Timing of Delivery and Associated Outcomes in Pregnancies Complicated by Maternal Congenital Heart Disease

Thalia Mok MD[1,2], Allison Woods BS[2], Adam Small MD[3], Megha Tandel MPH[4], Lorna Kwan MPH[4], Gentian Lluri MD PhD[2,5],
Leigh Reardon MD[2,5], Jamil Aboulhosn MD[2,5], Jeannette Lin MD[2,5], Yalda Afshar MD PhD[1,2]

1. Division of Maternal-Fetal Medicine, University of California, Los Angeles   2. David Geffen School of Medicine, University of California, Los Angeles
3. Division of Cardiology, New York University Langone Health   4. Department of Urology, University of California, Los Angeles
5. Ahmanson Congenital Heart Disease Center, University of California, Los Angeles

Background

- Pregnancies complicated by maternal congenital heart disease (CHD) have an increased frequency of adverse maternal, obstetric, and neonatal events
- There is limited data available assessing appropriate timing of delivery for pregnant patients with CHD

Objective

To evaluate timing of delivery for pregnancies complicated by maternal CHD and determine if early-term delivery is beneficial

Study Design

- Retrospective cohort study of singleton gestations with maternal CHD that delivered after 37 weeks between March 2013 and August 2020
- Categorized by gestational age (GA) at delivery: 37 weeks, 38 weeks, $\geq$ 39 weeks
- Primary outcomes:
  1. Composite adverse cardiovascular (CV) outcome
  2. Composite adverse maternal outcome
  3. Composite adverse neonatal outcome
- Outcomes compared by GA at delivery with Chi-squared (or Fisher's exact) and Kruskal-Wallis tests
- Multivariate logistic regression performed to calculate adjusted odds ratio for GA at delivery

Results

- 82 pregnancies with maternal CHD delivered after 37 weeks with known neonatal outcomes
  - 23 (28.0%) adverse CV outcome
  - 13 (15.8%) adverse maternal outcome
  - 11 (13.4%) adverse neonatal outcome
- Adverse CV outcome (p=0.13) and maternal outcome (p=0.24) were not significantly different by GA at delivery
- Early-term deliveries had increased rate:
  - Adverse neonatal outcomes (p=0.01)
  - NICU admissions (p=0.002)
  - Small for GA infants (p=0.03)
- Multivariate logistic regression
  - Adverse CV and maternal outcomes not associated with GA at delivery (p>0.05)
  - Increased odds of adverse neonatal outcomes with earlier GA at delivery (p=0.01)

Conclusion

- Early-term deliveries for pregnancies with maternal CHD associated with increased adverse neonatal outcomes without a decrease in adverse maternal or CV outcomes
- If no maternal or fetal indication, consider avoiding induction of labor prior to 39 weeks for pregnancies complicated by maternal CHD

Early-term delivery associated with increased adverse neonatal outcomes without a decrease in adverse maternal or cardiovascular outcomes

Questions?
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Table 1: Maternal, cardiovascular, and neonatal outcomes by gestational age at delivery

	37 – 37 6/7 weeks n = 17	38– 38 6/7 weeks n = 22	≥ 39 weeks n = 43	p-value
Composite adverse cardiovascular outcome	6 (35%)	9 (41%)	8 (17%)	0.13
Cardiac symptoms	7 (41%)	17 (77%)	27 (63%)	0.07
Hypertensive disease of pregnancy	2 (12%)	5 (23%)	6 (14%)	0.62
Composite adverse maternal outcome	3 (18%)	1 (5%)	9 (21%)	0.24
Birthweight (grams)	2665 (2510,2955)	3007 (2800, 3485)	3280 (2990, 3620)	< 0.001
SGA	4 (24%)	3 (14%)	1 (2%)	0.03
NICU admission	6 (35%)	3 (14%)	1 (2%)	0.002
Composite adverse neonatal outcome	6 (35%)	3 (14%)	2 (5%)	0.01

Figure: Rate of adverse cardiovascular and pregnancy outcomes by gestational age at delivery

Composite adverse cardiovascular outcome (p = 0.13) — Composite adverse maternal outcome (p = 0.24)
Hypertensive disease of pregnancy (p = 0.62) — Composite adverse neonatal outcome (p = 0.01)
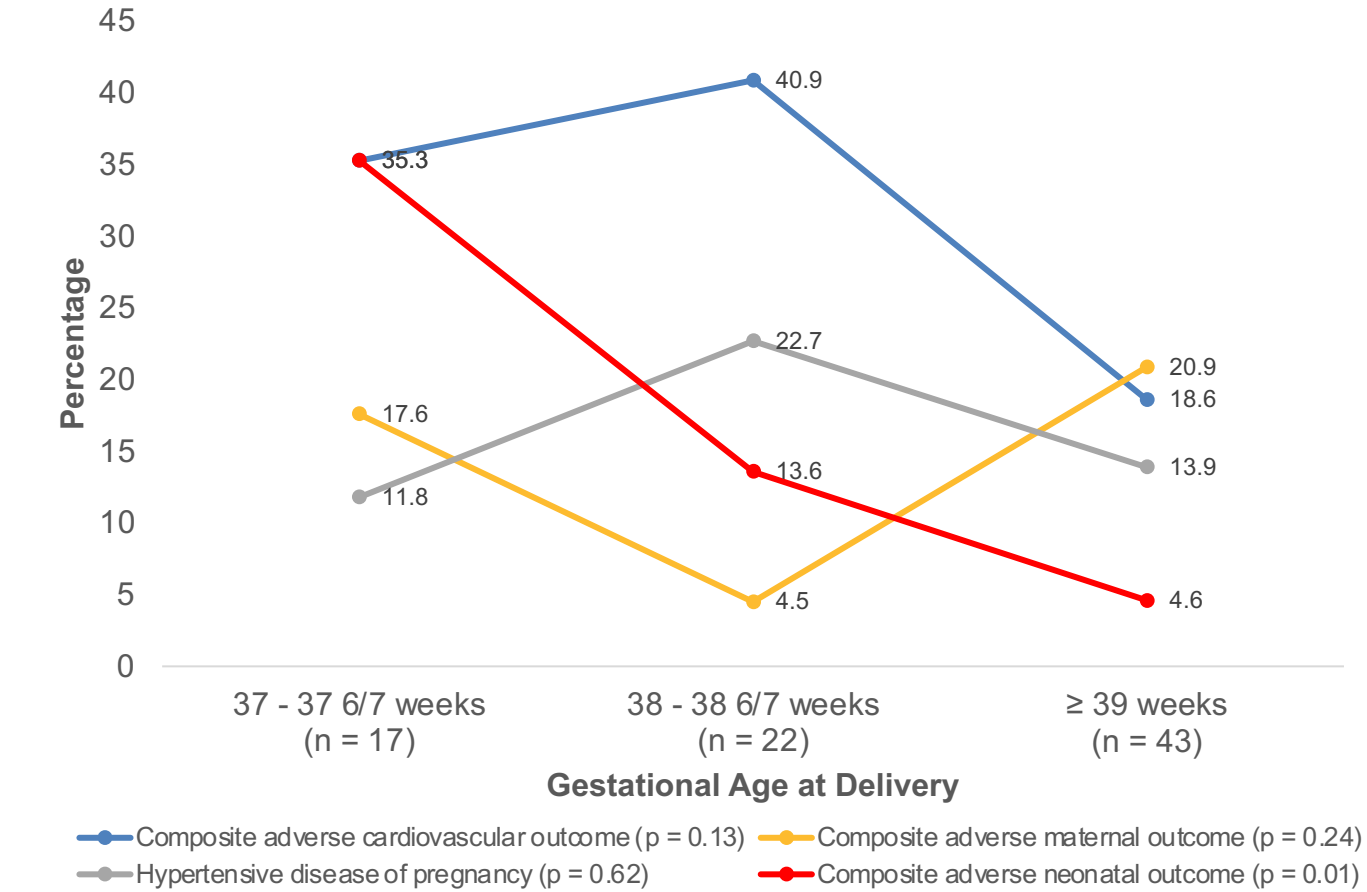
Table 2: Multivariate logistic regression of gestational age at delivery for composite adverse outcomes

	Composite adverse cardiovascular outcome		Composite adverse maternal outcome		Composite adverse neonatal outcome	
	OR (95% CI)	p-value	OR (95% CI)	p-value	OR (95% CI)	p-value
GA at delivery (referent is ≥ 39 weeks)		0.26		0.29		**0.01**
37 weeks	1.23 (0.29 – 5.26)	0.78	0.93 (0.21 – 4.16)	0.92	14.84 (2.42 – 91.42)	0.003
38 weeks	2.71 (0.81 – 9.15)	0.11	0.18 (0.02 – 1.54)	0.12	3.70 (0.55 – 24.71)	0.18
Advanced maternal age	0.70 (0.23 – 2.15)	0.53	1.08 (0.29 – 3.95)	0.91	0.47 (0.10 – 2.25)	0.34
CARPREG II Score	3.23 (1.02 – 10.85)	0.05	1.06 (0.26 – 4.34)	0.94	0.97 (1.91 – 4.96)	0.97
High-risk cardiac disease [a]	1.53 (0.28 – 8.36)	0.62	0.99 (0.09 – 10.36)	0.99	0.88 (0.07 – 11.44)	0.92

a. High-risk cardiac disease defined as one or more of the following: NYHA class > II, oxygen saturation < 90%, systemic EF < 40%, LVOT peak gradient > 30 mmHg, subpulmonary EF < 40%, or connective tissue disease