

Maternal and Fetal Outcomes in Women with Arrhythmias

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Background

- 50% of pregnant women experience an arrhythmia during their pregnancy.¹
- Pregnancy is an arrhythmogenic state.
- Arrhythmogenesis mediators:
 - Myocardial stretch, hyperdynamic state^{2,3}
 - Resting heart rate⁴
 - Adrenergic response^{5,6}
- Pre-existing cardiac disease increases risk.^{7,8}

1 Duvekot, J., AJOG 1993. 2 Silversides CK., Heart disease in pregnancy 2007.
3 Liebson PR, AJOG 1975. 4 Soliman EZ, Europace 2010.
5 Zuspan FP, J Reprod Med 1979. 6 Barron WM, AJOG 1986.
7 Siu SC, Circulation 2001. 8 Drenthen W, J Am Coll Cardiol 2007.

Background

- Prior studies focus on pregnancy outcomes with an identifiable cardiac structural abnormality.^{9,10,11}
- Prior studies compare incidence of arrhythmias.^{9,12}
 - Do not investigate maternal and fetal outcomes.

9 Drenthen W, et al, J Am Coll Cardiol 2007.

10 Drenthen W, et al., Eur Heart J 2010.

11 Siu SC et al, Circulation 2001.

12 Shotan A et al., Am J Cardiol 1997.

Specific Aim

- To estimate the risk of adverse maternal and fetal pregnancy outcomes in women with arrhythmias.

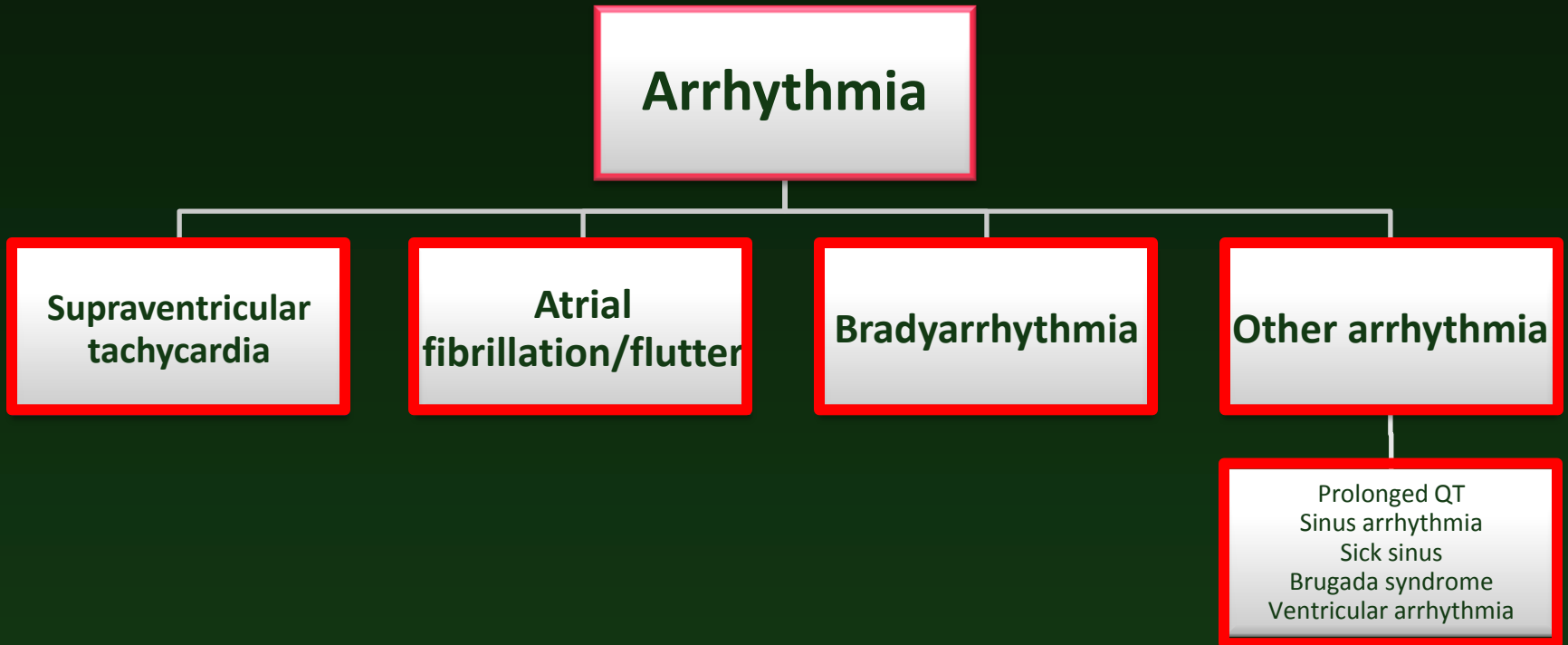
Methods

- Retrospective cohort study
- All pregnancies affected by maternal cardiac disease
- Data was obtained through detailed review of medical records from 2004 to 2014
- Single tertiary care academic center

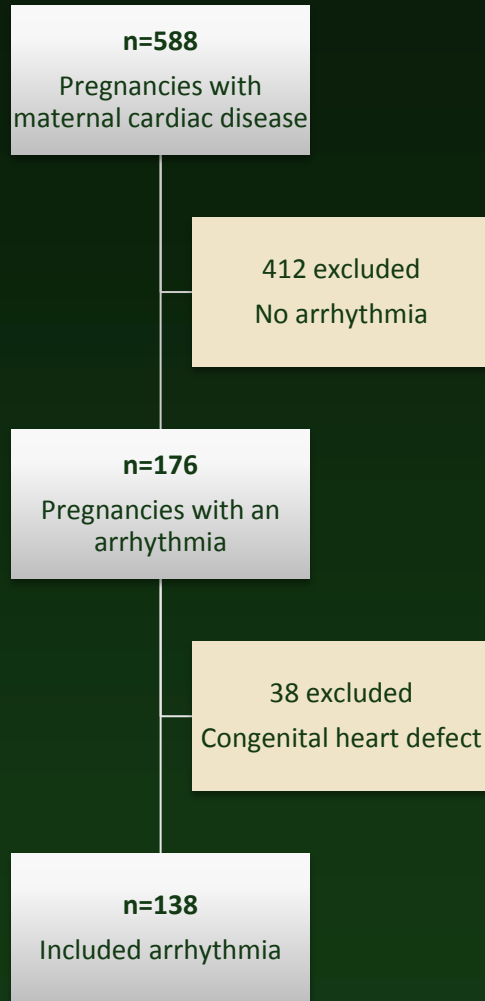
Methods

- **Inclusion criteria:**
 - Pregnancies with any pathogenic cardiac arrhythmia diagnosed prior to pregnancy, during pregnancy, or within 6 weeks postpartum
 - Delivered at Washington University
- **Exclusion criteria:**
 - Patients with congenital heart disease
 - PVCs, PACs, palpitations with no diagnosis, asymptomatic sinus tachycardia or bradycardia

Methods



Cohort



SVT	65 (47%)
Afib/flutter	32 (23%)
Bradyarrhythmia	8 (5.8%)
Other arrhythmia	33 (24%)

Methods

Maternal Outcomes

Induction of labor

Pre-eclampsia

Regional anesthesia

Cesarean delivery

ICU admission

Arrhythmia event during pregnancy or 6 weeks postpartum*

Hospital readmission within 6 weeks postpartum

Heart failure

Maternal death

***Included only those with diagnosis of arrhythmia prior to pregnancy**

Fetal Outcomes

Livebirth >20 weeks

Gestational age at delivery

Preterm delivery (<37 weeks)

Birthweight

Data Analysis

- Baseline characteristics and outcomes were compared between groups using descriptive statistics
- **Continuous variables:** Mean and Standard Deviation
- **Categorical variables:** Proportions

Baseline characteristics

Demographics and Co-morbidities

	All Arrhythmias (n=138)	SVT (n=65)	Afib (n=32)	Bradyarrhythmia (n=8)	Other arrhythmia (n=33)
Age	27.6 ± 6.5	27.5 ± 6.7	29.7 ± 6.2	23.9 ± 5.5	26.6 ± 6.3
Pre-preg BMI	29.1 ± 7.8	29.5 ± 7.8	30.5 ± 8.6	29.7 ± 4.6	26.9 ± 7.3
Parity	1.6 ± 1.6	1.6 ± 1.8	1.6 ± 1.3	2 ± 1.6	1.5 ± 1.4
African American race (n=82)	59.4% (82)	60% (39)	59.4% (19)	62.5% (5)	57.6% (19)
Chronic HTN (n=24)	17.4% (24)	15.4% (10)	28.1% (9)	12.5% (1)	12.1% (4)
Pre-gest diabetes (n=5)	3.6% (5)	3.1% (2)	6.3% (2)	0% (0)	3.0% (1)
Tobacco use (n=32)	23.2% (32)	30.8% (20)	3.1% (1)	25%(2)	27.3% (9)
Drug use (n=10)	7.3% (10)	4.7% (3)	3.1% (1)	37.5% (3)	9.1% (3)

Baseline characteristics

Medications used

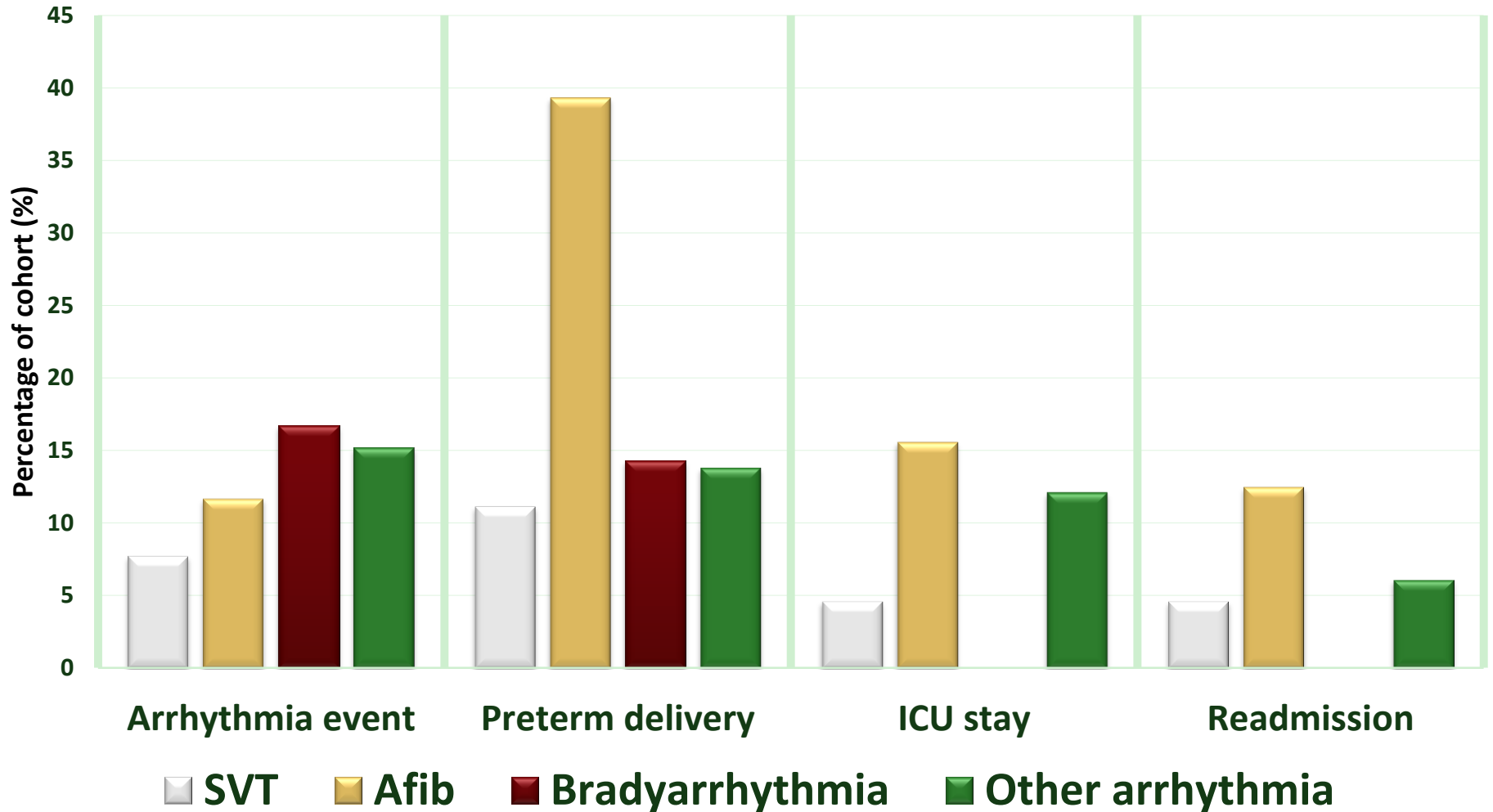
	All Arrhythmias (n=138)	SVT (n=65)	Afib (n=32)	Brady-arrhythmia (n=8)	Other arrhythmia (n=33)
Pacer (n=8)	5.8% (8)	0% (0)	0% (0)	25% (2)	18.2% (6)
AICD (n=9)	6.5% (9)	0% (0)	0% (0)	12.5% (1)	24.2% (8)
Anticoagulation* (n=19)	13.8% (19)	9.2% (6)	37.5% (12)	0%(0)	3.0% (1)
Beta Blocker* (n=54)	39.1% (54)	36.9% (24)	59.4% (19)	12.5%(1)	30.3% (10)
Digoxin* (n=6)	4.3% (6)	4.6% (3)	9.4% (3)	0% (0)	0% (0)
CaChannel Blocker* (n=21)	15.2% (21)	12.3% (8)	34.4% (11)	0% (0)	6.1% (2)

*Meds are used during pregnancy or within 6 weeks postpartum

Results

	All Arrhythmias (n=138)	SVT (n=65)	Afib (n=32)	Brady- arrhythmia (n=8)	Other arrhythmia (n=33)
Live birth	92% (127/138)	96.9% (63/65)	87.5% (28/32)	87.5% (7/8)	87.9% (29/33)
GA delivery*	38.1 ± 2.6	38.7 ± 1.9	36.8 ± 3.8	38.5 ± 2.7	38.1 ± 2.2
GA<37 weeks*	18.1% (23/127)	11.1% (7)	39.3% (11)	14.3% (1)	13.8% (4)
Cesarean delivery*	41.1% (53)	30.2% (19)	64.3% (18)	57.1 (4)	41.4 (12)
Regional anesthesia*	89.0% (113)	93.7% (59)	82.1% (23)	71.4% (5)	89.7% (26)
Induction of labor*	41.7% (74)	41.3% (26)	42.9% (12)	28.6% (2)	44.8% (13)
Birth weight*	3117 ± 706	3229 ± 615	2967 ± 894	3105 ± 403	3018 ± 742
ICU	8.7% (12)	4.6% (3)	15.6% (5)	0% (0)	12.1% (4)
PreE	13.4% (17)	17.5% (11)	14.3% (4)	0% (0)	6.9% (2)
Arrhythmia event †	7.7% (8/104)	7.7% (4/52)	11.7% (2/17)	16.7% (1/6)	3.5% (1/29)
Readmission	6.5% (9)	4.6% (3)	12.5% (4)	0% (0)	6.1% (2)
Heart Failure	2.9% (4)	3.1% (2)	0%(0)	0%(0)	6.1%(2)
Death	0.7% (1)	0% (0)	0% (0)	0% (0)	3.0% (1)
*Included only live births					
† Included only those with diagnosis of arrhythmia prior to pregnancy					

Results



Strengths and Limitations

- **Limitations:**
 - Retrospective cohort study
 - Analysis limited to descriptive statistics
 - Heterogeneity of “Other arrhythmia” group
- **Strengths:**
 - Large study cohort
 - Excluded pregnancies with congenital heart defect
 - Conducted at a single tertiary care facility
 - Modern cohort

Conclusion

- Arrhythmia is a common cardiovascular complication of pregnancy
- High rates of live, term birth
- 3.5-16.7% risk for arrhythmia event during pregnancy
- SVT seems to have the lowest risk.
- A fib seems to have the highest risk for medical and pregnancy complications.

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