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The successful pregnancy in patient with Wolff-Parkinson-White syndrome type B



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ABSTRACT

Background: An aberrant accessory route is a hallmark of the rare heart rhythm condition called Wolff-Parkinson-White (WPW) syndrome. The onset of tachyarrhythmias, which can result in hemodynamic instability and even maternal mortality, is considered to be triggered by a variety of physiological changes that occur during pregnancy. Therefore, it is anticipated that effective management options for pregnant women who have WPW syndrome will be able to regulate tachyarrhythmias and give healthy pregnancies for both the mother and the fetus.

Case Report: A 32-year-old pregnant woman with 34 weeks of gestational age arrived complaining of palpitations and breathing difficulties. The results of the ECG test revealed left branch bundle block (LBBB), a Wolff-Parkinson-White (WPW) type B pattern, and sinus tachycardia. Both an NST assessment and an echocardiographic evaluation revealed no fetal distress or structural abnormalities of the heart. The patient was treated with 300 mg of Propafenone, which was administered on a regular basis whenever the patient experienced palpitations. Due to a history of prior caesarean deliveries, the pregnancy had progressed to 40 weeks of gestation and caesarean birth under spinal anaesthesia was performed in this point. The infant was born healthy, full-term, and free from birth problems.

Conclusion: One of the causes of tachyarrhythmias in WPW syndrome is pregnancy. Arrhythmias that could develop in women with WPW syndrome can be controlled with good pregnancy planning and management.

Keywords: Wolff-Parkinson-White Syndrome, WPW, Pregnancy, Supraventricular Tachyarrhythmias.

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INTRODUCTION

Paroxysmal supraventricular tachycardia (PSVT) is one of pathological intermittent tachycardia other than atrial fibrillation, atrial flutter, and multifocal atrial tachycardia. While there are several different PSVT subtypes, Wolff-Parkinson White syndrome (WPW) is the most prevalent, especially in women of reproductive age (incidence: 1.2 per 1000).^{1,2} Pregnant women are also suffered of WPW syndrome, but the incidence is still not known. Changes in cardiac physiology occurs in pregnancy. However, many studies have shown an increase of tachyarrhythmia incidence in pregnancy. Most of the incidences happen on women with history of PSVT before pregnancy.

During pregnancy, the catecholamine level is likely to increase within the bloodstream. Additionally, maternal blood volume and adrenergic receptor sensitivity both rise. These mechanisms cause the pregnant women's atrial heart to stretch, and lead to increase mortality and

morbidity for both women and her fetus. WPW syndrome affects the choice of delivery, particularly for caesarean surgery which requires anaesthesia.^{1,2} Therefore, obstetric, cardiology, and neonatology departments must work together as a multidisciplinary team to treat pregnant women with WPW syndrome holistically. Pregnant women with WPW syndrome have a higher likelihood of having a normal pregnancy and uncomplicated delivery if they receive the proper treatment.³ From this case report, the author wants to discuss a case of pregnant woman with type B WPW syndrome who underwent caesarean surgery on the basis indication of previous caesarean delivery.

CASE REPORT

A 32-year-old female patient came to obstetrics and gynaecology department, G2P1001 with 34 weeks of gestational age. The patient was referred to cardiology department for her complaint of intermittent palpitations within the last

5 months. The patient also suffered from shortness of breath since one day ago. Shortness of breath was aggravated by activities, lying on bed, and also at night time. The symptoms are referred to dyspnea on effort, orthopnea, and paroxysmal nocturnal dyspnea. Swollen feet, vaginal discharge, and vaginal bleeding were denied. The patient had been diagnosed with supraventricular tachycardia (SVT) at 18-20 weeks of gestation, but the fetal movement was still active. For the past 2 months, the patient had been taken 150 mg of Propafenone Hydrochloride once every 24 hours. Similar symptoms were happened on the first pregnancy. The first child was born through caesarean surgery 9 years ago, weighed 2900 gram.

The patient weighs 86 kg with 160 cm height. For vital signs, her heart rate was 105 times/minute, blood pressure was 115/80 mmHg, and respiratory rate was 20 times/minute. Body temperature was at 36.7 °C. There were no widening of heart border and no additional heart sounds (gallop, murmur, opening snap, friction

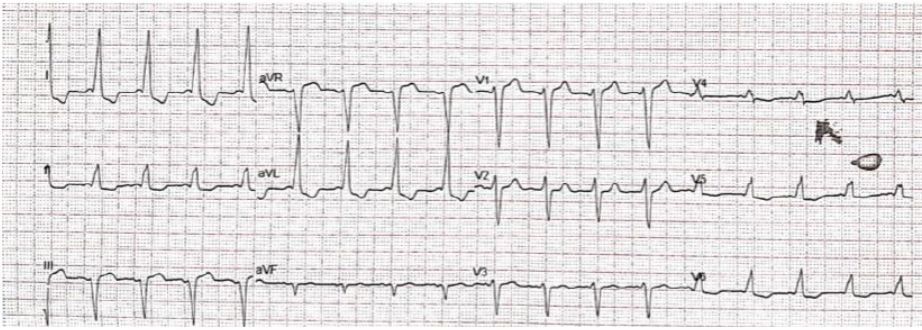


Figure 1. The results of the ECG examination showed a pattern of Wolff-Parkinson-White type B syndrome.

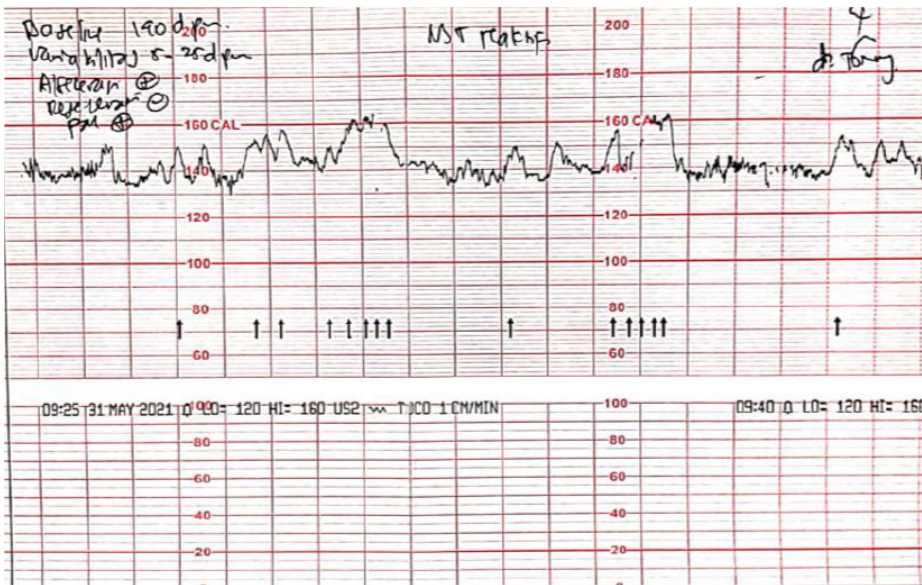


Figure 2. Non-Stress Test Results.



Figure 3. Baby born to mothers with Wolff-Parkinson-White Syndrome during Pregnancy. Baby was born in perfect maturation conditions and without congenital defects.

rub) on heart auscultation. The other examinations were within normal limit. On obstetric examinations, no uterine

contraction was found. The uterine fundal height (UFH) was 3 fingers below the xiphoid and the fetal heart rate (FHR) was

140 beats/minute. From transabdominal ultrasound, the examiner found the estimated fetal weight was 1958 grams with placenta corpus posterior grade 2 and single deepest pocket (SDP) was 5.34 cm. There were sinus tachycardia, left branch bundle block (LBBB), and a Wolff-Parkinson-White (WPW) pattern found in patient's electrocardiography (ECG) (Figure 1). From echocardiography examination, the dimensions of the heart chambers were normal, ejection fraction (EF) 68%, normal diastolic function, tricuspid annular plane systolic excursion or (TAPSE) 2.0 cm, global normokinesia, normal valve, eRAP 8 mmHg, IAS and IVS impression intact. There is a patent ductus arteriosus (PDA).

From the examination above, she was diagnosed with G2P1001 34 weeks 6 days with WPW type B syndrome and intrauterine growth restriction (IUGR) type I. She was treated through multidisciplinary treatment. Obstetrics and gynaecologist specialists, cardiologist, and anaesthesiologist were involved. Department of cardiology concluded mWHO class II with a small increased risk of maternal death. Propafenone 300 mg was also given to the patient whenever she feels palpitations. Every 2 weeks, she had been asked to do a follow-up for fetal development and heart rhythm monitoring. Through the follow-up, transabdominal ultrasound and non-stress test (NST) were performed to confirm the fetal condition. The delivery method can be adjusted based on the indications. The NST result didn't show any late decelerations. It showed a baseline FHR 140 beats/minute, variability of 5-25 beats/minute, and positive acceleration (Figure 2). Therefore, it can be concluded that there was no fetal distress.

Until the pregnancy reached 40 weeks gestation, it was effectively maintained. On the basis of a history of caesarean sections after prior deliveries, a caesarean delivery was voluntarily chosen. For the patient, regional (spinal) anaesthesia was the preferred anaesthetic. A baby boy weighing 2860 grams was born via caesarean section. Infant was delivered healthy with an Apgar score (AS) of 8 to 9 (Figure 3).

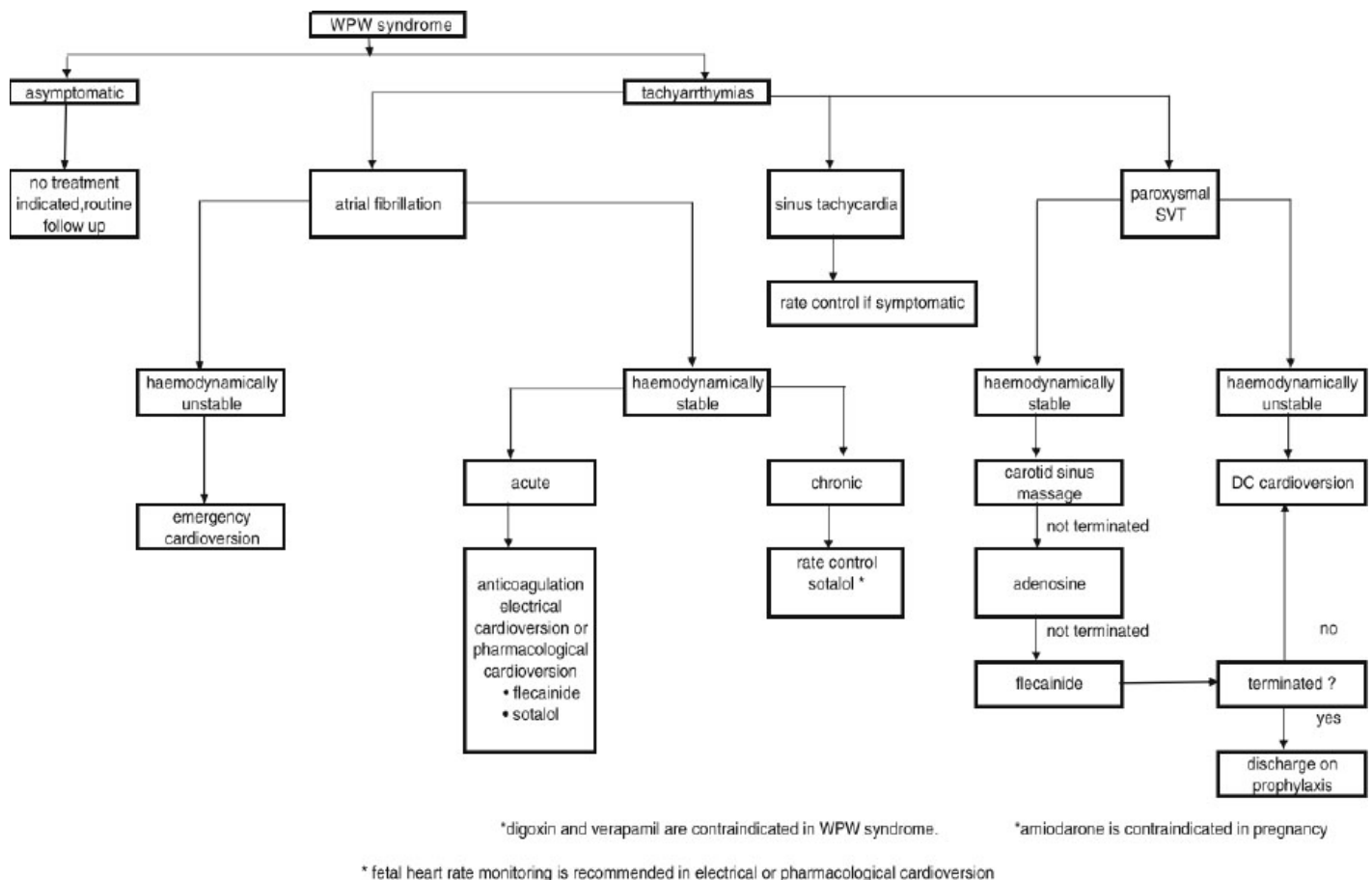


Figure 4. WPW Syndrome Management Algorithm in Pregnancy.³

DISCUSSION

The rare heart rhythm disease known as Wolff-Parkinson-White syndrome (WPW) is resulted by aberrant alternate cardiac electrical pathways or accessory pathways that connect the atria and ventricles. The bidirectional atrioventricular pathway will activate the ventricles early (pre-excitation) in order to generate atrioventricular muscle contraction without going through the atrioventricular (AV) node.^{3,4} The WPW condition is recognized to physiologically worsen during pregnancy. Plasma catecholamine levels rise during pregnancy as a result of hemodynamic, autonomic, hormonal, and emotional changes. The PR, QT, and QRS intervals in the cardiac rhythm are also shortened as a result of this, which further raises heart rate. Additionally, the increased intravascular volume can lead to atrial stretching and an increase in end-diastolic heart volume, which will impact a pregnant woman's heart's ability to transmit electrical

impulses. As estrogen can enhance the excitability of uterine muscles, it is also believed that an increase in estrogen can increase cardiac excitability. It is believed that certain physiological changes during pregnancy increase the risk of developing WPW syndrome.³⁻⁵

In fact, WPW syndrome can be asymptomatic. However, the majority of individuals with WPW syndrome typically complain of palpitations.^{3,4} Intermittent palpitations are actually rather typical in pregnant women. For pregnant women, sinus tachycardia, premature atrial and ventricular contractions, and palpitations are the most typical causes of heart palpitations.⁶ Pregnancy requires early detection and treatment of palpitations or excessive tachycardia brought on by WPW syndrome, which can result in a 40% reduction in cardiac output.^{3,4} The patient complained of palpitations and shortness of breath since she was 18 to 20 weeks pregnant. She had already experienced the pounding complaint with her first pregnancy.

Shortness of breath, lightheadedness, and fainting are some other WPW syndrome symptoms that are frequently experienced. These symptoms are ones that are also frequently experienced during pregnancy, making it challenging to make a clinical diagnosis in pregnant women.⁵ ECG readings are typically used to confirm WPW syndrome. ECG testing can be utilized to distinguish between WPW syndrome types A and B in addition to making the diagnosis. A dominant R wave and an inverted T wave in V1 with an R/S ratio greater than 1 are indicators of type A WPW syndrome. Whereas the R wave is often dominant in lead V1 due to right ventricular dominance, S is significant in leads V1 and V2.^{6,7} The WPW type B syndrome in our patient may be supported by a pronounced S wave in the right chest lead.

According to several studies, the first-line treatment for supraventricular arrhythmias in pregnant women is non-pharmacological therapy. Before transitioning to pharmacological therapy,

non-pharmacological treatments like carotid sinus massage and the Valsalva technique are advised to be tried. This is because using any antiarrhythmic medication may be hazardous to fetus development, and should be avoided during the first trimester of pregnancy. The management of supraventricular arrhythmias during pregnancy can become more complicated due to physiological changes and fetal safety considerations based on a number of factors, including gestational age, signs and symptoms, and maternal hemodynamic status. In this situation, the role of an obstetrician and gynaecologist is crucial.

Adenosine, beta blockers, and calcium channel blockers are the pharmacology treatments that are frequently used to treat acute supraventricular arrhythmias in pregnancy. Verapamil and adenosine have both been proved to be reliable and secure antiarrhythmic treatments during pregnancy. Adenosine is a purine nucleotide that slows atrioventricular conduction and briefly suppresses the activity of the sinoatrial (SA) node. Because it can work immediately and has a half-life of less than 10 seconds, adenosine is frequently used as the first option in hemodynamically stable acute situations. In the event that adenosine injection is unsuccessful, beta blockers are the preferred treatment for WPW syndrome to block the AV node, impede accessory route conduction, and prevent arrhythmias. Additionally, verapamil in particular has been shown to be just as efficient as adenosine in stopping acute supraventricular arrhythmias in pregnancy. Verapamil can produce hypotension due to its peripheral vasodilating and adverse inotropic effects, however because these side effects do not result in hypoperfusion, it is safe to use during pregnancy. Digoxin is another safe antiarrhythmic treatment during pregnancy. Because of its teratogenic effect and potential to reduce fetal growth in some trials, amiodarone is typically not administered as an antiarrhythmic during pregnancy.^{3,8,9} Sotalol, flecainide, and propafenone are used as the second line therapy of supraventricular arrhythmia in pregnancy.¹⁰

In situations of WPW syndrome

in pregnant women in any trimester, cardioversion is a safe choice to utilize if pharmacological and non-pharmacological therapies fail in hemodynamically stable individuals. Studies have revealed that in 61% of cases of WPW in pregnancy, acute arrhythmias are successfully terminated by cardioversion. Cardioversion side effects that could result from its use include hypertonic uterine contractions, fetal distress, and fetal bradycardia. As a result, close monitoring should be done after cardioversion and the lowest power (50 J) should be used when initiating cardioversion. Advanced cardiovascular life support (ACLS) algorithms that are adapted to deal with the physiological changes of pregnancy can be used in situations where the patient is hemodynamically unstable due to SVT and an immediate consultation with a more trained doctor is not readily available. The pregnant woman is positioned in the left lateral position, 100% oxygen is administered, and intravenous access is set up.²

The prophylactic medication for supraventricular arrhythmias in pregnancy must use the lowest dose and most secure pharmacological therapy. Flecainide and propafenone are advised as the first-line treatment for WPW syndrome without cardiac structural abnormalities in pregnant women. Flecainide has a number of adverse effects, including decreased fetal heart rate variability, maternal QT prolongation, neonatal QT prolongation, toxic heart failure, and poor maternal vision. Propafenone is a sodium channel blocker-based class 1C antiarrhythmic drug. Additionally, propafenone has an adrenergic-receptor blocking action. There is not much information about propafenone use during pregnancy as of now. There were no negative effects on the fetal cardiac rhythm in two studies that tested the use of propafenone as a therapy for arrhythmias in pregnant women in the second and third trimesters.^{3,10} Propafenone medication was administered to our patient when she was pregnant as a prophylactic treatment for controlling arrhythmias. Our patients' use of propafenone has not been found to have any negative pregnancy-related side effects on either the mother or the fetus.

Ablation treatment is an invasive procedure that can be used on patients who have pregnancy-related arrhythmias that cannot be managed by drug administration. However, ablation therapy can result in life-threatening arrhythmias and is complicated. As a result, this ablation operation needs to be performed in a tertiary healthcare institution with all the necessary equipment and professionals. Due to the amount of radiation that could be emitted during the treatment, special radiofrequency ablation is typically advised during the postpartum period.⁴ **Figure 4** details the pharmaceutical therapy algorithm for the treatment of WPW syndrome during pregnancy.

Obstetric indications in the form of a history of prior caesarean deliveries led to the caesarean delivery of our patient. Patients with WPW syndrome are typically advised to have a caesarean section to avoid difficulties from vaginal birth.¹¹ In these situations, regional anaesthesia should be the anaesthetic of choice. Regional anaesthesia is favoured in this situation because it can limit the administration of additional anaesthetic medications and prevent sympathetic activation due to the use of laryngoscopy and intubation. Because epidural anaesthesia can provide segmental block, hemodynamic stability, and better postoperative pain control than spinal anaesthesia, studies have shown that it is really more highly recommended.

Before surgery, a left lateral position and fluid loading can stop hypotension due to lowered atrial filling pressure. By preventing hypotension, individuals with WPW syndrome won't need as many vasopressors during surgery and anaesthesia, where those drugs can cause SVT. Following after the caesarean delivery, the recommendation of oxytocin administration is modest doses given slowly by intravenous infusion or maximum dose of 5 IU of oxytocin as a bolus.^{1,5}

Women who want to get pregnant should carefully plan their pregnancies because it has been established that pregnancy is linked to an increased risk of recurrent arrhythmias in people with WPW syndrome. In order to control or avoid arrhythmias during pregnancy, women with WPW should

first consider treatment options with their obstetrician and gynaecologist as well as a cardiologist. Options may include planning a pharmacological management strategy for her pregnancy or performing a curative ablation treatment before getting pregnant.^{8,9}

CONCLUSION

Severe tachycardia during pregnancy can lead to hemodynamic decompensation and endanger both the mother and the fetus' lives. To protect the safety of the mother and fetus, early diagnosis, adequate therapy, and close monitoring must be carried out. Depending on the severity of the condition, treatment options range from non-pharmacological to pharmacological to invasive procedures like cardioversion and ablation. To reduce the risk of morbidity and mortality in the mother and fetus, treatment aims to regulate arrhythmias during pregnancy.

DISCLOSURE

Conflict of interest

The authors declare that they have no conflict of interests.

Consent for publication

The patient has signed informed consent regarding the publication of medical data in medical scientific journals.

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Author contributor

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