

# Recurrent Atrial Flutter in a 37- Week Gestation Female Neonate

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## BACKGROUND

Though rare, atrial flutter is the second most common arrhythmia affecting fetuses and newborns. Most cases of neonatal flutter can be successfully converted to sinus rhythm via synchronized cardioversion or overdrive pacing.

## MEDICAL HISTORY IN UTERO

At 32 weeks gestation, the fetus was found to be tachycardic with a heart rate (HR) of 225 beats per minute (bpm) on fetal echocardiogram. The rhythm was interpreted as supraventricular tachycardia (SVT) and the mother had been treated with digoxin and flecainide throughout the remainder of her pregnancy. Rate control was attained at 170 bpm but the fetal rhythm had never converted to sinus.

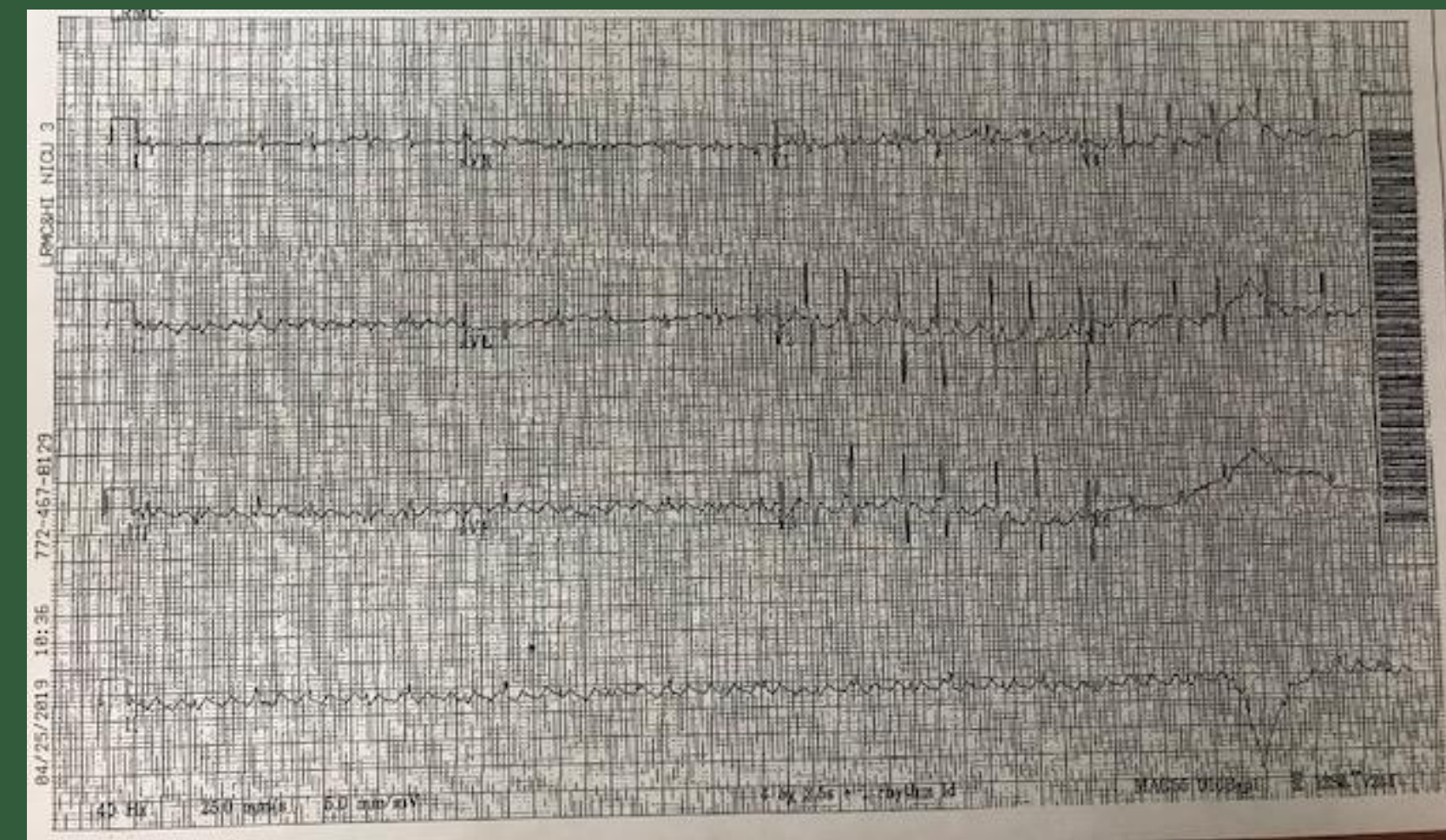
## CASE PRESENTATION

A 37+5 week gestation female neonate presented with atrial flutter after birth. On initial examination in the NICU, the neonate was awake, alert, in no acute distress and pink. She was saturating well on room air at 96% and pulses were 2/4 in all four limbs. The heart rate was 160 bpm. EKG after birth was significant for atrial flutter with variable conduction, mostly 2:1 with occasional 1:1 and 3:1.

At 2 hours of life she was successfully (DC) cardioverted with 0.5 J/kg. She remained in sinus rhythm until 15 hours later, when the rhythm reverted back to atrial flutter with a HR of 180-190 bpm. An echocardiogram was negative for structural abnormalities and biventricular function was adequate. DC cardioversion was attempted again but was unsuccessful. The neonate was started on IV esmolol and sotalol with electrophysiologist input. She had remained pink and had a good cry.

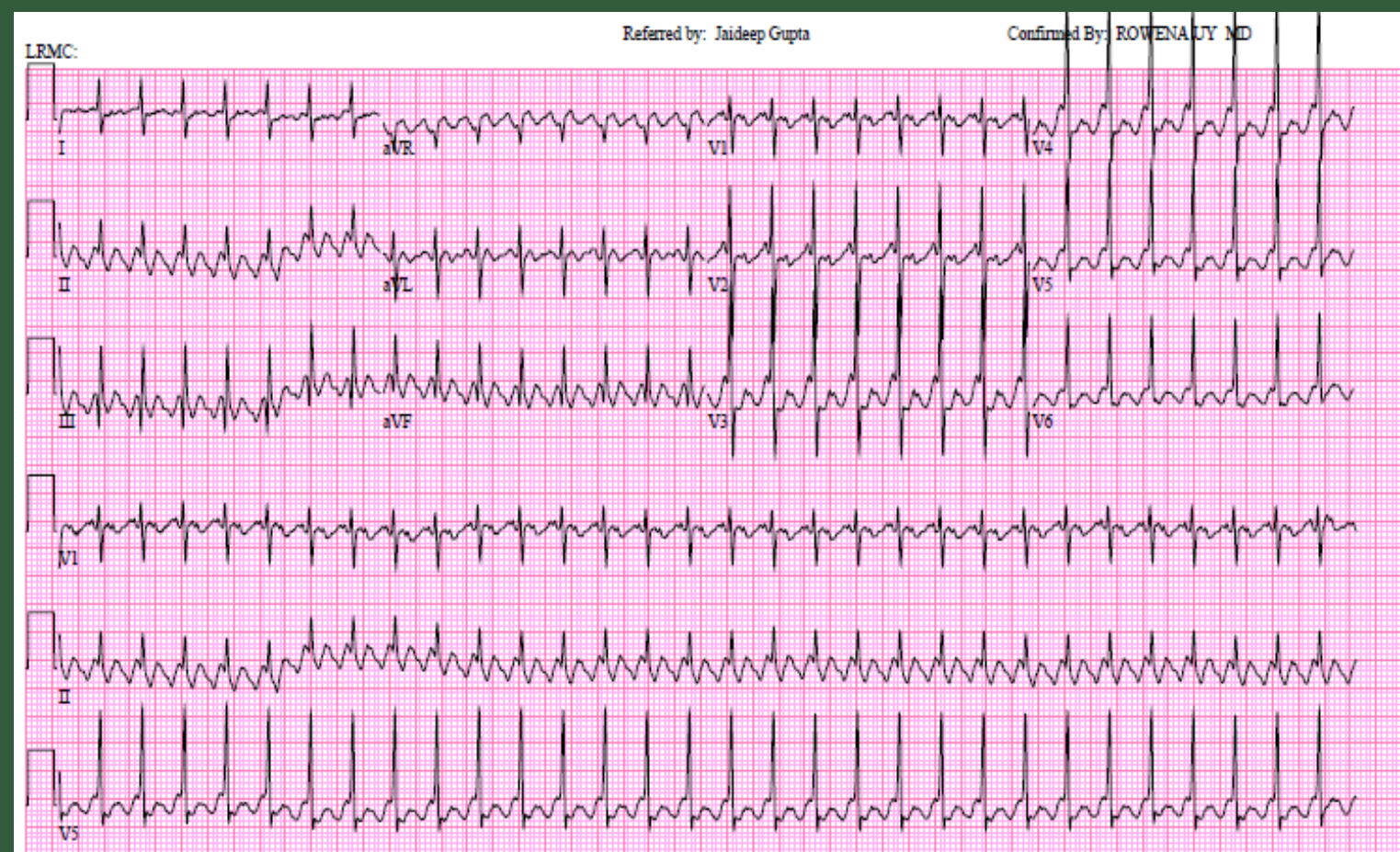
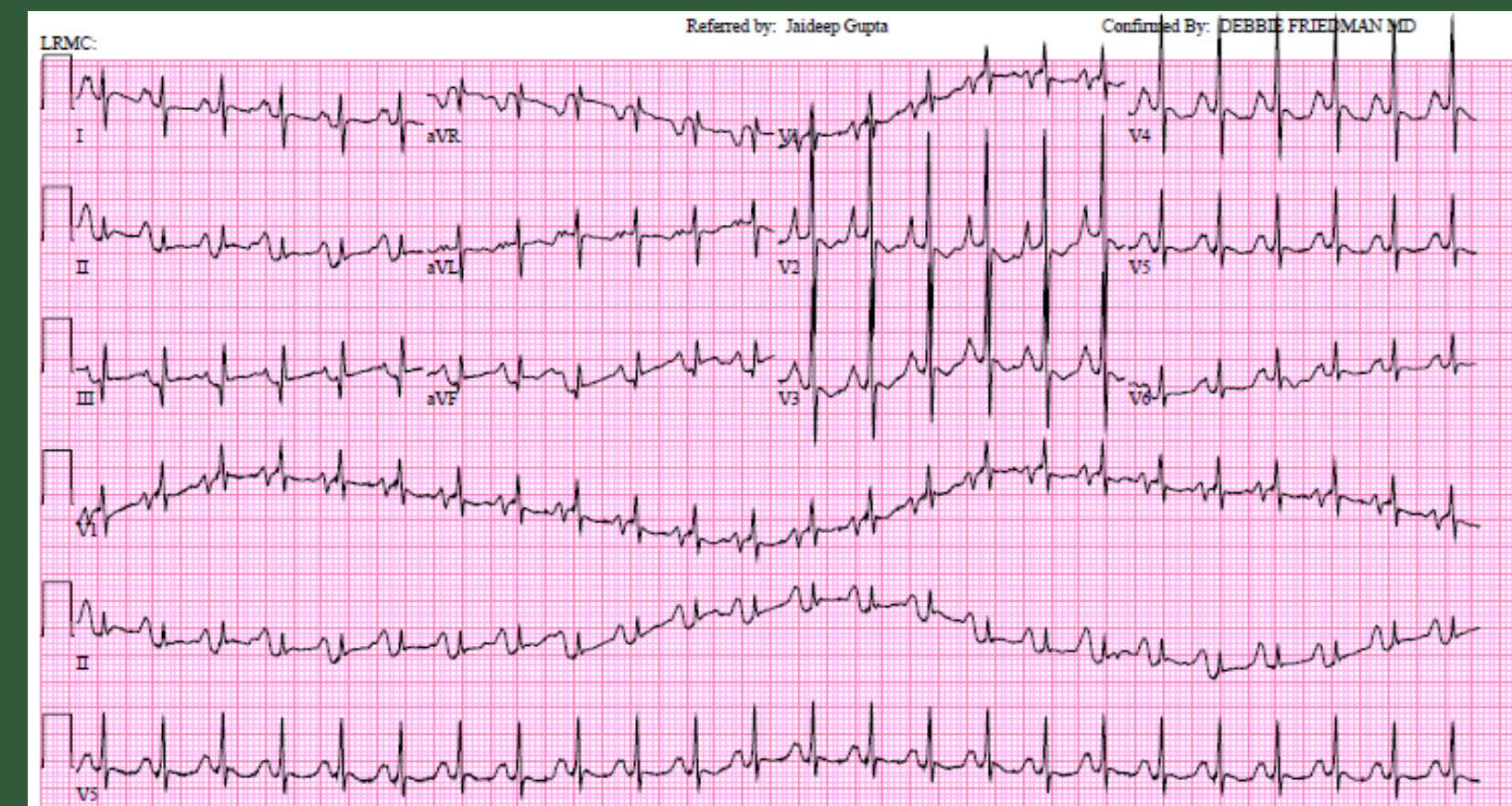
The neonate started to exhibit signs of sepsis and necrotizing enterocolitis on the third day of life. She had developed hypoxia and was placed on a nasal cannula at 4 L 40% oxygen. Chest X-ray was significant for diffuse haziness. Based on worsening clinical status, a final attempt of DC cardioversion was attempted and successful. She went into normal sinus rhythm with a heart rate of 140 bpm. She additionally received amiodarone and was transferred to a tertiary care center with no recurrence of flutter.

The neonate was treated for overwhelming sepsis secondary to necrotizing enterocolitis at the tertiary care center. She had no recurrence of flutter throughout her stay and was discharged home with oral sotalol. She has been following up with outpatient cardiology and has been in sinus rhythm since the fourth day of life.



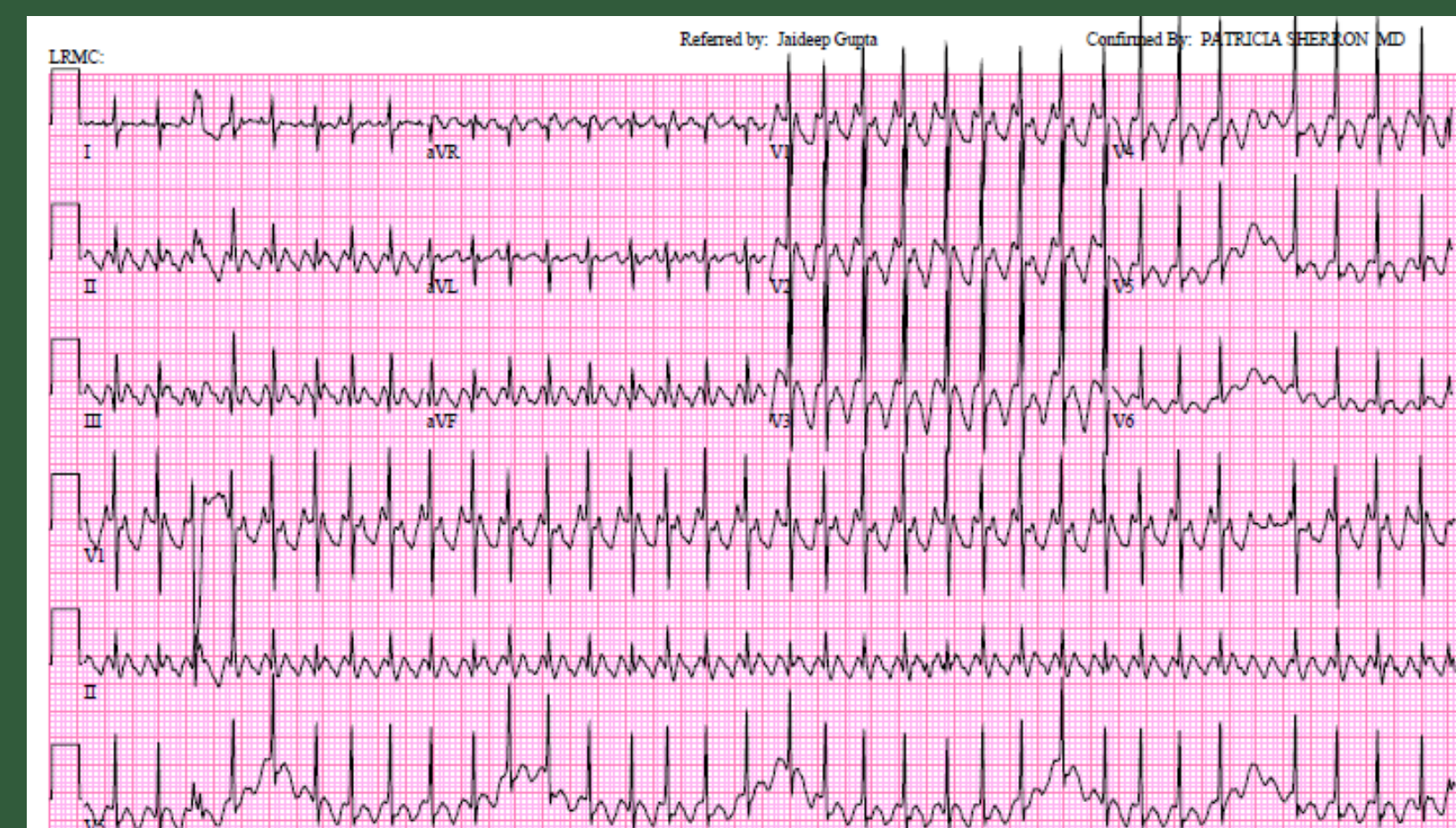
EKG that was performed at bedside at 2 hours of life. Atrial Flutter with variable conduction. 2:1, but with occasional 1:1 or 3:1. Atrial rate ~ 320 bpm.

EKG immediately post conversion. Normal Sinus Rhythm.



15 hours post cardioversion, recurrent atrial flutter with a ventricular rate of 185 bpm.

Post final conversion Sinus Tachycardia with short PR and premature atrial complexes with aberrant conduction. 3:1 conduction.



## DISCUSSION

Tachyarrhythmias occur in less than 0.1% of all pregnancies with atrial flutter occurring in 30% of these pregnancies. (1,2) Physiologically, the arrhythmic state causes decreased cardiac output and an increase in central venous pressure which can be catastrophic to the growing fetus by causing placental-cardiac failure, hydrops fetalis and even demise. (3) This patient was diagnosed with supraventricular tachycardia during a fetal echocardiogram and the mother was started subsequently on flecainide and digoxin for both rate and rhythm control. Digoxin is considered the first line treatment for fetal supraventricular tachycardia. When used with flecainide, it has a success rate of 86.7% when used to convert SVT to sinus rhythm in utero. (4)

For tachyarrhythmias that persist after birth, direct current cardioversion (DCC) is considered a first line treatment. DCC is superior to defibrillation based on its correlation with the cardiac cycle. DCC provides an electric shock that coordinates with the QRS complex in comparison to the defibrillation that occurs at random times in the cycle. (5) DCC is the treatment of choice for atrial flutter in the neonate and usually has an 85 % success rate. (5,6) Dosing for electric shock is based off of the Pediatric Advanced Life Support (PALS) algorithm. First shock dose should be attempted at 0.5 J/kg and a subsequent dose of 2J/kg if the rhythm does not return to sinus. For this patient, she converted to normal sinus rhythm after the first dose recommended on the algorithm. Typically a neonate will subsequently stay in sinus rhythm. (6) However, in this infant, sinus rhythm lasted for less than 24 hours and with subsequent attempts she had difficulty converting to sinus.

## CONCLUSION

The fetus had been diagnosed with SVT in utero and mom was started on the standard medication for non-hydrotic fetuses with SVT. Unfortunately, the rhythm was misdiagnosed and the fetus did not convert to sinus rhythm prior to birth. When the rhythm was identified correctly after birth, the baby was electrically cardioverted, as is standard of care for neonatal flutter. However, she failed to remain in sinus rhythm without significant additional interventions. Most newborns with atrial flutter undergo successful electrical cardioversion at birth. This is a rare case describing an otherwise normal neonate who initially cardioverted easily, but subsequently went back into recalcitrant atrial flutter.

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## DISCLOSURES / EMAIL

There is nothing to disclose.

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