WPW syndrome during pregnancy: Increased incidence of supraventricular arrhythmias

Josef Widendorf, MD, Arie L. M. Widendorf, MD, Shababdun H. Rahimtoola, ME, and Uri Elkayam, MD. Los Angeles, Calif.

Some authors have suggested that the incidence of supraventricular tachyarrhythmias (SVT) is increased during pregnancy in otherwise healthy women. Other reports have indicated that pregnancy may also precipitate SVT in asymptomatic patients with preexcitation to supraventricular tachyarrhythmias. The cases reported here indicate that pregnancy may also precipitate SVT in asymptomatic patients with preexcitation to supraventricular tachyarrhythmias. We report three clinical patients with Wolff-Parkinson-White (WPW) syndrome in whom the incidence of tachyarrhythmias increased during pregnancy.


From the Division of Cardiology, Department of Medicine, LAC+USC Medical Center, University of Southern California School of Medicine. Reprint requests: Josef Widendorf, MD, USC School of Medicine, Division of Cardiology, 2025 Zonal Ave., Los Angeles, CA 90033. 4/9/92
A 21-year-old obese woman with a history of asymptomatic preexcitation presented to an emergency room at an outside hospital with severe palpitations and chest pain. Her ECG showed orthodromic atrioventricular reciprocating tachycardia with a heart rate of 200 beats/min. The SVT was terminated with intravenous procaainamide (slow release, 3 gm/day), with the shortest R-R interval being 260 msec. The patient delivered a 4607 gm male infant with an Apgar score of 7 at 1 and 5 minutes. The infant's ECG did not reveal preexcitation. Postpartum, procainamide was discontinued and the patient remained free of any symptoms up to 8 months of follow-up.

Patient No.3. A 21-year-old obese woman with a history of asymptomatic preexcitation presented to an emergency room at an outside hospital with severe palpitations and chest pain. Her ECG showed orthodromic atrioventricular reciprocating tachycardia with a heart rate of 200 beats/min. The SVT was terminated with intravenous verapamil. Subsequently during her pregnancy, she had four other episodes of severe symptomatic SVT requiring treatment with intravenous verapamil in the emergency room. Between these severe attacks she had frequent episodes of palpitations lasting up to 30 minutes. The patient was treated with oral verapamil, 80 mg during the attacks, and with atenolol, 25 mg/day. At 39½ weeks of pregnancy, she was admitted at LAC+USC Medical Center with a diagnosis of pregnancy-induced hypertension, preeclampsia, and amnionitis. Three days later, she delivered a healthy 3500 gm male infant with an Apgar score of 7 and 9 at 1 and 5 minutes. Five days after delivery, the patient had another SVT attack that was treated successfully with verapamil. During the following 2½-year period after pregnancy, in which she did not take any antiarrhythmic drugs, she had only three episodes of palpitations that terminated spontaneously.

Conclusions. The incidence of pre excitation in the normal population ranges from 0.01 % to 0.3 %. The incidence of paroxysmal tachycardias in the young adult population with preexcitation is approximately 10%, and it increases with age up to 36%. The exact incidence of WPW syndrome during pregnancy is not known, but some reports have indicated that pregnancy may facilitate the onset of tachyarrhythmias. Several hypothetical mechanisms have been invoked to explain the increased propensity for arrhythmias during pregnancy. These include hemodynamic, autonomic, hormonal, and emotional changes occurring in the pregnant women. The physiologic volume overload occurring during pregnancy results in an increased left ventricular enddiastolic volume and may lead to an increased myocardial irritability. Heart rate increases steadily during pregnancy, and sinus tachycardia is often seen in normal pregnant women during the third trimester and at term. An accelerated heart rate may promote cardiac arrhythmias by modifying the effective refractory period, velocity of conduction, and spatial dispersion of refractoriness. An elevated heart rate in patients with WPW syndrome may induce unidirectional block in the reentrant circuit and start atrioventricular reciprocating tachycardias.

Hormonal changes are thought to play an important role in the development of arrhythmias during pregnancy. Estrogens increase the excitability and the frequency of action potentials in susceptible tissues such as uterine muscle fiber. The blood levels and the metabolism of catecholamines do not change significantly during pregnancy. However, Roberts et al.9 and Metz et al.10 have shown that...
estrogens increase the number of a-adrenergic receptors and adrenergic sensitivity in susceptible tissues (myometrium, platelet). In other tissues (i.e., hypothalamus) (j-adrenergic receptors are incre−ed. II Therefore sex hormones modulate receptors of h−r−ones and neurotransmitters in various tissues; the consequent autonomic changes and the increased adrenergic sensitivity may potentially playa role in the genesis of arrhythmias by modifying the refractory periods and conduction velocity in the reentrant circuit. 8 During normal pregnancy, women experience major physical and psychological changes that often require adjustments in relationships and life-styles. These changes lead to various degrees of stress and anxiety. 12 Anxiety about health of the fetus and fears that harm may come to the fetus are almost universal. Stress, anxiety, and fear activate the pituitary-adrenal axis and stimulate the sympathetic nervous system, with potential arrhythmogenic effects. 8 In summary, it appears that there is an increased propensity for supraventricular tachyarrhythmias in the pregnant population with and without preexisiting atrial fibrillation. 11,12 Therefore further prospective studies are necessary to clearly document this increased arrhythmia susceptibility during pregnancy, the magnitude of the problem, mechanisms, and the preferred therapeutic approach in these patients.

REFERENCES