racic echocardiography showed an immobile leaflet of the prosthetic aortic valve (**Figure 1a**), increased peak (86 mmHg), and mean (49 mmHg) gradients across the prosthesis (**Figure 1b**), mild aortic regurgitation, dilated ascending aorta with maximal diameter of 46 mm and normal left ventricular ejection fraction. On admission to the Intensive Cardiac Care Unit, transesophageal echocardiography revealed obstruction of one leaflet with a thrombus (5 x 6 mm) and restricted mobility of the other leaflet.

After a thorough evaluation by a multidisciplinary team, the patient underwent surgical thrombectomy at 13 weeks of gestation. No valvular damage was registered after the removal of the thrombus and normal mechanical valve function was restored (**Figure 2**). The total duration of the non-pulsatile cardiopulmonary bypass was 62 minutes, mild hypothermia of 34°C was achieved, and the pump flow rate was 3 - 3.5 L/min/m². The fetal ultrasound showed a viable fetus with appropriate biometric measurements pre- and post-operatively. Since the patient entered the second trimester, low molecular weight heparin was changed to acenocoumarol. She was discharged 10 days after surgery. At 36 weeks of gestation, she was admitted to the hospital, and a planned cesarean section was performed. Acenocoumarol was changed to subcutaneous low molecular weight heparin in the hospital, four days

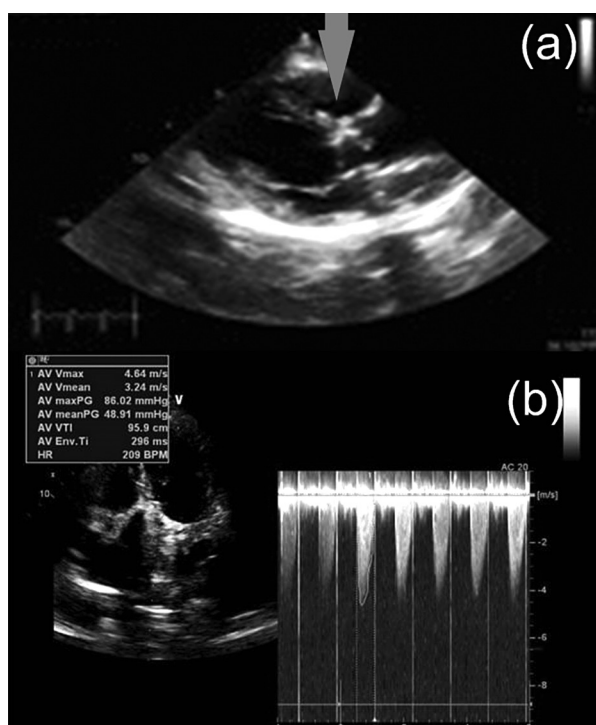


Figure 1. Transthoracic echocardiography: a) Arrow points to the immobile leaflet of the prosthetic aortic valve with a thrombus; b) Elevated maximal (86 mmHg) and mean (49 mmHg) gradients across the prosthesis

Slika 1. Transtorakalna ehokardiografija. (a) Strelica pokazuje na nepokretan listić veštačke aortne valvule sa trombom. (b) Povišen maksimalni (86 mmHg) i srednji (49 mmHg) gradijent nad valvulom

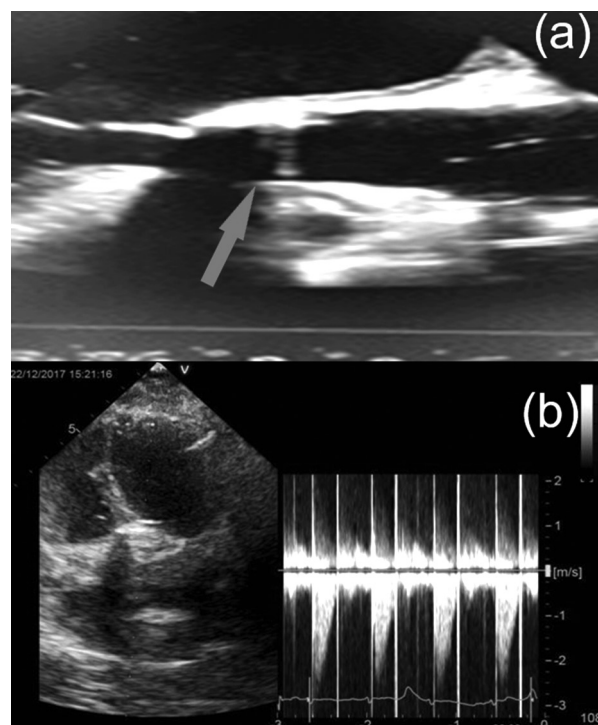


Figure 2. Postoperative echocardiography: a) Transesophageal echocardiography shows normal excursions of mechanical aortic valve leaflets (arrow points to the prosthetic aortic valve); b) Transthoracic echocardiography shows a normal gradient across the prosthesis

Slika 2. Postoperativni ehokardiografski pregled. (a) Transesofagealna ehokardiografija pokazuje normalne pokrete listića mehaničke aortne valvule (Strelica pokazuje na veštačku aortnu valvulu). (b) Transtorakalna ehokardiografija pokazuje normalan gradijent nad valvulom.

before surgery. The postpartum period was uneventful. The baby girl had an Apgar score of 9 at 1 minute and 9 at 5 minutes with a birth weight of 2,520 grams. The mother and the baby remained well during the 5-year follow-up.

Discussion

The number of women with congenital heart diseases reaching childbearing age is growing [5]. Considering the fact that there are no randomized clinical trials on pregnant women, we suppose that presentation of each individual case, especially with good clinical outcomes for both the mother and the child, is of great importance in the evaluation of the current guidelines [2]. Although vitamin K antagonists are considered to be most effective in the prevention of mechanical valve thrombosis during pregnancy, they carry the greatest risk of adverse fetal events during the first trimester. In the Registry of Pregnancy and Cardiac Disease, mechanical valve thrombosis was present in 4.7% of 202 pregnant women on heparin and half of the thrombosis cases occurred during the first trimester [1, 3].

The 2018 European Society of Cardiology guidelines for cardiovascular diseases during pregnancy

recommend anticoagulation regimen during the first trimester depending on the dose of vitamin K antagonists. Low doses (warfarin < 5 milligrams per day, acenocoumarol < 2 milligrams per day) should be continued during the first trimester, while higher doses should be replaced with unfractionated heparin or low molecular weight heparin [2]. Guidelines recommend peak anti-Xa levels for low molecular weight heparin dose adjustment, although cases of mechanical valve thrombosis have been reported in appropriately managed patients as well [2, 6]. Moreover, some patients were never monitored for anti-Xa values during the pregnancy [4]. In our case, anti-Xa levels were not monitored, and it was an error in treatment and follow-up of our patient.

Management of thrombotic valve in pregnancy is consistent with the management of non-pregnant patients, with an increased fetal risk [7]. The therapeutic strategy (surgery or fibrinolysis) is an emergency treatment for obstructive left-sided prosthetic valve thrombosis and it carries a substantial risk of complications. Surgery is usually an emergency reintervention and fibrinolysis has a higher risk of bleeding, systemic embolism, and recurrent thrombosis compared to surgery [8]. The optimal time for surgical intervention is between the 13th and 28th week of pregnancy [9]. At the time of surgery, our patient was 15 weeks pregnant without contraindications for surgery. Although fetal loss with cardiopulmonary bypass ranges from 15 to 56%, after a thorough discussion with a multidisciplinary

nary team that involved an obstetrician, a cardiologist, and a readily available experienced surgeon and anesthesiologist, our patient chose surgery [10, 11]. We can say that the timely decision for surgical intervention by experienced staff and a short duration of cardiopulmonary bypass resulted in a favorable outcome for both the mother and the baby.

Vaginal delivery is recommended for most women with cardiac diseases since it is associated with a lower risk of bleeding, infection, and thromboembolic events. Patients with obstetric indications, presenting in labor on vitamin K antagonists, those with aortic diameter more than 45 mm, acute heart failure, or severe pulmonary hypertension have indications for cesarean delivery. Our patient was a high-risk patient (group III, according to the modified World Health Organization classification of maternal cardiovascular risk) regarding aortic pathology and mechanical valve thrombosis [2, 12]. A planned cesarean section was performed to reduce aortic wall stress and to shorten the period without vitamin K antagonists.

Conclusion

In conclusion, mechanical heart valves in pregnancy carry a very high risk of complications, so an individualized approach to the management of women with mechanical valves is required to improve and provide more uniform antenatal care in centers that provide complete care from pregnancy planning to delivery.

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