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# Mechanical valve thrombosis during pregnancy

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**Abstract**

**Introduction:** In pregnant women with mechanical prosthetic heart valves one of the most important changes is the increased risk for thromboembolic events.
**Case report:** We report a case of nonobstructive aortic prosthetic valve thrombosis in early pregnancy. The patient was successfully treated with unfractioned heparin.
**Conclusion:** Our case is an example of the successful use of unfractionated heparin in a pregnant women with nonobstructive mechanical valve thrombosis. With this case we review the treatment of prosthetic valve thrombosis during pregnancy, and prevention (with oral and parentheral anticoagulant therapy) according to 2017 ESC/EACTS guidelines for the management of valvular heart disease.

**Kew words** mechanical valve, thrombosis, pregnancy

## Introduction

Pregnancy causes changes in cardiovascular system (increase in blood volume and cardiac output, reduction in systemic vascular resistance and blood pressure and increased risk of thrombothic events (hypercoagulability due to increased concentration of coagulation factors and diminished fibrinolysis).

Hemodynamic chances during pregnancy, witch are normal in all pregnant women, may exacerbate underlying cardiac disease. Physiological changes in pharmacokinetics of drugs make adjustments of anticoagulant drugs doses very important. In order to prevent these complications adequate anticoagulation is very important.

In pregnant women with mechanical prosthetic heart valves one of the most important changes is the increased risk for thromboembolic events.[1]

We present a case of a pregnant women with aortic valve thrombosis at 10 weeks of gestation who was successfully treated with parenteral anticoagulant therapy.

## Case report

A 35-year-old female with a history of bicuspid aortic valve stenosis is presented. A surgical aortic valvulotomy was performed at the age od 6, repeated at the age od 12 due to restenosis. At the age od 28, due to severe symptomatic aortic stenosis (NYHA II, pressure gradient across the aortic valve 104 mmHg (peak)/ 64mmHg (mean) (PG/MPG) aortic regurgitation (AR) 1-2+, mitral prolaps with regurgitation (MR) 1-2+, prostetic mechanical aortic valve (St. Jude No 19) was implanted with patch plastica of aortic ostium ascendant aorta. Postoperative echo showed good functioning prosthetic valve with PG/MPG 30/18 mmHg.

The patient became pregnant at 35 year of age in October 2014. In the second month od pregnancy she began to feel fatigue on effort and during climbing the stairs. Echo exam showed nearly the same findings. Complaints progressed. At that time she was receiving low molecular weight heparin (LMWH) instead of oral anticoagulant (OAC) therapy acenocumarol. Repeated echo exam in December showed elevated gradient across arteficial valve (PG/MPG 85/50 mmHg, AVA 0.9 $cm^2$). She was admitted to Obstetrics and gynecology clinic for control. Pregnancy was without other complications. Due to thrombosis of prosthetic aortic valve (repeated echo – PG/MPG 102/64 mmHg) she was transferred to Cardiology clinic.

At admission she was in NYHA class II, without signs of heart failure. Heart sounds were rhythmic, the prosthetic heart sounds were not decreased and 2-3/6 systolic murmor was heard at aortic area, blood pressure was 120/70 mmHg, pulse rate was 112 beats/min, normal body temperature (36.4° C). The electrocardiogram showed sinus tachycardia.Blood tests showed mild hypochromic anemia.

All signs indicated nonobstructive aortic valve thrombosis. Prosthetic heart valve thrombosis (PVHT) still remains one of the most serious and potentially lethal complications of implanted mechanical heart valves despite improvements of valve design and materials. It is especially serious in pregnant women when is potentially lethal for both mother and fetus. Our version of heart team (cardiologist, cardiac surgeon, gynecologist) after detailed analysis decided to treat patient with continuous infusion of unfractionated heparin (UFH) and to monitor aPTT close. Several days later, gradient over valve began to fall, the patient was feeling better. Serial echo exams showed smaller (still elevated for this type of valve) gradients. These find-

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ings were confirmed on transoesophageal echocardiography. Fetal echocardiography showed normal gestation, as gynecological controls. At the middle of March when she was switched to OAC therapy with acenocumarol and when, the lowest gradient was 54/29 mmHg she was discharged. At the begining of the IX month of pregnancy, in June 2015. she was addmitted to Obstetrics and gynecology clinic, for switching to UFH. After that she underwent an elective cesarean section and delivered a healthy baby. After delivery OAC was started. Both mother and baby were discharged from hospital in a good clinical condition. Control echocardiogram in November 2017. showed pressure gradient across the aortic valve 57/39 mmHg (PG/MPG), AR 1+, MR 1-2+ and normal dimension of heart structures. In the follow up period of 2.5 years she is well, on OAC therapy, INR is in therapeutic range.

## Discussion

Pregnancy in women with prosthetic valves is associated with increased maternal risk and the risk for the baby. In women with a mechanical heart valve it might be associated with a high risk for maternal and foetal complications: mother mortality in 1-4 % and other complications in up to 40 % cases.[2] That is the reason why women with the family, before planning pregnancy, should be informed in detail. Women also, before planing pregnancy, if prosthetic valve in unavoidable because of valve disease, according to the 2017 ESC/EACTS guidelines,[3] may chose biological valve. For this type of valve three months after the operation OAC therapy is not necesery, but they carry risk of the rapid occurrence of structural valve deterioration. I.d. a bioprosthesis is recommended according to the desire of the informed patient (Class I, level C).

Haemodynamically, women with well-functioning mechanical prostheses tolerate pregnancy well, but the need for anticoagulation raises risk of valve thrombosis, of haemorrhagic complications, and of offspring complications.[4,5,6,7] OACs cross the placenta. Their use in the first trimester can result in embryopathy in 0.6–10% of cases.[5,8,9] UFH and LMWH do not cross the placenta and do not have these complications. The risk depends on the anticoagulation regimen used during pregnancy and the quality of anticoagulation control.

When the diagnosis of pregnancy is made in women with mechanical prosthetic valve, the change of anticoagulation regimen should be implemented in hospital. According to guidelines[3, 10,11,12] continuation of OACs should be considered during the first trimester if the warfarin dose required for therapeutic anticoagulation is <5 mg/day (or acenocoumarol <2 mg/day), after patient information and consent. In patients with a warfarin dose required of >5 mg/day (or acenocoumarol >2mg/day) OAC should be discontinuated between weeks 6 and 12 and replaced by adjusted-dose UFH (a PTT ≥2× control; in high risk patients applied as intravenous infusion) or LMWH twice a day (with dose adjustment according to weight and target anti-Xa level 4–6 hours post-dose 0.8–1.2 U/mL, assessed weekly).[13,14,15] Guidelines recomend OACS during the second and third trimesters until the 36th week. Then OAC should be discontinued and dose-adjusted UFH (a PTT ≥2× control) or adjusted-dose LMWH (target anti-Xa level 4–6 hours post-dose 0.8-1.2 U/mL) started at the 36th week of gestation. If delivery starts while on OACs, caesarean delivery is indicated.[3]

The same regimen for the first several weeks of pregnancy was used in our patient but without strict control od anti Xa which resulted in non obstructive valve thrombosis. According to guidelines for non-obstructive mechanical prosthetic valve thrombosis without previous adequate anticoagulant therapy[3] we optimized anticoagulant therapy with UFH. This resulted in decreasing pressure gradient accros the prosthetic valve, pregnancy was well terminated and healthy baby was born by caesarean delivery. In the follow up period of 2.5 years both mother and the baby are well.

In our case a course of OAC therapy with UFH was effective without complications. Our case is a good example of the successful use of UFH in a pregnant women with nonobstructive mechanical valve thrombosis.

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## Sažetak

### *Tromboza veštačke valvule tokom trudnoće*

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***Uvod:*** *Jedna od najvažnijih promena kod trudnica sa mehaničkim veštačkim srčanim valvulama je povećani rizik od tromboembolijskih događaja.*
***Prikaz slučaja:*** *Prikazujemo slučaj neopstruktivne tromboze veštačke mehaničke aortne valvule u ranoj trunoći. Pacijentkinja je uspešno lečena nefrakcioniranim heparinom.*
***Zaključak:*** *Ovaj slučaj je prikaz uspešne primene nefrakcioniranog heparina kod trudnice sa neopstruktivnom trombozom mehaničke veštačke aortne valvule. Uz prikaz slučaja izložen je i pregled lečenja tromboze veštačkih srčanih zalistaka u trudnoći i prevencija (oralnom i parenteralnom antikoagulantnom terapijom) prema 2017 ESC/EACTS vodiču za lečenje valvularnih bolesti srca.*
***Ključne reči:*** *mahanička valvula, tromboza, trudnoća*