American Journal of Emergency Medicine 37 (2019) 1604.e1–1604.e2

Contents lists available at ScienceDirect

American Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/ajem

Case Report

Lack of fetal effect from adenosine administration in a pregnant patient

Samuel Schiff, MD [a,b], Alfred Sacchetti, MD [a,b,*], Jillian Santiago, RN [a], Lynn Beatty, PA-C [a]

[a] Our Lady of Lourdes Medical Center, Department of Emergency Medicine, Camden, NJ, United States of America
[b] Thomas Jefferson University, Department of Emergency Medicine, Philadelphia, PA, United States of America

ARTICLE INFO

Article history:
Received 11 May 2019
Received in revised form 17 May 2019
Accepted 22 May 2019

ABSTRACT

Supraventricular Tachycardias are the most common cardiac rhythm disturbances in pregnant patients. Adenosine is the recommended medication to treat these arrhythmias in part because the medication is projected to be metabolized prior to crossing the placenta and producing any fetal effects. Reported here is a case of a pregnant patient treated with adenosine in which the fetal heart activity was monitored through point of care ultrasonography with documentation of no fetal impact from this medication. This is the first documentation of a lack of fetal effect from adenosine.

1. Introduction

Atrioventricular nodal re-entry tachycardia (AVNRT) is the most common abnormal cardiac rhythm identified in women of child bearing years and the most common Supraventricular Tachycardia (SVT) in pregnant women [1,2]. Adenosine has been recommended as the treatment of choice for this arrhythmia during pregnancy because of the theoretical expectation that the drug would be metabolized before crossing the placenta [1-3]. This lack of such a fetal impact has never been documented. Reported here is the first case of the fetal response to adenosine treatment of an SVT in a pregnant patient.

2. Case report

A 31-year-old previously healthy woman, G4P3003, 36 weeks gestation presented to the Emergency Department with the sudden onset of chest pain and shortness of breath.

The patient appeared uncomfortable, exhibiting marked tachycardia on her heart exam, with heart rates estimated to be up to 200 BPM. The remainder of her vital signs included a blood pressure of 152/65 mmHg, a respiratory rate of 32, a temperature of 98.3 F and a pulse oximetry of 100% on room air. An electrocardiogram (ECG) demonstrated a rapid regular narrow complex tachycardia at a fixed rate of 198 bpm consistent with a Supraventricular Tachycardia (SVT) rhythm. Fig. 1 contains the patient's initial EKG.

Antecubital vascular access was obtained along with continuous cardiac monitoring. A 6 mg bolus dose of adenosine administered through a rapid normal saline infusion resulted in restoration of normal sinus rhythm.

While under observation in the Emergency Department the patient remained in normal sinus rhythm. Approximately 1 hour post treatment the patient developed abdominal contractions and was transfer to Labor and Delivery. Following a brief period of monitoring she was discharged.

Immediately before the administration of the Adenosine two videographers using smart phones separately recorded the heart rate of the mother and the fetus. One videographer recorded the mother's bedside cardiac monitor, while the other recorded the fetal heart activity on POCUS.

On later analysis the two videos were synchronized based on the verbal cue of “Go” clearly heard on both videos and set as time mark zero. The synchronized maternal and fetal heart rates are presented in Fig. 2. The maternal heart rate demonstrates the expected brief period of asystole associated with adenosine administration. The fetal heart rate showed normal baseline variability throughout the monitoring period with no negative chronotropic effect.

3. Discussion

Adenosine remains the first line treatment of SVT's in pregnant patients [1-3].

Because of its rapid metabolism, Adenosine has always been considered an ideal drug for pregnant patients because of the belief that it is metabolized prior to crossing into the fetal circulation.

This case report is the first to clearly document no fetal cardiac effect in a patient receiving a therapeutic dose of adenosine. Even with extended cardiac monitoring well beyond the drug's impact on the maternal heart rate, no bradycardic fetal effects were observed. The POCUS recording was carried out to 58 second post adenosine

* Corresponding author at: Our Lady of Lourdes Medical Center, 1600 Haddon Avenue, Camden, NJ, 08103, United States of America.
E-mail address: Sacchetti1011@gmail.com (A. Sacchetti).

https://doi.org/10.1016/j.ajem.2019.05.042
0735-6757/

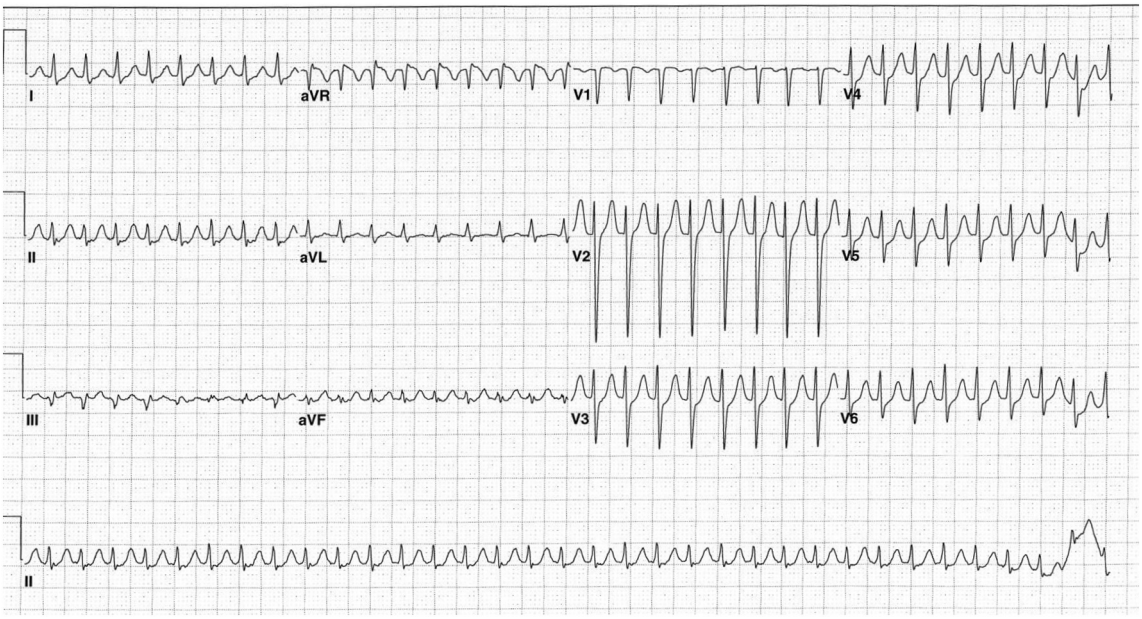

Fig. 1. Maternal ECG on arrival.

bolus which should have provided ample time for any unmetabolized adenosine to reach the uterine arteries, cross the placenta, and impact the fetal conduction system.

This patient was successfully cardioverted with a 6 mg dose of adenosine. An argument might be made that at higher doses a fetal effect would appear. However, higher doses of adenosine are generally required in patients with faster rates of adenosine metabolism or slower circulation times. Both of these conditions would result in more drug being inactivated prior to delivery to the fetal heart making a negative chronotropic effect on the fetus less likely.

The patient in this report did develop uterine contractions during her ED observation. Adenosine has been associated with non-sustained uterine contractions at supra therapeutic concentrations [4,5]. In the current instance, the uterine contractions did not appear until almost an hour post adenosine infusion making it more likely it was the stress of the arrhythmia and not the adenosine that was the etiology behind the uterine activity.

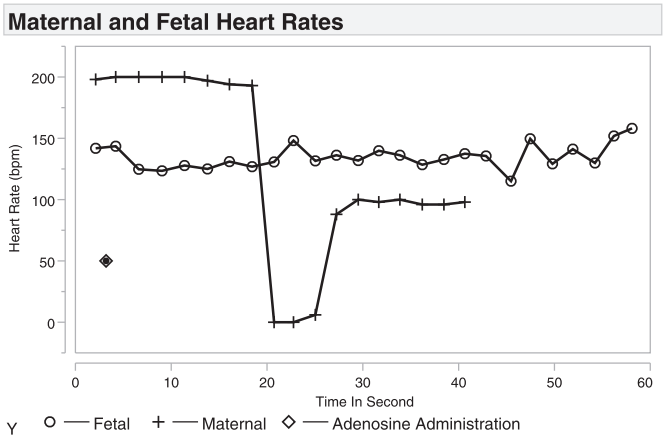

Fig. 2. Synchronized maternal and fetal heart rates following IV bolus administration of adenosine.

4. Conclusion

Adenosine administration to a late term pregnant patient successfully converted an Atrioventricular Nodal Re-entry Tachycardia with no ultrasound documented effect on fetal heart rate.

Contributions

Schiff, Sacchetti, Santiago all contributed to clinical care of patient.
Schiff and Sacchetti authored report.
Santiago edited report.

References

[1] Page R, Joglar J, Cadwell M, et al. 2015 ACC/AHA/HRS guideline for the management of adult patients with supraventricular tachycardia. Circulation 2015:e506–77.
[2] Lee SH, Chen SA, Wu TJ, et al. Effects of pregnancy on first onset and symptoms of paroxysmal supraventricular tachycardia. Am J Cardiol 1995;76(10):675–8.
[3] Page RL. Treatment of arrhythmias during pregnancy. Am Heart J 1995;130:871–6.
[4] Hutchings G, Gevaert T, Deprest J, Nilius B, Williams O, De Ridder D. The effect of extracellular adenonine triphosphate on the spontaneous contractility of human myometrial strips. Eur J Obstet Gynecol Reprod Biol 2009;143:79–83.
[5] Canlorbe G, Azria E, Michel D, Iung B, Mahieu-Caputo D. Preterm labour after adenosine treatment for paroxysmal supraventricular tachycardia during pregnancy, a case report. Ann Fr Anesth Reanim 2011;30:372–4.