

# CHOOSING CALCIUM CHANNEL BLOCKERS FOR PREGNANT WOMEN WITH PAROXYSMAL SUPRAVENTRICULAR TACHYCARDIA AND PRETERM LABOR: A CASE REPORT

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Preterm labor is a major clinical hazard causing both maternal and neonatal morbidity and mortality. Paroxysmal supraventricular tachycardia (PSVT) complicated by preterm labor is rare. Of the many drugs used to treat PSVT, only calcium channel blockers are tocolytics. Here, we present the case of a 29-year-old female admitted to our ward with previously diagnosed PSVT and preterm labor at 31 weeks' gestation of her fourth pregnancy. Calcium channel blockers were administered and her uterine contractions subsided. Afterwards, no side effects were noted and she suffered no further tachycardic attacks during her pregnancy. She successfully delivered a full-term baby and received subsequent regular follow-up at the outpatient clinic.

**Key Words:** calcium channel blockers, PSVT, tocolysis  
(*Kaohsiung J Med Sci* 2004;20:457-60)

Arrhythmias complicating pregnancy may threaten either maternal or fetal well-being [1]. Due to recent advances in cardiac surgery, supraventricular or ventricular arrhythmias are now more frequently encountered in patients of reproductive age [2]. There are worries about anti-arrhythmic drugs and that maternal pro-arrhythmia may occur with the use of Vaughan William Class 1 and 3 agents [3,4]. Therefore, challenges to obstetricians include the choice of anti-arrhythmic drugs to provide maternal symptomatic relief and the avoidance of possible adverse effects to the fetus.

Treatment plans become more complex if the arrhythmia is associated with preterm labor. Betamimetics such as

ritodrine are the traditional first-line drugs for tocolysis, but they may cause considerable undesirable maternal cardiac effects [5]. King et al recently demonstrated that calcium channel blockers are safe when used as tocolytics, based on their review of 12 randomized controlled trials [6]. Here, we report clinical experience with a pregnant woman who had the complications of both paroxysmal supraventricular tachycardia (PSVT) and preterm labor.

## CASE PRESENTATION

A 29-year-old woman, gravida 3, para 0, aborta 2, with a history of palpitation, shortness of breath, and cold sweats, was first diagnosed with PSVT at our hospital on June 17, 1995, when she was discovered to be pregnant. She was first seen at our obstetric department at 6 weeks' gestation of her third pregnancy on June 20, 1995, and received follow-up at the outpatient clinic following multiple episodes of PSVT. At 37 weeks' gestation, cesarean delivery was performed

Received: January 8, 2004

Accepted: June 14, 2004

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due to progressive atrial tachycardia, and a healthy male infant weighing 2,700 g was delivered. Maternal intraoperative blood pressure was 90/70 to 115/75 mmHg, and pulse rate was 130 to 162 bpm. Anesthesia was administered by epidural induction. Apgar scores at 1 and 5 minutes were 5 and 7, respectively.

On April 20, 2001, the patient was readmitted to our hospital at 22 weeks' gestation of her fourth pregnancy for PSVT control. During this pregnancy, she had suffered from dyspnea, palpitation, orthopnea, leg edema, and cold sweats since 6 weeks' gestation. Symptoms were aggravated in the afternoon, especially in the supine position. Her blood pressure was 116/74 mmHg and heart rate was 160 bpm. Immediate electrocardiography confirmed recurrent PSVT. Cardiac echography showed a fraction shortening of 30%, trivial mitral regurgitation, septal hypokinesia, and a small amount of pericardial effusion.

On June 18, 2001, she visited our clinic at 31 weeks' gestation complaining of regular cramping abdominal pain. Fetal monitoring showed regular uterine contractions at 8-minute intervals with pressure tension of 50 mmHg and a fetal heart beat averaging 150 bpm. We used nifedipine, administered orally in doses of 10 mg, three times a day to treat both atrial tachycardia and preterm labor. Fortunately, the contractions subsided and there was an obvious improvement in symptoms, so she was discharged. At 36 weeks' gestation, she delivered, by cesarean section, a healthy male infant weighing 2,950 g, with Apgar scores of 8 and 9 at 1 and 5 minutes, respectively. No complications except intraoperative hypotension were noted. Blood pressure was 96/40 mmHg and pulse rate was 158 bpm initially, and 120/62 mmHg and 128 bpm, respectively, postoperatively. The postpartum period was uncomplicated.

## DISCUSSION

Tawam et al reported that pregnancy is associated with an increased risk of supraventricular tachycardia (SVT) [7]. Even during normal pregnancy, especially in the second trimester, altered regional blood flow distribution, increased cardiac output and left ventricular diameter, and myocardial hypertrophy result in a maternal hyperhemodynamic status to sustain fetal growth [8,9]. These physiologic adaptations lead to the speculation that maternal arrhythmias are prone to be prevalent during pregnancy or in labor [10–12].

The use of anti-arrhythmics during pregnancy may cause immense concern regarding safety issues and is limited with regard to fetal well-being. Some reports illustrate

successful use of radiofrequency catheter ablation of supraventricular arrhythmias [13]. Fortunately, in our patient, symptoms subsided after nifedipine use and were controlled long term with digoxin. Resolution of atrial tachycardia during the first pregnancy was evident postpartum in our patient, but recurred in a following pregnancy.

Various studies have found nifedipine to be at least as effective as ritodrine and associated with fewer side effects in suppressing preterm labor. One such study by Saade et al reported that nifedipine was more effective than magnesium sulfate in treating preterm labor [14]. Without entering into the debate on which tocolytic drug is superior, we make an early assumption that calcium blockers are preferable to conventional tocolytic agents in cases of preterm labor with PSVT. Verapamil is a calcium channel blocker that has often been used in the management of PSVT. Response has been described as excellent, with a lack of maternal and fetal side effects [15]. Other authors insist that caution should be exercised when using verapamil since it has exacerbated systemic hypotension, congestive heart failure, bradyarrhythmias, and ventricular fibrillation. It also crosses the placenta and may result in fetal bradycardia, heart block, depression of contractility, and hypotension [16]. Klein and Repke reported that up to 96.7% of episodes of narrow-QRS SVT are converted to sinus rhythm within 1 to 2.5 minutes after administration of intravenous verapamil [17]. However, to our knowledge, there is little information on the management of maternal tachycardia complicated by preterm labor. Similarly, several tocolytic agents inhibit preterm labor, among which betamimetics such as ritodrine have been shown to decrease mortality rate, respiratory distress, and result in a higher birth weight, compared to infants who do not receive such treatment [18]. Nevertheless, when carefully assessed, these betamimetics simultaneously resulted in potentially serious complications that may aggravate the maternal cardiac and metabolic condition [19].

Even though the efficacy of oral ritodrine has been challenged, many doctors prescribe it for arresting preterm labor in an outpatient setting [20]. Calcium channel blockers such as nifedipine and verapamil are currently used to treat coronary artery disease and hypertension via smooth muscle relaxation, making it more promising for the treatment of uterine contraction and preterm labor [20].

All drugs have possible side effects. The role of calcium channel blockers in preterm labor mandates further studies. To the best of our knowledge, there are few reports on preterm labor in pregnant women with atrial tachycardias in the English literature. Our use of calcium channel block-

ers resolved two issues for this pregnant woman, preterm labor and PSVT. Our case report serves to address the use of calcium channel blockers as preferable first-line therapy for maternal atrial tachycardias complicated by preterm labor.

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# 選擇鈣離子阻斷劑對於陣發性上心室心博過速合併 子宮早期收縮之孕婦 — 病例報告

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子宮早期收縮合併上心室心博過速在文獻上很少被提到。治療上心室心博過速的藥物之中，只有鈣離子阻斷劑有安胎的效果。本文報告一位 29 歲懷孕第四胎的孕婦，在懷孕第 31 周時有子宮早期收縮的現象。使用鈣離子阻斷劑之後有效的停止子宮早期收縮，且之後心室心博過速在懷孕期間也沒有再發作，後來順利產下足月兒。

**關鍵詞：**鈣離子阻斷劑，上心室心博過速，安胎  
(高雄醫誌 2004;20:457-60)

收文日期：93 年 1 月 8 日

接受刊載：93 年 6 月 14 日

通訊作者：蔡英美醫師

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