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Case Report

Successful management of pregnancy with dual mechanical heart valves: a case report

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ABSTRACT

Incidence of cardiovascular diseases in pregnancy is increasing due to advanced maternal age at first conception and frequent association of comorbid chronic medical conditions. Rheumatic heart diseases comprise 56-89% of all CVDs in pregnancy in non-western countries. Management of pregnant women with mechanical valves is very challenging due to high risk of cardiac and non-cardiac complications either due to heart disease itself or changes in hemodynamics during pregnancy or due to anticoagulant therapy. We presented here a case of a 35-year-old pregnant woman with rheumatic heart disease with dual mechanical (aortic and mitral) valve replacement who was managed successfully by our team of expert clinicians with intensive antepartum surveillance with good obstetric outcome. It is very important for managing clinicians to have necessary information about high-risk cardiovascular diseases during pregnancy along with their management and treatment related fetomaternal complications in order to have optimal fetomaternal outcome.

Keywords: Heart diseases in pregnancy, Rheumatic heart diseases, Mechanical heart valves in pregnancy, Anticoagulants in pregnancy

INTRODUCTION

Incidence of cardiovascular diseases in pregnancy is increasing due to increasing age at first conception and frequent association of diabetes, hypertension and obesity in late reproductive years (40-50 years). In addition to these, many women with congenital heart diseases and RHDs reach childbearing age due to improved medical and surgical care resulting into higher survival rate.^{1,2}

Many women report directly during pregnancy without having adequate pre-conceptual cardiac evaluation, therefore, posing a great challenge for clinicians managing these high-risk mothers and their fetuses. Maternal heart diseases are one of the major causes of maternal mortality. Rheumatic heart diseases comprise 56-89% of all CVDs in pregnancy in non-western countries.^{2,3} Patients with mechanical valve prosthesis are classified under category

III (significantly increased risk of maternal mortality or severe morbidity with maternal cardiac event rate of 19-27%) by modified WHO classification of maternal cardiovascular risk.^{2,4} Such cardiac conditions require expert care with multidisciplinary team approach involving cardiologist, obstetrician, pediatrician or neonatologist, hematologist with close antepartum, intrapartum and postpartum surveillance. We presented here a case of a pregnant woman with rheumatic heart disease with dual mechanical valve replacement who was managed successfully by our team of expert clinicians with intensive antepartum surveillance making her journey uneventful with good obstetric outcome.

CASE REPORT

A 35-year-old para one attended our clinic for pre-conceptual counselling in view of rheumatic heart disease with dual mechanical valves (aortic and mitral).

She had full term normal vaginal delivery 7 years back. She got diagnosed with RHD with bivalvular dysfunction in postpartum period. She underwent valve replacement surgery. She was on oral warfarin 6 mg once daily for therapeutic anticoagulation and injection benzathine penicillin G 1.2 Mu monthly for infective endocarditis prophylaxis. She was found to be hemodynamically stable with sinus rhythm on examination. There was no history of recent cardiac decompensation, valve thrombosis, thromboembolism, infective endocarditis, cardiac arrhythmias, heart failure or hemorrhagic complications related to anticoagulant therapy. Fitness from managing cardiologist was obtained. Her ECG and 2 D echo was normal. She had no other major medical or surgical illness. She was using copper IUCD for birth spacing which was removed after she decided for next pregnancy. She was explained about high risk of major cardiac events during pregnancy along with major fetal risks related to anticoagulants and maternal heart disease (warfarin embryopathy, miscarriages, sudden IUPD, prematurity, growth restriction etc). She was advised for early antenatal registration, folic acid supplementation and aspirin 75mg periconceptionally. She was informed about all benefits and risks associated with various anticoagulants (warfarin, UFH, LMWH) and need for frequent coagulation profile monitoring throughout the pregnancy. She opted to continue with warfarin. She came for her first antenatal visit in early first trimester. Fetal viability was confirmed by ultrasound at 7 weeks.

Antenatal profile was normal. Nuchal translucency and anomaly scan was normal. Warfarin was continued at 6mg OD dosing. INR was monitored biweekly with target INR 2-3. Maternal echocardiography at 18 weeks revealed normal mitral and aortic valvular function with normal left ventricular function with no evidence of any vegetation or regurgitation. At 30 weeks, she complained of bilateral pedal edema and weakness. After being reviewed by cardiologist, she was started on oral antibiotics and furosemide 20 mg OD. Fetal growth was monitored monthly with ultrasound with doppler flow velocimetry. There was adequate interval growth with normal amniotic fluid volume and normal doppler. She was advised to stop warfarin and to start LMWH (enoxaparin 80 mg BD) from 36 weeks onwards. Cardiologist's opinion was taken at 37 weeks before planning delivery.

Maternal Echo was normal. He advised her to continue with same medications and to go for trial of labour if there was no contraindication for vaginal delivery. Induction of labour was done at 38.5 weeks after stopping LMWH. Unfractionated heparin infusion (10,000 IU 8 hourly) was started. IE prophylaxis was given. Heparin infusion was stopped during active phase of labour. She had a vacuum assisted vaginal delivery and male baby weighing 3 kg was delivered with normal Apgar score.

Neonate was evaluated by pediatrician. He had no postnatal complications or congenital birth defects. Mother was reviewed by cardiologist after birth and was

advised to resume therapeutic anticoagulation. Postpartum period was uneventful.

DISCUSSION

Cardiovascular disorders affect approximately 1-4% of pregnancies and they are one of the leading causes of non-obstetric maternal mortality. Incidence of pregnant women with heart diseases is on rise due to improved medical care allowing them to reach childbearing age and changing demographics with advanced maternal age at conception.¹ Valvular heart diseases commonly result from rheumatic heart diseases particularly in low-middle-income countries. Mechanical valve prosthesis provides excellent hemodynamic performance and long-term durability. But at the same time, it increases the fetomaternal morbidity and mortality due to the need of anticoagulation. In comparison to bioprosthetic valves, risk of major cardiac events during pregnancy is much higher with mechanical valves.²

Patients with mechanical heart valves require life-long anticoagulation to prevent thromboembolic events. Management of pregnant women with mechanical valves is challenging due to high risk of thromboembolic complications and anticoagulant therapy used to prevent these complications. Anticoagulant therapy mainly includes warfarin, unfractionated heparin (UFH) and low molecular weight heparin (LMWH). Adjunctive aspirin therapy should be considered in high-risk women with previous history of systemic embolism and atrial fibrillation. Warfarin crosses placenta and is well known to cause teratogenicity or warfarin embryopathy (nasal hypoplasia and epiphyseal stippling when administered between 6-12 weeks gestation) along with increased fetomaternal and neonatal hemorrhage whereas heparin does not cross placenta and has no teratogenic effect. Therefore, it may be suitable option for prophylaxis of systemic thromboembolism in pregnant women with mechanical heart valves. Warfarin is drug of choice in nonpregnant women.⁵

Ideally, all women in child bearing age group should have pre-conceptional counselling for pregnancy risk assessment, optimization of cardiac status pre-pregnancy and change of teratogenic cardiac medications to safer ones along with discussion about safe contraceptive options in those who don't want to conceive or where pregnancy is contraindicated.¹ Pregnancy is not advisable in women with severe mitral and aortic valve disease and in women with mechanical prosthetic valves where effective anticoagulation is not possible.

Heparin has been considered safer for the foetus than warfarin, but it may not provide effective anticoagulation during pregnancy. In a meta-analysis by D'Souza et al they reviewed the fetomaternal outcomes in women with mechanical heart valves treated with vitamin-K antagonists (VKAs), first trimester heparin followed by VKAs (sequential treatment), LMWH and UFH during

pregnancy. With VKAs, sequential treatment and LMWH, maternal mortality occurred in 0.9%, 2% and 29%, thromboembolic complications in 2.7%, 5.8%, and 8.7%, livebirths in 64.5%, 79.9%, and 92% and anticoagulant-related fetal/neonatal adverse events (embryopathy and/or fetopathy) in 2%, 1.4%, and 0%, respectively. Fetal loss and adverse events occurred with the first-trimester warfarin doses ≤ 5 mg/day. Therefore, they concluded as VKAs are associated with fewest maternal complications and fewest livebirths.⁶ In another study, authors found that warfarin was more effective than heparin in preventing thromboembolism and did not show any significant impact on the babies.⁷ Vaginal delivery is preferred over caesarean section. Early delivery is recommended for clinical and hemodynamic deterioration. Caesarean is done only when there is maternal or fetal instability.¹

CONCLUSION

It is very important for managing clinicians to have necessary information about risks associated with cardiovascular diseases during pregnancy along with their management in order to have optimal fetomaternal outcome. One also needs to take into consideration about fetomaternal risks related to treatment prescribed during pregnancy. Such high-risk pregnancies should be managed in well-equipped hospitals with intensive cardiac critical care facility and a team of senior doctors having expertise in treating cardiovascular diseases in pregnancy. Availability of emergency drugs or blood products required for reversal or correction of deranged coagulation (e.g. protamine sulphate, fresh frozen plasma, platelets etc) must be ensured.

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