

Prosthetic Mitral Valve Thrombosis in Late Pregnancy

GEÇ HAMİLELİKTE PROTEZ MİTRAL KAPAK TROMBOZU

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Summary

Objective: Reports indicate an increased risk of thrombotic and embolic events, in patients with mechanical heart valve prosthesis during pregnancy. These patients must have anticoagulation therapy, but the ideal anticoagulation regimen is uncertain. Teratogenic and hemorrhagic effects of currently used oral anticoagulants is well documented. Heparin reduces thromboembolic complications, but the efficacy of this drug is unproved. The purpose of this study is to discuss causes and management of mechanical heart valve thrombosis, and alternatives for the anticoagulation therapy in pregnant women with mechanical heart valves.

Intusion: Ege University Medical Faculty, Department of Cardiovascular Surgery, Obstetrics and Gynecology, and Department of Anesthesiology, İzmir.

Results: A 21-year-old woman with a mechanical heart valve, in the first month of pregnancy, stopped taking warfarin due to concerns of teratogenicity. She suffered prosthetic valve thrombosis in the 34th week. She was in cardiogenic shock and required replacement of her prosthetic valve as quickly as possible. Also she became in distress. Combined procedure was scheduled. She underwent cesarean section and a healthy male baby was born. Emergently, mechanical valve replacement was performed.

Conclusion: We believe that each case of pregnancy associated with a prosthetic heart valve presents its own risks and pregnant women should be counseled in these patients. Small injection of an adjusted dose of heparin subcutaneously is the recommended approach for the duration of pregnancy. In the first trimester and the last week of pregnancy warfarin should be replaced with continuous intravenous heparin. Anticoagulation is necessary to prevent thromboembolism in patients with mechanical prosthetic heart valve. We conclude that if prosthetic valve thrombosis occurs at near term a viable fetus could be delivered by cesarean section or surgical intervention.

Key Words: Pregnancy, Valve Thrombosis, Anticoagulation

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Özet

Amaç: Mekanik kalp kapağını sahip hamile hastalarda trombotik ve embolik komplikasyon riski artmaktadır. bu hastaların antikoagülan tedavi alması gerekliliği bilinmekle birlikte ideal bir tedavi yaklaşımı konusunda görüşler birliktedir. Yaygın olarak kullanılan oral antikoagülan/hemorajik etkileri ve teratojenik etkileri iyi bilinmemektedir. Heparin tromboembolik komplikasyonu azaltmaktadır; fakat etkisi henüz tam olarak değerlendirilmemiştir. bu çalışmanın amacı tromboembolik komplikasyonları nedenlerini, tedavi prensiplerini ve mekanik kalp kapağı bulunan hamilelerde uygulanacak cerrahi ameliyat tedavisi protokollerini incelemektir.

Çalışmanın Yapıldığı Yer: Ege Üniversitesi Tıp Fakültesi, Kalp ve Damar Cerrahisi, Kadın Hastalıkları ve Doğum ve Anesteziyoloji Anabilim Dalı.

Bulgular: 21 yaşında mekanik kalp kapağına sahip bayan hasta hamileliğinin ilk ayında teratojenik etkisi nedeniyle warfarin tedavisini kemli kendisi kesmiştir. Hamileliğin 34. haftasında prosedür kalp trombozu gelişmiştir. Hasta kardiyojenik şok tablosunda görülmüştür. Hemen sonra ciddi bir distres ile birlikte bulunmuştur, kombine girişim planlanmış ve acil olarak sezaryen ile doğum gerçekleştirilmiştir. Hemen sonra acil mitral valv replasmanı uygulanmıştır.

Sonuç: Mekanik prolezli kalp kapağına sahip hamileliğin komplikasyonu olmadığını düşünmemektedir. bununla birlikte, antikoagülasyonu mekanik prolezli kalp kapak hastalarında tromboz oluşumunu önlemek için mutlaka kullanılmalıdır. Hamileliğin ilk 2 ayı ve son 1 hafta ile ilgili olarak heparin tedavisi kesilerek, subkutan heparin tedavisi ile bunun dışında tedaviye varılabilir ve devan edilmesi en uygun seçenek olduğunu düşünmekteyiz.

Anahtar kelimeler: Hamilelik, Kapak tromboz, Antikoagülasyon

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Prosthetic heart valves, especially the mechanical ones require long term, usually life-long anticoagulant therapy to avoid the risks of thromboembolism. A hypercoagulable state exists in pregnancy when concentrations of clotting factors, platelet turnover and viscosity are increased and fibrinolysis is diminished (1). These changes increase the risk of prosthetic valve thrombosis. It's known that anticoagulant drugs cause damage to the fetus and mother during pregnancy. The most commonly used oral anticoagulant coumarin have high teratogenic risks. In addition the fetus becomes overanticoagulated because the vitamin K bound coagulation factors cannot pass through the placenta while warfarin can. These causes risk of haemorrhage in the fetus (2).

Especially- in the first trimester and last month of pregnancy the use of sufficient dose of heparin instead of warfarin has been suggested. Because heparin is a huge molecule, it does not cross the placenta and it can have no teratogenic or anticoagulant effect on the fetus, however the complications of heparin therapy during pregnancy include maternal haemorrhage, thrombocytopenia, osteoporosis and hypoadosteronism (3).

There are many published reports of valve thrombosis in mothers receiving heparin, 'folic pregnant women that have prosthetic heart valves are under serious risk which threatens the life of their own and the child. Particularly in the underdeveloped countries some pregnant women may cease the use of medicine without any medical consulting. Also medical surveillance during pregnancy may not be regular.

We report a patient with a mechanical heart valve who suffered valve thrombosis during late pregnancy.

(Case Report

A 21-year-old woman with a history of rheumatic heart disease underwent mitral valve replacement (MVR) with a no. 27 Bjork-Shiley mechanical prosthesis. The patient was started on warfarin therapy. She used 5 mg warfarin each day tiller operation but prothrombin time and activity wasn't routinely checked. She was given dipyridamol and acetyl salicylic acid besides warfarin. After learning that she was pregnant on the third

week of the pregnancy the patient stopped all drugs because of fears of teratogenicity. She did not go to her routine obstetric controls. Also no heparin therapy was started.

On the 36th week of pregnancy she was feeling sensation of breathlessness and dyspnea on exertion. Also she noticed a decrease in the intensity of the prosthetic valve sounds. Approximately 5 days later the patient presented with extreme dyspnea and orthopnea. Vital signs were; Blood pressure 90/50 mmHg and heart rate 120, mm with atrial fibrillation. The respiratory rate was elevated and there was inspiratory retraction of the intercostal spaces and supraclavicular fossae. Jugular venous distension was also present. She was profusely sweating and the skin was cold and cyanotic. On chest auscultation typical sign of acute pulmonary edema was heard with the disappearance of prosthetic valve clicks. Chest roentgenography showed bilateral pulmonary congestion. Arterial blood gas measurement disclosed: PaO₂ (oxygen pressure, arterial) 48 mmHg; PaCO₂ (carbon dioxide pressure, arterial) 28.3 mmHg; pH 7.36; base excess -6.7; bicarbonate 16.3 and oxygen saturation 82%, despite inhalation of oxygen by mask. A 2-D echocardiography revealed a left atrial thrombus involving the prosthetic mitral valve. Fetal ultrasonography showed a fetus with no detectable anatomical abnormality and a fetal heart rate of 80 beats per minute. With this evaluation endotracheal intubation and mechanical ventilation was instituted. The patient was brought to the operation room after preoxygenation with 100% oxygen. Anaesthesia induction was maintained with IV thiopental sodium 200 mg, fentanyl 75 µg and vecuronium bromide 5 mg. Emergency caesarean section was performed and healthy male baby was born with Apgar score 7. The birth weight was 2.480 kg. During caesarean section arterial and balloon tipped pulmonary artery catheter was placed. Initial values were; Central venous pressure 14 mmHg. Pulmonary artery pressure 56/36 mmHg. Pulmonary capillary wedge pressure 31 mmHg and cardiac output 2 lt/min. Because of the prosthetic valve thrombosis the patient underwent redo mitral valve replacement immediately after caesarean section. At this operation a large thrombus in the left atrium was densely adherent to the orifice ring of the prosthesis. The old valve was replaced with a

no.27 Sorin belcalcl mechanical prosthesis. During cardiopulmonary bypass hypothermia to 28 of was induced. Cardiopulmonary bypass time was 127 minutes. X-Clamp time was 80 minutes. She tolerated the operation well. Short time alter the arrival of the cardiac intensive care unit she was back to the operation room because of mediastinal haemorrhage. With in 24 hours of operation the patient was started on warfarin therapy.

The patient was discharged from the hospital on the postoperative day 12. Acetyl salicylic acid (100 mg day) and thpyridamol (225 mg/day) was given in addition to warfarin (5 mg/day). Postoperative echocardiography control was earned out 6 months later. It revealed normal prosthetic valve functions.

Discussion

Pregnancy is known to have harmful cardiac effects in humans ranging from minor aggravations of preexisting cardiac conditions to complications serious enough to warrant interruption of pregnancy. However most patients with valve replacements tolerate pregnancy well. All patients with mechanical heart valves need long term treatment with anticoagulant drugs to prevent thromboembolism.

Mechanical prosthetic heart valves increase the risk of thromboembolism and infective endocarditis in the mother, whereas the fetus is at increased risk of teratogenic effects of oral anticoagulants.

To assess the maternal and fetal risks in patients with cardiac valve prostheses, the outcome of 64 pregnancy of 40 women who conceived after cardiac valve replacement were reviewed by Ayhan et al (4). fetal wastage was 53.2% in coumarin administered pregnancies, 36.4% using heparin and 16.7% without anticoagulant. Antenatal bleeding was developed in 20% of patients. Other common complications were atrial fibrillation, thromboembolic episodes and cardiac failure In another study, a series of 223 pregnancies in 156 women was studied: The incidence of cerebral embolism was 25% in patients treated with antiplatelets agents and 23% in patients treated with coumarin, while that of spontaneous abortion was 10.3% and 28.1%, respectively (5).

There is no certain agreement about the optimal anticoagulation treatment concerning the preg-

nant patients with mechanical heart valves, because of possible teratogenicity of anticoagulant drugs. Warfarin therapy during pregnancy is associated with a high fetal mortality. Fetal exposure to warfarin in the first trimester may cause a specific malformation known as coumarin embryopathy. The use of coumarin by the mother near term and at the time of delivery has been related to an increased incidence of fetal deaths, primarily caused by haemorrhage (2).

Some physicians believe that continuous high dose intravenous heparin therapy is the optimal choice for pregnant patients with mechanical heart valves (6). Subcutan heparin was recommended at least until the end of the first trimester, after which the teratogenic risks of warfarin are considerably reduced. The activated partial thromboplastin time should be adjusted to 1.5 to 2 times the control. The patient may start warfarin therapy during the second and third trimester. Switch back to heparin on the last weeks of pregnancy in order to reduce bleeding complication at birth was advised (2). Adjusted dose heparin is probably more effective than fixed dose heparin. However some authors have stated that high dose heparin may fail to prevent thromboembolic complications in a pregnant woman with a mechanical heart valve (7). The use of antiplatelet agents during pregnancy¹ has been suggested to avoid the risks of warfarin. Biale and associates reported successful pregnancies in their patients with mechanical prosthesis treated with dipyridamole and acetyl salicylic acid (8). On the basis of these data there is no anticoagulant or antiplatelet agents that totally inhibit the risks of thromboembolic events in pregnant patients with mechanical heart valves.

Woman in childbearing years should be advised when possible to have their children before valve replacement. Undoubtedly, valve repair procedures are the best choice for suitable valves in this age group. If valve replacement procedure is inevitable mechanical valves should be chosen. Despite the possible improvement in fetal outcome, the accelerated rate of degeneration of bioprosthesis in young patients, especially during pregnancy, limits their usefulness. These patients should be informed that a bioprosthesis will probably require replacement in 6 to 9 years. Ideally, women with a prosthetic heart valve should be counselled

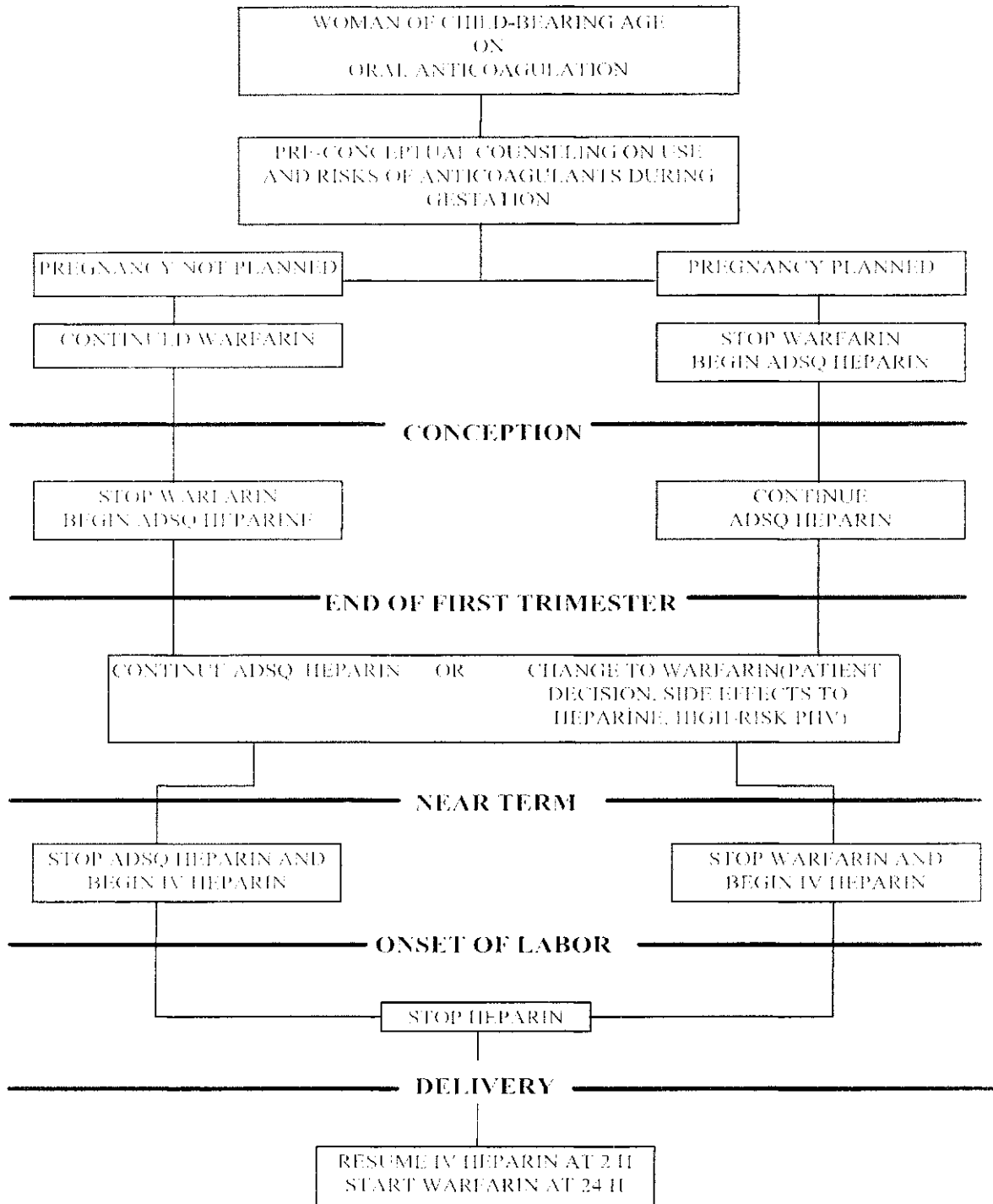


Figure 1. Recommended strategy for anticoagulation therapy during pregnancy. ADSQ = adjusted dose subcutaneous; H = hours; PHV = prosthetic heart valve; IV = intravenous.

against becoming pregnant. If prosthetic valve thrombosis occurs, surgical intervention can successfully be performed during pregnancy. Cardiac surgery doesn't seem to affect the maternal mortal-

ity, but there is fetal mortality of approximately 20(9). A review of intracardiac surgery in pregnant woman was presented by Becker in Ds3(10). Of the 68 patients who underwent cardiopulmonary

bypass, 100% maternal death resulted and more than 80% of fetuses survived. More recently, multicenter results showed (maternal and embryolethal mortality were 2.2% and 20.2% respectively (11). Embryolethal mortality enhanced when hypothermia was used. Hypothermia during cardiopulmonary bypass provoked uterine contractions in several patients. Hypothermia decreases exchange through the placenta.

The appropriate gestational age for good fetal surgical outcome is not certain. Surgery, if possible, should be performed prior to the pregnancy or the time after pregnancy. However, necessary cardiac surgery should not be postponed due to pregnancy, as such intervention is often curative. If possible, surgery should not be performed in either the third trimester of pregnancy, due to the marked hemodynamic changes that peak during this time and the risk of premature labor, or in the first trimester due to the different exposures of the fetus during organogenesis. Therefore the second trimester is the optimal time. In our case the fetus was 36 weeks gestational age, viable and apparently in distress. Therefore we decided that the fetus could be delivered by emergency caesarean section before cardiopulmonary bypass. On the other hand the patient was in distress and required emergency valve replacement procedure. But it was possible to postpone redo valve replacement until the delivery was performed by emergency caesarean section. By this way the fetus was protected from perinatal complications of cardiopulmonary bypass.

The newer generation mechanical prostheses have low thrombogenic potential. Our patient did not receive anticoagulant or antiaggregant agents during pregnancy. Despite the hypercoagulable state no thromboembolic complication was seen till the last month of the pregnancy.

We believe that each case of pregnancy associated with a prosthetic heart valve presents its own unique problems and pregnancy is not contraindicated in these patients. Self injection of an adjusted dose of heparin subcutaneously is the recommended approach for the duration of pregnancy. In the

first trimester and the last week of pregnancy warfarin should be replaced with continuous adjusted dose heparin. Anticoagulation is necessary to prevent thromboembolism in patients with mechanical prosthetic heart valve. Recommended strategy for peripartum anticoagulation therapy is shown in Figure 1 (12). We conclude that if prosthetic valve thrombosis occurs at near term a viable fetus could be delivered by caesarean section before surgical intervention.

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