

Case report

Successful thrombolysis of mitral valve prosthesis by streptokinase during pregnancy

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Introduction

Classical management of prosthetic valve thrombosis, a life-threatening condition, is a repeat prosthetic valve replacement or clot removal that requires cardiopulmonary bypass and carries a high risk of mortality. Successful restoration of valve function by thrombolytic therapy has been reported before. Here we describe the successful use of streptokinase for thrombosed mitral valve prosthesis in a pregnant woman.

Case report

A 37-year-old mother of five children presented with progressive shortness of breath of 4 days duration. She had a history of rheumatic fever in early childhood. She had undergone mitral valve replacement because of rheumatic mitral incompetence, using bileaflet St. Jude prosthesis, 8 years prior to presentation. She was diagnosed as pregnant in her eleventh week of pregnancy. Ten days prior to the onset of her symptoms, her maintenance oral anticoagulant (coumadin) was discontinued and she was given instead subcutaneous unfractionated heparin (12,500 IU, twice daily). Physical examination revealed a dyspnoeic, afebrile woman with a blood pressure of 100/60 mmHg and regular pulse 110/minute. Chest

examination showed bibasal crepitations. Heart auscultation revealed muffled prosthetic valve clicks. No focal neurological deficit was detected.

Surface electrocardiogram showed sinus tachycardia but was otherwise normal, and chest X-ray showed bilateral fluffy alveolar pulmonary oedema. Transthoracic two dimensional echocardiography (TTE) and colour-coded Doppler showed malfunctioning mitral valve prosthesis with 25 mmHg gradient across the mitral prosthesis and grade II transprosthetic mitral incompetence, as well as no echocardiographic evidence of clot, or vegetations, or pannus formation by TTE.

Cinefluoroscopy, which is a rapid and easily accessible diagnostic tool used frequently in our institute in the evaluation of prosthetic valves, revealed immobile mitral prosthetic leaflet in the open position. Gestational age was evaluated by abdominal ultrasound to be about 13 weeks.

After joint discussion between the attending cardiologist, cardiac surgeon and obstetrician, the decision was made to give the patient prolonged streptokinase infusion in an attempt to restore prosthetic valve function and to avoid repeat surgery. The streptokinase protocol was adopted. According to this protocol, 250 000 IU of streptokinase are given by intravenous in-

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fusion over 30 minutes, followed by continuous streptokinase infusion at a rate of 100 000 IU/hour for 72 hours. Serial cinefluoroscopy was used to assess restoration of prosthetic valve leaflet motion.

On the second day, the patient demonstrated clinical improvement but developed signs of right leg ischaemia, which was managed conservatively. Symptoms and signs of limb ischaemia vanished soon and the patient regained her limb pulses after 24 hours.

Cinefluoroscopy at 72 hours showed full restoration of prosthetic valve leaflet motion. Follow-up abdominal ultrasound revealed a live fetus with normal fetal heart and biparietal diameter of 25 mm, typical at 14 weeks gestational age. At this stage, streptokinase infusion was discontinued and intravenous unfractionated heparin therapy initiated. Afterwards, warfarin therapy was resumed and titrated to achieve an international normalized ratio of 3.0–3.5. The woman was discharged from hospital in excellent condition. At 36 weeks of pregnancy, a standard vaginal delivery was performed. Both mother and baby had an uneventful recovery. Tubal ligation was performed at a later stage.

Discussion

Prosthetic heart valve disease may be complicated by thromboembolism, bleeding, endocarditis, valve dysfunction, re-operation or death. These affect patients at a rate of 5% per year over their lifetimes [1,2]. Prosthetic valve obstruction may be caused by thrombus formation or pannus ingrowth, or a combination of both. The cause may be difficult to determine, requiring knowledge of the clinical presentation and findings on echocardiography, including transoesophageal echocardiography.

Pregnancy increases the risk of each of the aforementioned complications. The risk of pregnancy in women with a valve prosthesis is multifactorial. Potential problems may be related to an increased haemodynamic load, hypercoagulable state of pregnancy, and risk to the fetus due to anticoagulants. It should be noted that significant changes in the levels of coagulation factors increase the risk of thrombosis during gestation.

Thrombosis of prosthetic valves during pregnancy has been reported in several cases, despite adequate anticoagulation [3]. Thrombolytic therapy has been used in pregnant women with deep vein thrombosis, pulmonary embolism and acute myocardial infarction [4] and thrombosed tricuspid prosthetic valve [5]. Rinaldi et al. [6] reported successful thrombolysis with recombinant tissue plasminogen activator (rt-PA) in a 28-year-old pregnant woman with thrombosed St. Jude aortic valve prosthesis implanted 2 years earlier, delivered at term by caesarean section. Fleyfel et al. [7] reported a 32-year-old patient whose pregnancy was complicated by two episodes of thrombosed St. Jude mitral prosthesis. The first occurred at 20 weeks of pregnancy during a shift from warfarin to heparin (as in our case). The patient was in cardiogenic shock and was treated by clot removal. The second episode was treated by thrombolysis rt-PA. It was considered the first case in which pregnancy was carried to term and standard vaginal delivery performed.

Thrombolytic therapy for a prosthetic valve obstructed by thrombus is associated with significant risks and is often ineffective. Two extensive reviews [8,9] of thrombolytic therapy for left-sided prosthetic valve thrombosis have reported that thrombolytic therapy is ineffective in 16%–18%

of cases and acute mortality is 6%. The risk of thromboembolism is 12%; stroke, 3%–10%; major bleeding episodes, 5%; non-disabling bleeding, 14%; and recurrent thrombosis, 11%. Thrombolytic therapy is reserved for those in whom surgical intervention carries a high risk and for those with contraindication to operation. Patients who have a large clot, those with evidence of obstruction and those with New York Heart Association class III or IV should undergo early/immediate reoperation.

Pregnant patients with mechanical valve prostheses have an obligate need for anticoagulation. While some have suggested that warfarin is an acceptable anticoagulant, most would advise avoidance, particularly in the first trimester, as warfarin is teratogenic and crosses the placenta. Some others have advocated the use of warfarin throughout pregnancy, despite increased fetal teratogenicity, with the risk perhaps lessened if the warfarin dose is < 5 mg/day. Nonetheless this approach is still controversial, despite the fact that the teratogenic effects of warfarin have been over-emphasized [10]. Heparin does not cross the placenta and is generally considered safer. Its longer-term use, however, is complicated by sterile abscesses,

osteoporosis, thrombocytopenia, and bleeding.

Numerous case series and patient registries attest to an unacceptable incidence of thromboembolic complications, including fatal valve thrombosis, in high-risk pregnant women managed with subcutaneous heparin (12%–24%). Unfortunately, the efficacy of dose-adjusted subcutaneous heparin has not been definitively established.

Low molecular weight heparin offers several potential advantages over unfractionated heparin, including greater bioavailability, easy administration, lack of a need for laboratory monitoring and lower incidence of thrombocytopenia and osteoporosis. Low molecular weight heparins may be a reasonable alternative but have still not been thoroughly evaluated in patients with prosthetic valves [11]. Therefore, it seems that there is no safe method of anticoagulation during pregnancy in women with a mechanical heart valve.

Conclusion

Thrombolysis of thrombosed prosthetic heart valve in pregnant women may be feasible and relatively safe in selected cases and may allow continuation of pregnancy.

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