A Sentinel Case of Maternal Atrial Fibrillation during Active Labor

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Disclosures

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Rising trend in arrhythmias, 2000-2012

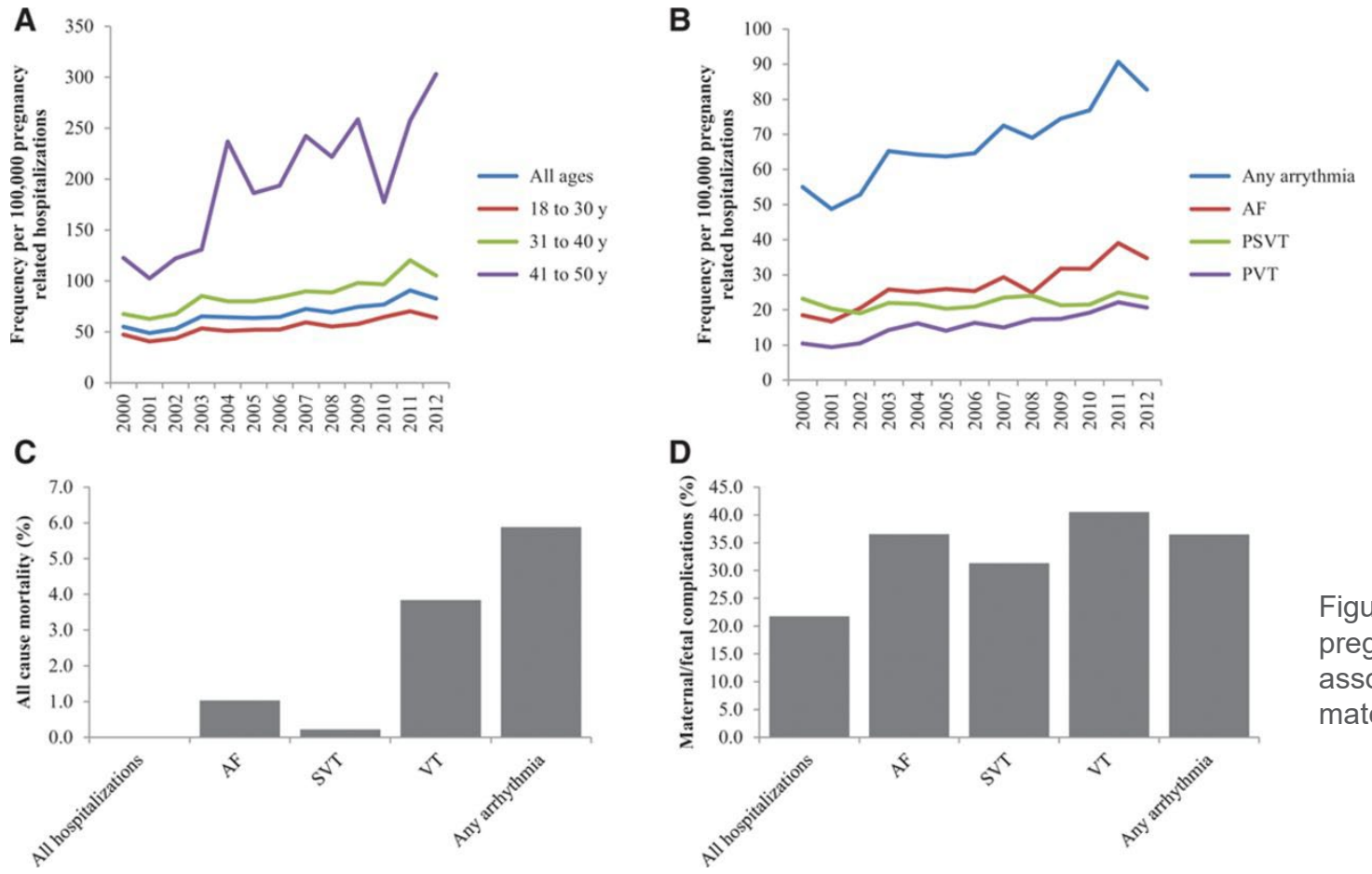

Figure 1. Prevalence of pregnancy-related arrhythmias, associated mortality, and maternal/fetal complications.[1]

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Rising trend in arrhythmias, 2000-2012

Pregnancy-related hospitalizations with arrhythmias			
Arrhythmia	2000 (per 100,000)	2012 (per 100,000)	% Increase
Total arrhythmias	55	83	+58%
Atrial fibrillation	18	35	+94%
Ventricular tachycardia	10	21	+110%
Supraventricular tachycardia	--	--	+12%

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Atrial fibrillation during pregnancy and active labor

- Atrial fibrillation (AF) is the most common arrhythmia during pregnancy
- Limited published data on AF during active labor
- Most episodes occur during the **third trimester**

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Increased risk of arrhythmias in pregnancy

Normal physiologic changes:

- Increased sympathetic activity
- Decreased parasympathetic activity
- Positive chronotropic effects of relaxin
- Intravascular volume expansion
- Increased atrial stretch
- Hypokalemia

Cardiovascular changes:

- 10-25% increase in heart rate
- 45% increase in cardiac output
- Nitric oxide production stimulated by estrogen and relaxin
- Typical to see premature atrial and ventricular contractions

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Risk factors

- Pre-existing atrial fibrillation
- Obesity
- Structural heart disease
- Advanced maternal age
- Cardiovascular comorbidities
- African American race
- Lower socioeconomic status

Complications

- Preeclampsia
- Stroke
- Heart failure
- Decreased uteroplacental perfusion
- Fetal distress
- Preterm birth
- NICU admission

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Initial Presentation

- **32-year-old African American female, G3P2003 at 39 weeks, 1 day EGA presented for scheduled induction of labor**

- Pregnancy complications:
  - **Chronic hypertension without medication**
  - **Pre-pregnancy BMI of 33**
  - Sickle cell trait, silent carrier of alpha thalassemia
  - Pre-diabetes with HbA1c of 5.9%
  - Positive GBS R/V culture

- Prenatal tests:
  - Passed 1-hour GCT during pregnancy
  - Fetus: Horseshoe kidney with pyelectasis noted during ultrasound

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Hospital Admission

- **ROS:** Denied chest pain, shortness of breath, palpitations
- **Vitals:** HR 86 bpm, BP 117/81, RR 18, T 98.5^{o}F at the time of admission
- **Physical exam:**
  - CV: Tachycardia in 120 bpm range
  - Pulmonary: Speaking without dyspnea, breathing comfortably on room air
  - Extremities: Negative Homan sign bilaterally
  - Pelvic exam: Cervix 5 cm dilated
- **Initial fetal heart tracing:** HR 130s bpm, moderate variability, accelerations, category 1

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Active Labor

- **Physical exam:** Maternal tachycardia, irregular rhythm on auscultation
- **Cardiovascular work-up**
  - **EKG:** new onset atrial fibrillation with rapid ventricular response (AF with RVR), premature ventricular contractions, tachycardia 110-120 bpm
  - **Cardiology consult:** Administered **diltiazem IV** → No immediate improvement
    - CHADS-VASC: 0
    - **AF with RVR** was **stress-induced**

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Active Labor

- **Second stage of labor**
  - Fetal heart tracing deteriorated: recurrent variable decelerations despite amnioinfusion and maternal positional changes
- **Delivery**
  - Low forceps-assisted vaginal delivery
  - Apgar scores: 8 at 1 minute, 9 at 5 minutes
  - Neonatal weight: 2760 g

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Postpartum

- Two hours postpartum: MET call activated for **persistent AF with RVR** with HR 160s bpm
- Converted to sinus rhythm with **metoprolol, diltiazem, flecainide**
- Echocardiogram: normal cardiac valvular anatomy and function
  - Ejection fraction: 65%
- Postpartum day 2: Clinically stable at normal sinus rhythm
- Discharged with **diltiazem 120 mg once daily** and **flecainide 150 mg every 12 hours**

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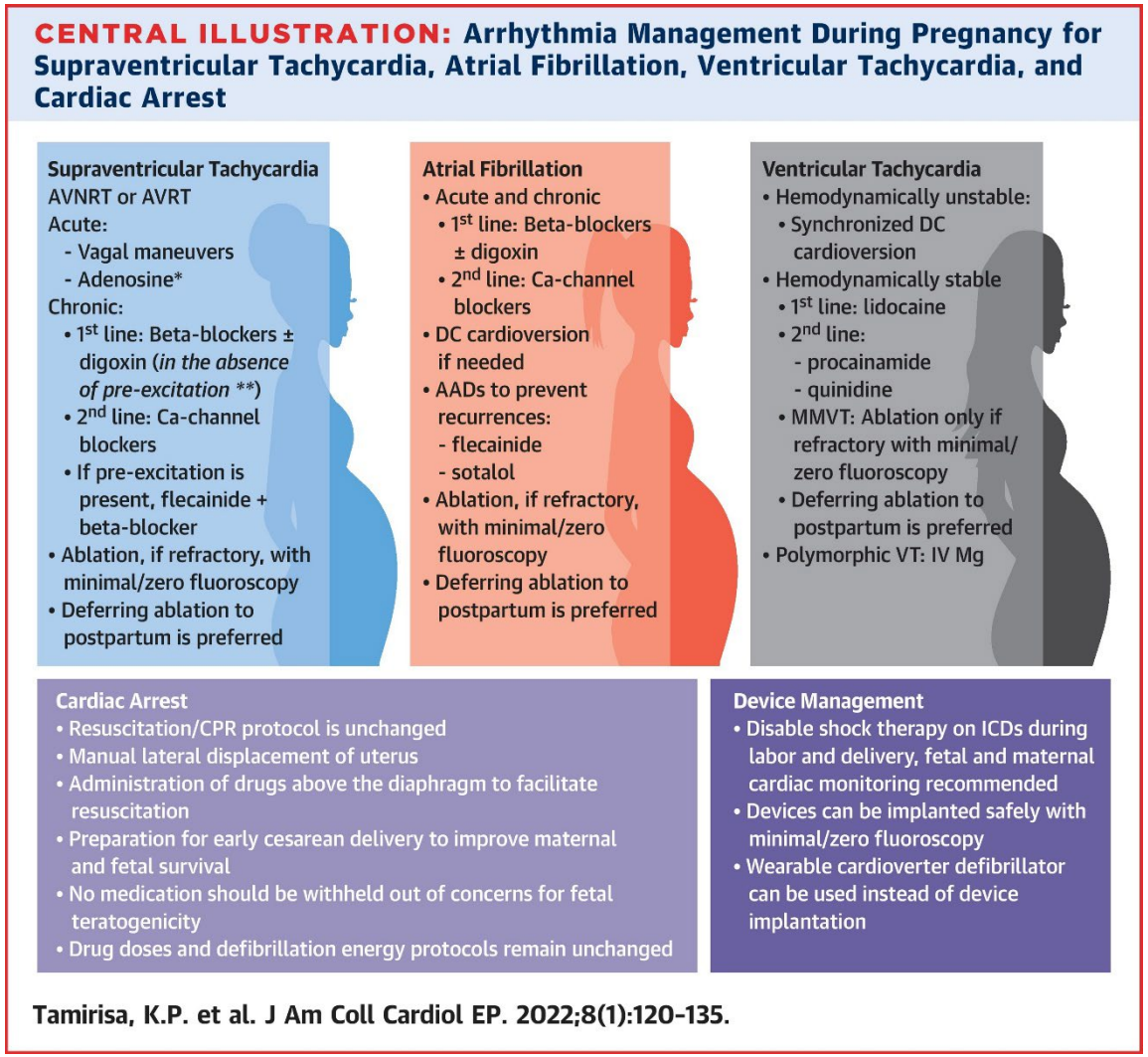
Acute stabilization and chronic management



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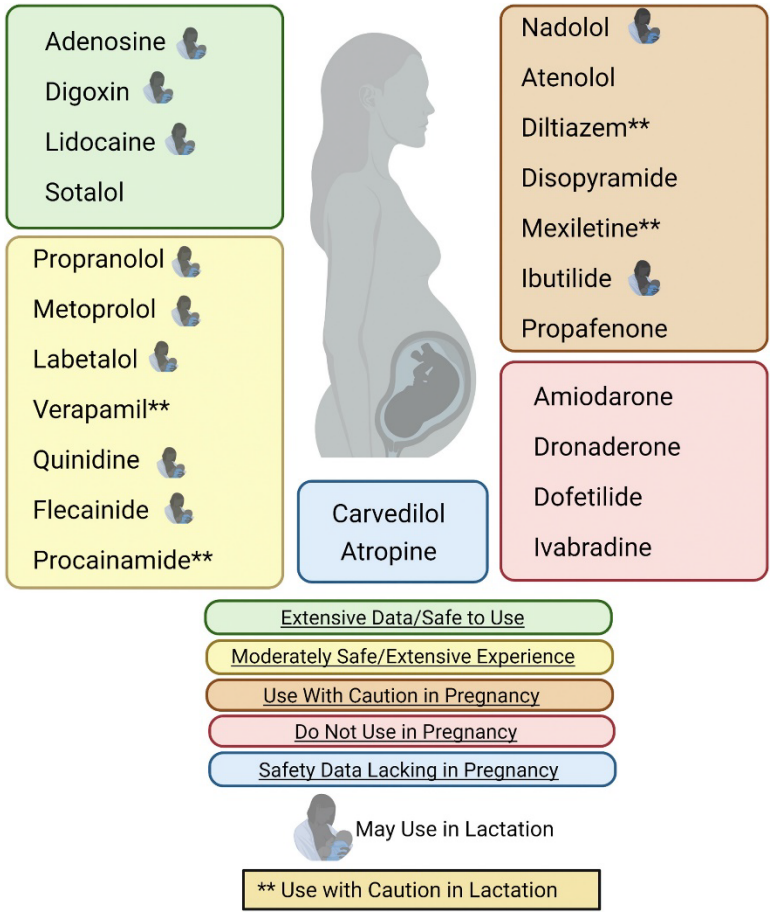

Figure 3. Medication safety profiles for management of arrhythmias in pregnancy.[3]

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Further diagnostic evaluation

- **Echocardiogram**
- **Screen for reversible causes**
  - Thyroid disease
  - Electrolyte derangement
  - Pulmonary embolism
  - Alcohol use

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Conclusion

- Arrhythmias are becoming increasingly **more prevalent** in the obstetric population
- **Early diagnosis and interdisciplinary care** especially in complicated pregnancies with known risk factors to reduce maternal and fetal morbidity and mortality
- Careful review of **safety profile of antiarrhythmic medications** during pregnancy and breastfeeding

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