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A Case: Optimal Treatment of Pregnancy with Rheumatic Heart Disease

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Abstract

The number of women who have a pre-existing cardiovascular disease (CVD) or develop cardiac problems during pregnancy is increasing, and it is the leading cause of non-obstetric mortality during pregnancy. Heart disease complicates approximately 1–3% of pregnancies and is responsible for 10 to 15% of maternal mortality. The rheumatic heart disease remains the number one worldwide cause of maternal cardiac complications in pregnant. It is important that obstetric, anesthesiologists, cardiologist, remain aware of the disease, its complications and management of valvular lesions throughout the birthing process.

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Introduction

Heart disease is the highest cause of morbidity and mortality during pregnancy and labor. Pregnancy will aggravate the existing heart disease, while heart disease can affect the growth and development of the fetus inside the uterus. In developing countries, the most frequently found heart disease is rheumatic heart disease and it rises problem in pregnant women. Rheumatic heart disease started with rheumatic fever. In rheumatic fever, the reaction that occurred was autoimmune, triggered by the exposure of host that is genetically vulnerable to an antigen in Group A β-hemolytic streptococcus which causes pathological damage to the tissue due to chronic inflammation in the form of exudation, proliferation, and formation of scar tissues on heart muscles and valve, thus leading to heart malfunction and valve insufficiency [1-6].

Hemodynamic changes occur in pregnant women because of increased blood volume of 30-50% which started from the first trimester and reached its peak during 32-34 weeks of pregnancy and stayed until full-term. Most blood volume increase causes increased capacity of uterus, mammae, kidney, smooth muscles and vascular system. Prominent hemodynamical changes due to pregnancy may have a huge impact on existing heart disease. Women with heart disease may not be able to adapt to these changes which causes ventricular dysfunction that lead to cardiogenic heart failure. Heart valve disorder is one of heart diseases that is frequently found during pregnancy. This disorder can elevate the incidence of heart failure, morbidity and mortality in pregnant woman and her fetus. The disorders included are

mitral stenosis caused by rheumatic heart disease, mitral and aortic regurgitation, tricuspid valve disease and prosthetic heart valve [7-11].

The most frequently found valvular disease is mitral valve regurgitation (65-70% cases). Changes in valve structure, followed by shortening and thickening of tendinous cords causes mitral valve insufficiency. Increased input volume and left ventricular inflammatory process causes the left atrium to dilate due to blood regurgitation. Increased pressure on left atrium will cause pulmonary congestion, followed by left heart failure. If this disease is severe and chronic, right heart failure may also occur [12-13].

Mitral regurgitation can be tolerated for prolonged period without complaints of the heart, both during resting or activities. Shortness of breath and tiredness are the first symptoms which gradually turns to orthopnea, paroxysmal nocturnal dyspnea, and peripheral edema. These severe symptoms can be triggered by atrial fibrillation due to increased regurgitation degree, or cord rupture. During physical examination, Mitral facies are less common than mitral stenosis. During palpation, the apex is usually pushed to the lateral/left according to left ventricular enlargement. Thrill on the apex is a sign of severe MR. During auscultation, blowing pansystolic murmur is heard at the apex, extending to the axilla and left infrascapular region. The first heart sound is usually merged with murmur. The third heart sound is heard due to fast filling to the left ventricle during early diastolic, followed by diastolic flow murmur due to high left atrium volume that flows to the left ventricle [14-17].

During adjunctive examination, C-reactive protein assessment and erythrocyte sedimentation rate, and electrocardiography can be performed to assess cardiomegaly and pulmonal congestion as signs of chronic heart failure, and echocardiography to assess valve insufficiency/stenosis degree. Complications that may occur include premature birth, intrauterine growth retardation, respiratory distress syndrome, intraventricular hemorrhage and death. In several cases of pregnancy with heart valve disorder, antibiotics are needed to prevent endocarditis (prophylaxis).

The treatment of patients with rheumatic heart disease is mostly aimed to eradicate group A beta-hemolytic streptococcus bacteria, suppress inflammation from autoimmune response, and provide supportive therapy for congestive heart failure. Penicillin G Benzathine Intramuscular, Penicillin V Potassium Oral, and Amoxicillin Oral are the drug of choice for the treatment of group A beta-hemolytic streptococcus. The diet of rheumatic heart disease patients should be nutritious and non-restrictive, unless in heart failure patients. Postpartum period should be closely observed, considering that heart failure may occur during postpartum period even though no heart failure occurred during pregnancy and birth. Postpartum complications such as postpartum bleeding, anemia, infection and thromboembolism are more dangerous in patients with heart disease [18-21].

Case Report

A 27-year-old female patient presented to Raden Mattaher General Hospital, Jambi for cesarean section preparation for her pregnancy. The patient was pregnant with her first child and was in 39-40 weeks of pregnancy. On admission, the patient complained having shortness of breath, followed with heavy sensation on the chest, chest pain and heart beating. The complaints were accompanied by intermittent stomach pain which extended from the waist to front stomach. The patient did not complaint any water coming out from the birth canal, blood and mucus discharge from birth canal (-), urge to push (-). From 7 months of pregnancy, the patient felt swelling in both of her legs, thus felt difficult to walk.

Five years prior, the patient complained of continuous fever for 3 days and sore throat, accompanied by pain all over her joints. The patient also complained of round-shaped bump under the skin of both of her hands and redness on her hands. The patient came to the general practitioner and was referred to a cardiologist. The patient was diagnosed with rheumatic heart disease by the cardiologist and routinely consume furosemide, nitral and amoxicillin. The cardiologist suggested that the patient received valve replacement surgery. However, the suggestion was rejected by the patient. She routinely received injection of penicillin G benzathine intramuscular every 21 days. Over the past five years, patients also complained of chest pain, feel tired quickly and paroxysmal nocturnal dyspnea, visit antenatal care > 4 times. On physical examination found moderate pain with compos mentis awareness. Blood pressure 130/70 mmHg pulse 121x minutes, RR 28x / min and temperature 36.7°C. Conjunctiva anemic, on physical examination of the chest found rhonki in basal, the presence of trhill, enlargement of the heart to the left and abnormalities of heart rate sound frequency in auscustation (systolic heart murmur), JVP increased by 5 ± 4 mmHg. On abdominal examination found gravidity, gravida

striae, horizontal center, auscustation of a normal baby's heart rate with inadequate his. On leopold examination it is concluded that the fetal head is presented. Vaginal examination does not show portion opening.

The results of routine blood tests showed anemia with 9.4 g / dL, liver function, kidney function and urinalysis normal. ECG examination with sinus tachycardia prolonged PR interval. Ultrasound examination gravida 39-40 weeks, head presentation with interpretation of fetal weight 3242 grams. The patient was examined for echocardiography with the conclusion of severe mitral regurgitation, mild mitral stenosis, left atrial dilation and left ventricle with 76% ejection fraction.

Figure 1. USG examination result.

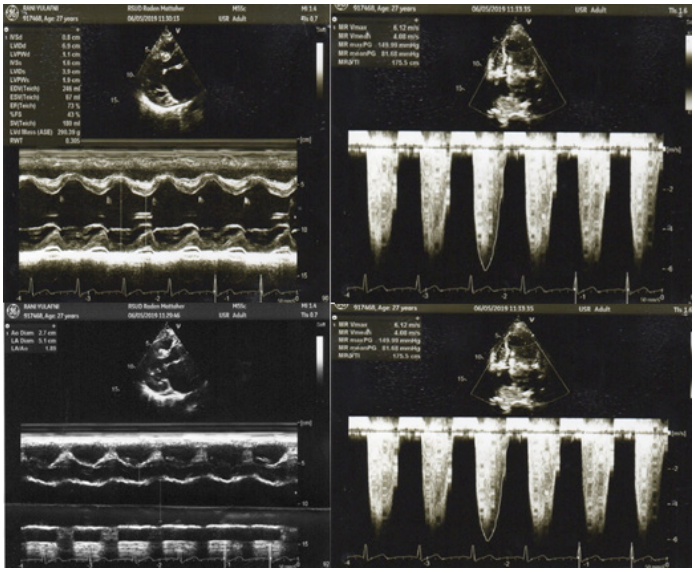

Figure 2. Echocardiography.

The patient then underwent cesarean section using spinal anesthesia. The drugs given for anesthesia were 3 ml bupivacaine 0.5% and 0.1 ml adjuvant morphine. The blood pressure during early anesthesia was 97/67 mmHg. The patient was given 10 mg ephedrine intravenously for blood pressure stabilization until the end of surgery with average of 113/70 mmHg and pulse of 111 times per minute. The patient was given 40 mg furosemide to induce diuresis and prevent hypervolemia. Intraoperative bleeding was 500 ml. The infant was born via cesarean section with 3300 gram birth weight and 48 cm height. Apgar score was 8/9. The patient was observed ICCU and the baby was observed in perinatology.

Discussion

In this case, the patient was diagnosed with G1A0P0, pregnant for 39-40 weeks with heart failure e.c. rheumatic heart disease. Diagnosis was established according to history taking, physical and adjunctive examinations. During history taking, the patient often complained of shortness of breath, accompanied by chest pain, tiredness and headache. According the patient's symptoms, the shortness of breath lead to heart failure because the symptom stays even though the patient is resting and she felt more comfortable with the head elevated, and there was also the swelling on her legs. Most patients admit to reduced tolerance to performing activities and felt more easily tired. This condition is closely related to increased body weight gained during pregnancy and due to physiological anemia during pregnancy. Fainting episodes and mild headache occurred due to mechanical compression from pregnant uterus to the inferior vena cava, which lead to inadequate venous flow to the heart, especially during third trimester [22-23].

Physical examination on this patient showed disease. Other manifestations of heart failure are muscle weakness, heart enlargement, tachycardia, systolic murmur, gallop third heart sound (S3), smooth wet rhonchi in the pulmonary base due to air flow through edematous alveolus. Systolic murmur can be heard in pregnant women and a result of hyperkinetic circulation during pregnancy. Murmur is best heard on lower left sternum line and above pulmonal area. Continuous benign murmur, such as uterus cervical vein sound and mammary souffle, is also caused by increased secondary flow to hemodynamic changes from pregnancy. Diastolic murmur heard throughout pregnancy requires further investigation using echocardiography and doppler. Heart failure can be caused by myocardial infarction, heart myopathy, valve defect, congenital malformation and chronic hypertension. The cause of heart failure in this patient

was suspected to be rheumatic heart disease. Heart failure can affect left heart, right heart, or both (biventricular). The most common manifestation from left heart failure is dyspnea or feeling of shortness of breath. This is especially caused by decreased pulmonary compliance due to edema and pulmonary congestion and by increased activity of autonomous pulmonary stretch receptor. The most prominent dyspnea is found during physical activity (dyspneu d'effort). Dyspnea is also clear when the patient lies down (orthopnea) due to increased amount of venous blood returning to the thorax from lower extremities due to elevated diaphragm in this position. Paroxysmal nocturnal dyspnea is a dramatic dyspnea, in which the patient awoken with sudden severe shortness of breath, accompanied by coughing, strangled sensation, and wheezing. The classification of heart failure according to New York Heart Association (NYHA) can be divided into 4 categories. According to history taking and physical examination, this patient was considered third degree NYHA heart failure because the patient did not felt shortness of breath during resting, however her daily physical activities are limited [24-29].

Adjunctive examination found that her Hb level was 9.4 mg/dl. Anemia is a cause or complication of heart failure. The mechanism of anemia in heart failure include bone marrow dysfunction due to decreased cardiac output and cytokine activity. TNF-α activity can cause bone marrow depression, insensitivity to erythropoietin (EPO) and disrupts the release and usage of iron. According to adjunctive examination, the diagnosis led to rheumatic heart disease. Rheumatic heart disease is a heart defect caused by the remnants of acute rheumatic fever without the accompaniment of acute inflammation. The defect can occur in all parts of the heart, especially mitral valve and aortic valve. This disease is preceded by acute rheumatic fever, i.e. inflammatory syndrome that occurs after sore throat caused by group A beta-hemolytic streptococcus that tend to recur. The clinical symptoms include subfebrile, anorexia, paleness, arthralgia, and stomach pain. Diagnosis establishment uses Jones criteria. The major criteria found in this patient were fever and arthralgia. Carditis was proven by echocardiography which showed severe mitral regurgitation [30-31].

The diagnosis of rheumatic heart disease in this case is correct because the Jones criteria had already been fulfilled, both major and minor criteria. Minor criteria assessment such as CRP and LED, however, was not performed. Regardless, the certain diagnosis assessment, throat swab for streptococcus infection should be performed to confirm this diagnosis. The treatment for this case included bed rest, 1.2 million units of benzathine penicillin, and 1 x 40 mg furosemide tablets. The duration and extent of bed rest depends on the nature and severity of attacks. Basically, cesarean section can aid in relieving the mother's burden during labor process because there is no need to push which can increase cardiac output. This is proven by studies conducted on several developed countries that perinatal and maternal mortality showed lower incidence on cesarean section (1.6%) compared to vaginal birth (5%).23 However, according to a study in the US, the obstetric complication rate severely increased on cesarean section, the morbidity of mothers increased two folds in cesarean section compared to vaginal birth. Surgery increased the burden to the heart due to stress of surgery, infection, prolonged anesthesia, heavy bleeding, and increased thromboembolism risk.32 The consideration of cesarean section should not use the indication of heart disease. Cesarean section will not reduce the severity of heart disease or complication frequency occurred to the heart compared to vaginal birth. Unless in severe pulmonal hypertension due to various causes, Marfan syndrome and aortic aneurism, surgery should be performed electively. However, intensive care is needed during postpartum period [33].

In this patient, cesarean section was chosen. Even though several theories stated that cesarean section should only be performed on obstetric indication. In this patient, early heart failure symptoms had occurred, which was shortness of breath with respiratory rate of 28x per minute, orthopnea, and irregularity of heartbeat. Therefore, cesarean section was chosen. In conditions such as found in this patient, things that triggers uterus muscle contraction should be avoided because it may increase blood flow to the heart and added burden to the heart which may endanger the patient's condition. Therefore, the choice of treatment in this case was appropriate [1,6].

Further treatment on this patient include the patient is permitted to get pregnant again with the if her heart disease has been treated and requires close observation from the obstetrician and cardiologist. This patient should have contraception in the form of IUD to gap her pregnancy. The patient was also suggested to perform mitral valve repair/mitral valve replacement because usually, the outcome of surgery is still better compared to medication therapy. The outcome is closely related to disease severity, comorbidity, hospital ability/facility, medical staff ability and team

cooperation between surgeon, obstetrician, cardiologist, anesthetist, intensivist, and postoperative care. With the development of valve repair surgery, the surgeons tend to choose valve anatomy repair compared to prosthetic valve replacement, especially in mitral valve disease. The advantage of valve repair is lower perioperative morbidity and mortality, maintained function of left ventricle because the cords are preserved, free from anticoagulants, and relatively better durability.

Conclusion

It has been reported, a 27 years old expecting woman is in 39th week of pregnancy and diagnosed with heart failure et cause rheumatic heart disease. The most prominent principal of management pregnancy with heart disease is early findings and reduce excessive cardiac loads from the first trimester until puerperium phase. All the efforts should be intended to prevent increased cardiac loads and secondary infection. Furthermore, choosing delivery methods should be considered and involving multidisciplinary to reach optimum maternal and neonatal outcomes.

References

1.
2. Baumgartner H, Falk V, Bax JJ (2017) ESC/EACTS Guidelines for the management of valvular heart disease. European Heart Journal 38: 2739-2791.
3. Nanna M, Stergiopoulos K (2014) Pregnancy complicated by valvular heart disease: An Update. J Am Heart Assoc vol 3: 3.
4. Chambers J, Prendergast B, Iung B, Rosenhek R (2017) Standards defining a "heart valve centre": ESC Working Group on Valvular Heart Disease and European Association for Cardiothoracic Surgery viewpoint, Eur Heart J 38: 2177-2182.
5. Van Hagen IM, Roos-Hesselink JW (2015) ROPAC Investigators and the EURObservational Research Programme (EORP) Team. Pregnancy in women with a mechanical heart valve: data of the European Society of Cardiology Registry of Pregnancy and Cardiac Disease (ROPAC), Circulation 132: 132-142.
6. French KA, Poppas A (2018) Rheumatic heart disease in pregnancy, Circulation 137: 817-819.
7. The National Heart Foundation (2014) New Zealand guidelines for rheumatic fever. Diagnosis, management and secondary prevention of acute rheumatic fever and rheumatic heart disease.
8. RHD Australia (ARF/RHD writing group) et al. (2012) Australian guideline for prevention, diagnosis and management of acute rheumatic fever and rheumatic heart disease (2nd edition).
9. Chambers J, Prendergast B, Iung B (2017) Standards defining a "heart valve centre": ESC Working Group on Valvular Heart Disease and European Association for Cardiothoracic Surgery viewpoint. Eur Heart J 38: 2177-2182.
10. Laksmi PW, Alwi I, Setiati S, Manajoer AM, Ranita R. (2008). Penyakit-penyakit pada kehamilan peran seorang internis. Pusat Penerbitan Ilmu Penyakit Dalam Fakultas Kedokteran Universitas Indonesia.
11. Carapetis JR, Beaton A, Cunningham MW (2016) Acute rheumatic fever and rheumatic heart disease. Nature Reviews Disease Primers.
12. French KA, Poppas A (2018) Rheumatic heart disease in pregnancy, Circulation 137: 817-819
13. Cunningham F, MacDonald P, Gant N (2001) Cardiovascular diseases. In: Williams obstetrics, 21 st ed New York, McGraw Hill p1181-203.
14. Wibowo B, Wiknjpasienastro GH (2002) Penyakit jantung katup. Ilmu Kebidanan. Ed : 3rd. Jakarta : Yayasan Bina Pustaka Sarwono Prawirohardjo Pg 766-773.
15. LHP, Bhandiwad A, Desai N, Kondareddy T (2017) Maternal outcomes of rheumatic heart disease in pregnancy, International Journal of Reproduction, Contraception, Obstetrics and Gynecology 6: 802.
16. Prawirohardjo S (2014) Ilmu Kebidanan, Edition 4 ed Jakarta: PT Bina Pustaka Sarwono Prawirohardjo
17. Wilson N (2013) Secondary prophylaxis for rheumatic fever: Simple concepts, difficult delivery, World J Pediatr Congenit Heart Surg 4: 380-384.
18. Bowater SE, Thorne SA (2010) Management of pregnancy in women with acquired and congenital heart disease, Postgrad Med J 86: 100-105.
19. Ziruma A, Nyakanda M, Muyotcha AF, Hove, F, Madziyire MG (2017) Rheumatic heart disease in pregnancy: a report of 2 cases, Pan African Medical Journal.
20. Mitchelson B, Douglas E (2018) Optimal Management of a Pregnant Patient with Rheumatic Heart Disease, University of Kansas School of Medicine-Wichita: Department of Anesthesiology.
21. Nanna M, Stergiopoulos K (2014) Pregnancy complicated by valvular heart disease: An Update, J Am Heart Assoc.
22. Gewitz MH, Baltimore RS, Tani LY, Sable CA, Shulman ST et al. (2015). Revision of the jones criteria for the diagnosis of acute rheumatic fever in the era of doppler

echocardiography: A scientific statement from the American Heart Association.

23. Kothari SS (2013) Of history, half-truths, and rheumatic fever, Ann Pediatr Cardiol 6: 117-120.
24. Ghati N (2018) A case of rheumatic heart disease with history of complicated pregnancy. Department of Cardiology, All India Institute of Medical Sciences: New Delhi, India.
25. Homenta S (2014) Penyakit jantung pada kehamilan. Fakultas Kedokteran Universitas Indonesia: Jakarta.
26. Nanna M, Stergiopoulos K (2014) Pregnancy complicated by valvular heart disease: An update, J Am Heart Assoc.
27. Lancellotti P, Tribouilloy C, Hagendorff A et al. (2013) Scientific Document Committee of the European Association of Cardiovascular Imaging. Recommendations for the echocardiographic assessment of native valvular regurgitation: an executive summary from the European Association of Cardiovascular Imaging. Eur Heart J Cardiovasc Imaging
28. Lang RM, Badano LP, Mor-Avi V, Afilalo J, Armstrong A et al. (2015) Recommendations for cardiac chamber quantification by echocardiography in adults: an update from the American Society of Echocardiography and the European Association of Cardiovascular Imaging, J Am Soc Echocardiogr.
29. Regitz-Zagrosek V, Roos-Hesselink JW, Bauersachs J, et al. (2018). 2018 ESC Guidelines for the management of cardiovascular diseases during pregnancy. European Heart Journal.
30. Frishman WH, Elkayam U, Aronow WS (2012) Cardiovascular drugs in pregnancy, Cardiol Clin.
31. Tsiaras S, Poppas A (2009) Mitral valve disease in pregnancy: outcomes and management, Obstetric Medicine 2: 6-10.
32. Wilson N (2013) Secondary prophylaxis for rheumatic fever: Simple concepts, difficult delivery, World J Pediatr Congenit Heart Surg.
33. Pekpak E, Atalay S, Karadeniz C et al. (2013) Rheumatic silent carditis: Echocardiographic diagnosis and prognosis of long-term follow up, Pediatr Int.
34. Wyber R, Carapetis J Evolution (2015) Evidence and effect of secondary prophylaxis against rheumatic fever, J Pract Cardiovasc S.