Thrombotic Occlusion of the Björk–Shiley Prosthetic Heart Valve in a Pregnant Woman; A Case Report

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Summary

In this report, we describe a case of thrombosed valve in early postpartal period. The patient was a 35-year-old woman who received an operation of aortic valve replacement (Björk-Shiley valve) for her rheumatic heart disease 13 years ago. Since then she was constantly on oral anticoagulants. Two years ago she intentionally stopped to take oral warfarin because of her wish to have a baby. She became pregnant early 1985, since then low-dose heparin injection combined with oral dipyridamole had begun. On Oct. 3, 1985 she gave a birth to a 3,080 g baby. But on the 8th postpartal day, she began to complain of increasing dyspnea. Her chest X-ray film showed remarkable pulmonary congestion. She died on 12th day following the delivery due to heart failure. The postmortem examination revealed a thrombosed Björk-Shiley valve with very limited leaflet motion.

Introduction

Thrombotic occlusion has been reported with many types of prosthetic valves. Especially, when thrombus and fibrous tissue interfere with motion of a tilting disc mechanism, profound hemodynamic consequences may ensue. On the other hand, dramatic changes in coagulation systems during pregnancy and puerperium put patients at the risk of thrombosis. The following case report illustrates many of the clinical problems associated with thrombosis of a prosthetic valve in a pregnant woman.
I. Case report

A thirty five year-old woman was admitted to our hospital for the delivery of a child on Sept. 28, 1985. She was in the 36 th week of pregnancy, and so far her course was uneventful in spite of her previous history of heart disease. She received an operation of aortic valve replacement (22 mm, Björk-Shiley valve) 14 years ago and she was on oral anticoagulant therapy (warfarin) all along and bimonthly her blood was taken for thrombotest. The dosage of warfarin was varied according to the value of the thrombotest (optimal level 10-25 % range).

Four years ago, she stopped to take warfarin because of her wish to have a baby and since then she was on oral dipyridamole (300 mg/day) constantly. Her pregnancy became apparent in early 1985. In order to prevent maternal thromboembolic episodes, 10,000 unit of subcutaneous heparin injection was begun, and its dosage was increased to 15,000 unit/day after 24 th week of pregnancy (Fig. 1). She was well until around the last trimester of her pregnancy, but she was admitted earlier than the expected date for the treatment of toxemia. On Oct. 3, 1985 she gave a birth to a healthy 3,080 g baby. She was quite all right until a week later when she started to bleed from the episiotomised area and hematoma formation was noted. Her blood hemoglobin level fell to as low as 6.8 g/dl. On Oct. 9, 1985 hematoma was removed surgically and within 2 days a total of 1400 cc preserved blood was transfused. On Oct. 11 she started to complain of dyspnea and her daily urine volume decreased to 400 cc. She was transferred to the Cardiology ward on Oct. 15.
On admission, she appeared severely ill and perspired. Her pulse rate was 130/min, blood pressure 110/80 mmHg, respiration rate 30/min, her skin was wet and cold, and moist rales were audible on both lungs. Prosthetic valve click sound was not audible, a grade 2 systolic ejection murmur was best heard at apex with radiation to the left sternal border. Slight hepatomegaly was noted on palpation but no ascites was found. Neurologically, no abnormality was found. Her chest X-ray film showed marked pulmonary congestion (Fig. 2). The blood gas analysis data showed lowered PaO₂. The showed sinus tachycardia of 130/min, left atrial overload, poor R wave progression in V1-V4 leads and the left ventricular hypertrophy. The diagnoses of congestive heart failure, pulmonary edema were made. Despite many efforts, her condition rapidly aggravated and she died on the night of Oct. 15, 1986. At autopsy, a thrombotic occlusion of the Björk-Shiley mechanical valve was found. The thrombus was firmly stuck to the strut and the tilting disc. Thrombus formation was seen from aortic side as well as left ventricular side (Fig. 3 and Fig. 4A, B). The valvular motion was extremely restricted and almost fixed at 15 degree.

According to the microscopical examination, the thrombus which firmly attached to the Björk-Shiley bioprosthesis consisted of two layers (Fig. 5). And obviously the inner layer
Fig. 4 Photograph of the left ventricle. Note the thickening of the left ventricular wall due to the aortic valvular disease. The arrow shows the thrombotic occlusion of the prosthetic valve (A). The magnified view of the aortic valve from the ventricular aspect (B). The tilting disc is barely seen due to the large thrombus.

Fig. 5 Microscopic specimen of the thrombus which attached to the artificial valve. Note two-layer component of the thrombus. B is the magnified view of the circumscribed portion in A.
was older than the outer layer. On October 11, the patient started to complain of dyspnea, and probably around this time the older thrombus was formed. The second thrombus seemed very fresh and this might be formed during the last hours of her course.

II. Discussion

Thrombotic occlusion of the artificial cardiac valve is a well-recognized complication for a long time. Therefore, a lot of people did emphasize the necessity of anticoagulation and antiplatelet therapies. Long-term follow-up studies also recommend that patients with mechanical heart valves should receive oral anticoagulants indefinitely1). On the other hand, the commonest oral anticoagulants warfarin seems to be of no drug of choice during pregnancy because of its teratogenicity2-4). Most people agree that pregnant women with prosthetic heart valves are best handled with subcutaneous heparin injection alone or combined with dipyridamole5-6).

But many people also state that a fixed dose of 5,000 unit of subcutaneous heparin every 12 hours does not give adequate protection against thromboembolic complications in pregnant women with artificial valves7-8). In our case, the patient stopped to take oral warfarin 4 years ago and since then she took dipyridamole, 300 mg/day alone. and as soon as her pregnancy became evident, she began to receive subcutaneous injection of heparin 10,000 unit/day. The dose was increased to 15,000 unit/day after the third trimester (Fig. 1). In spite of these efforts, she died of thrombotic occlusion of the valve. If the dose of heparin was adjusted to increase the partial thromboplastin time to 1.5 times the control value (6,000—8,000 unit every 8 hours), the result might have been different. Also, it is widely admitted that long-term administration of heparin carries side effects, such as osteoporosis9). So, ideal dose of heparin in these situations require further investigation.

Also, it is important to keep it in the mind that pregnancy and puerperium are the periods which show significant changes in the coagulation system and hormones. Many reports concerning the changes in the coagulation systems and blood platelets during pregnancy and puerperium are available10-12). In this case obviously hypercoagulable state during peripartal period played an important role in the making of thrombotic obstruction of the Björk-Shiley prosthetic heart valve. Fig. 2 shows the marked elevation of the heparplastin test value (more than 200%) in the early postpartal period. Besides it, rapid blood transfusion aggravated the heart failure. Authors stress meticulous care must be paid for the pregnant women with prosthetic heart valves.

Once the diagnosis of the thrombosed mechanical valve is made the procedures to take are either emergency valvular replacement operation or thrombolytic therapy using urokinase or streptokinase13-14). In order to achieve a successful therapy, rapid interpretation of the patient condition is very important. To make a diagnosis of thrombotic obstruction of the mechanical heart valve, one must be careful to listen to the click sound which often disappear in the cases of thrombosed valves. But this is not an easy job because patients are usually in orthopnea and tachycardia. In our case, when she was brought to the Cardiology ward, clicks were absent. Today, we have various methods that may be useful for the diagnosis of thrombosed mechanical valve, such as fluorocinescopy15), two-dimensional echocardiography and spectral analysis of prosthetic valve clicks16) etc.
Many cardiologists including us tend to hesitate to send the patient like her to surgery, but from this case we learned only an emergency operation could save her life.

Reference