Left atrial thrombosis in pregnant women with mitral stenosis and sinus rhythm

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Objective: The purpose of this study was to describe pregnant patients with mitral stenosis who had intracardiac thrombosis in the absence of atrial fibrillation.

Study design: We reviewed the clinical course of 3 pregnant women with severe mitral stenosis and normal sinus rhythm who had clinically significant intracardiac thrombosis.

Results: The first patient was examined at 21 weeks of gestation with embolic stroke that was the result of left atrial thrombus. A second patient was found to have a large left atrial thrombus that prevented the performance of balloon valvuloplasty. The third patient had left atrial clot that partially occluded the mitral valve orifice and led to the development of pulmonary edema that resulted in an emergent cesarean delivery and anoxic brain injury in the newborn infant.

Conclusion: Pregnant patients with mitral stenosis in normal sinus rhythm can experience thromboembolic events that can be detrimental to both the mother and the fetus. Anticoagulation therefore should be strongly considered in this group.

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Mitral stenosis (MS) is the most commonly acquired valvular heart disease in pregnancy and can have an important impact on maternal and fetal outcomes. Systemic embolization may occur in 10% to 20% of patients with MS, and the risk is associated usually with the presence of atrial fibrillation. Present guidelines recommend the use of anticoagulation in patients with MS who have atrial fibrillation or patients with previous embolic events. No data are available to support the use of anticoagulation in patients with MS without these risk factors.

Pregnancy is associated with alteration in the level of coagulation factors that lead to a hypercoaguable state and thus to increased incidence of thromboembolic events. The present report describes 3 cases of MS and normal sinus rhythm that resulted in the development of left atrial thrombi and in important maternal complications in 2 cases and a fetal complication in 1 case. This experience may suggest that pregnancy should be considered to be a risk factor for thromboembolic events in patients with MS, even in the presence of sinus rhythm.
Case presentation

Case 1

A 27-year-old Filipino woman was diagnosed at 15 weeks of gestation with severe MS after 1 month of progressive shortness of breath. An electrocardiogram showed sinus tachycardia, right axis deviation, right ventricular hypertrophy, and biventricular enlargement. A transthoracic echocardiogram revealed a rheumatic mitral valve with a valve area of 0.9 cm², a mean transmitral valve gradient of 20 mm Hg, moderate tricuspid regurgitation, left atrial enlargement (5.6 cm), estimated systolic pulmonary artery pressure of 60 mm Hg, and normal left ventricular size and function. The patient was started on metoprolol therapy with symptomatic improvement. At 21 weeks of gestation, the patient was admitted with a stroke that was manifested by confusion, right facial weakness, dysarthria, and severely decreased motor strength in the right upper and lower extremities. The electrocardiogram revealed sinus rhythm. A non-contrast computed tomography scan of the head showed an ischemic stroke in the left middle cerebral artery distribution. The patient was treated with tissue plasminogen activator, followed by heparin. Her neurologic examination improved over the ensuing hours with clearance of her mental status, and she regained 4 of 5 motor strengths in the right upper and lower extremities. The results of a carotid artery duplex scan and an electroencephalogram were both within normal limits, and a transesophageal echocardiogram demonstrated a left atrial appendage thrombus. The patient was discharged home on hospital day 7 in stable condition and received metoprolol and enoxaparin therapy. During subsequent follow-up visits, she remained relatively asymptomatic. Anticoagulation status was monitored every 2 weeks by measurement of anti Xa levels, which ranged between 0.8 and 1.0 U/mL at 4 hours after drug administration. The patient delivered a 2380-g male infant (whose Apgar scores were 9 and 9 at 1 and 5 minutes, respectively) by a spontaneous vaginal delivery in gestational week 36. Enoxaparin, which was started on metoprolol therapy (50 mg by mouth, twice daily) with symptomatic improvement. A repeat transthoracic echocardiogram revealed a 1.6 × 1.0-cm mass attached to the left side of the interatrial septum (Figure 1). A transesophageal echocardiogram verified this finding (Figure 2) and showed a layered mass on the wall of the left atrium that started above the left upper pulmonary vein (Figure 3). These findings were very suggestive of atrial thrombi and were treated with enoxaparin, which aimed at a predose anti Xa level of >0.5U/mL. By gestational week 21, the patient again reported worsening of symptoms and was treated with an increased dose of metoprolol and diuretics. Predose anti Xa levels were measured every 2 weeks and ranged between 0.54 and 1.13 U/mL. Repeated transesophageal echocardiogram at gestational week 33 showed resolution of the thrombus on the interatrial septum (Figure 3). The patient delivered a 2100-g female baby (whose Apgar scores were 8 and 9 at 1 and 5 minutes, respectively) by an uncomplicated low transverse cesarean delivery, with an estimated blood loss of 300 mL in gestational week 38. The enoxaparin therapy was stopped before delivery and was switched over to intravenous unfractionated heparin. Mitral valve replacement with a St. Judes mechanical valve (29 mm) was performed 2 days after the delivery without complications, and the patient was discharged in stable condition on postoperative day 7.

Case 2

A 27-year-old Hispanic woman (gravida 3, para 1) with a history of 1 spontaneous abortion was referred to our high-risk obstetrics clinic at 7 weeks gestation with a history of surgical mitral commissurotomy for rheumatic MS at age 14 years, after which she was asymptomatic. At the end of the second trimester of her first pregnancy at age 18 years, she had symptoms of dyspnea on exertion, which improved with medical therapy. An attempt to perform percutaneous balloon valvuloplasty in gestational week 32 was discontinued because of the start of uterine contractions during the procedure. The patient was delivered of a 5-lb male infant by cesarean delivery 1 day later and remained asymptomatic after the delivery. A subsequent pregnancy 6 years later resulted in a spontaneous abortion at 10 weeks of gestation. At examination, the patient was asymptomatic; her cardiovascular examination was consistent with MS and pulmonary hypertension. A transthoracic echocardiogram revealed severe MS with a calculated mitral valve area of 0.88 cm², normal size and function of left ventricle, moderately dilated left atrium (4.5 cm), trace mitral regurgitation, moderate tricuspid regurgitation, and a calculated systolic pulmonary arterial pressure of 50 mm Hg. The patient gradually experienced exertional dyspnea. She was started on oral metoprolol therapy (50 mg by mouth, twice daily) with symptomatic improvement. A repeat transthoracic echocardiogram revealed a 1.6 × 1.0-cm mass attached to the left side of the interatrial septum (Figure 1). A transesophageal echocardiogram verified this finding (Figure 2) and showed a layered mass on the wall of the left atrium that started above the left upper pulmonary vein (Figure 3). These findings were very suggestive of atrial thrombi and were treated with enoxaparin, which aimed at a predose anti Xa level of >0.5U/mL. By gestational week 21, the patient again reported worsening of symptoms and was treated with an increased dose of metoprolol and diuretics. Predose anti Xa levels were measured every 2 weeks and ranged between 0.54 and 1.13 U/mL. Repeated transesophageal echocardiogram at gestational week 33 showed resolution of the thrombus on the interatrial septum (Figure 3). The patient delivered a 2100-g female baby (whose Apgar scores were 8 and 9 at 1 and 5 minutes, respectively) by an uncomplicated low transverse cesarean delivery, with an estimated blood loss of 300 mL in gestational week 38. The enoxaparin therapy was stopped before delivery and was switched over to intravenous unfractionated heparin. Mitral valve replacement with a St. Judes mechanical valve (29 mm) was performed 2 days after the delivery without complications, and the patient was discharged in stable condition on postoperative day 7.

Case 3

A 24-year-old white woman was diagnosed with severe MS after a spontaneous abortion during the fifth week of her first gestation. A transthoracic echocardiogram showed a mitral valve area of 0.9 cm², a mean gradient of 23 mm Hg across the mitral valve, a moderately dilated left atrium (5 cm), moderate mitral regurgitation with normal left ventricular systolic function, and mild tricuspid regurgitation. The patient presented 1 year
later in gestational week 13 without symptoms, but, had a gradual increase in shortness of breath that started at the end of the second trimester. On gestational week 31, she was admitted for worsening symptoms and uterine contractions that were 2 to 3 minutes apart. On examination, she was found to be in pulmonary edema; her heart rate ranged between 120 to 140 beats/minute; her systolic blood pressure ranged between 102 and 70 mm Hg; her respiratory rate was 48 per minute, and her oxygen saturation was 80% on room air. The patient was intubated emergently and started on a dopamine infusion. Because of fetal bradycardia and repetitive prolonged decelerations, an emergency caesarean delivery was performed; a female infant with Apgar scores of 0 at 1 and 5 minutes, respectively, with a cord pH of 6.81 was delivered. The infant was resuscitated successfully and required intensive care. After the cesarean delivery, an open surgical commissurotomy of the mitral valve was performed. A large thrombus was seen on the atrial aspect of the mitral valve, which partially occluded the valve orifice. The postoperative course was complicated by supraventricular tachycardia that was treated with intravenous digoxin and electrical cardioversion. The patient was discharged on postoperative day 12, with warfarin, digoxin, and lasix therapy. The infant was diagnosed with developmental delay that resulted from severe anoxic brain injury at the time of delivery.

Comment

Thromboembolism is a common complication in patients with MS, with a reported incidence between 10% and 20%. The highest risk for thromboembolic events, however, has been reported in patients with previous embolic events and patients with atrial fibrillation. At the same time, left atrial thrombi have been detected echocardiographically in only 2% to 4% of patients with MS who are in sinus rhythm, and embolic complications are uncommon. For these reasons, recent practice guidelines include strong recommendations (class I) for prophylactic anticoagulation in patients with MS and atrial fibrillation or with a history of embolic events. These guidelines state that it is controversial whether other patients, who might be at higher risk (ie, severe MS or enlarged left atrium), should be considered for long-term anticoagulation. Therefore, there is a level IIb recommendation (usefulness/efficacy is less well-established by evidence/opinion)
for anticoagulation of patients with severe MS and left atrial dimension of ≥ 55 mm by echocardiography, and the use of anticoagulation for all other patients with MS is not recommended.

Pregnancy is a hypercoagulable state, which is associated with an increase in thromboembolic complications. This increase in the incidence of thromboembolism is greatly related to coagulation changes during gestation, which include an increase in levels of factors I, II, VII, VIII, IX, and X after the first trimester of pregnancy and subsequent increase in factors V, VII, VIII, and X after the delivery. These changes in coagulation during pregnancy are associated with a significant rise in the incidence of venous thrombosis, pulmonary embolism, and valve thrombosis in patients with prosthetic heart valves and may further enhance the already increased risk of thromboembolism in women with MS. The cases that are presented in this report may also indicate an increased likelihood for the formation of left atrial thrombosis and the risk for severe thromboembolic events in patients with MS during pregnancy even without atrial fibrillation or left atrial dimension of ≥ 55 mm by 2-dimensional echocardiogram. Because of the potential risk of thromboembolism to both the mother and the fetus, strong consideration should be given to prophylactic full-dose anticoagulation in patients with severe MS throughout pregnancy, even in the absence of atrial fibrillation or a history of thromboembolism. At the same time, more information in larger groups of pregnant women with MS is needed to further define risk predictors for thromboembolism in patients with MS during pregnancy.

References