Frequency, Characteristics, and Management of Parturients with Fontan Circulation Delivering with Anesthesia: A Multicenter Retrospective Cohort Analysis

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INTRODUCTION

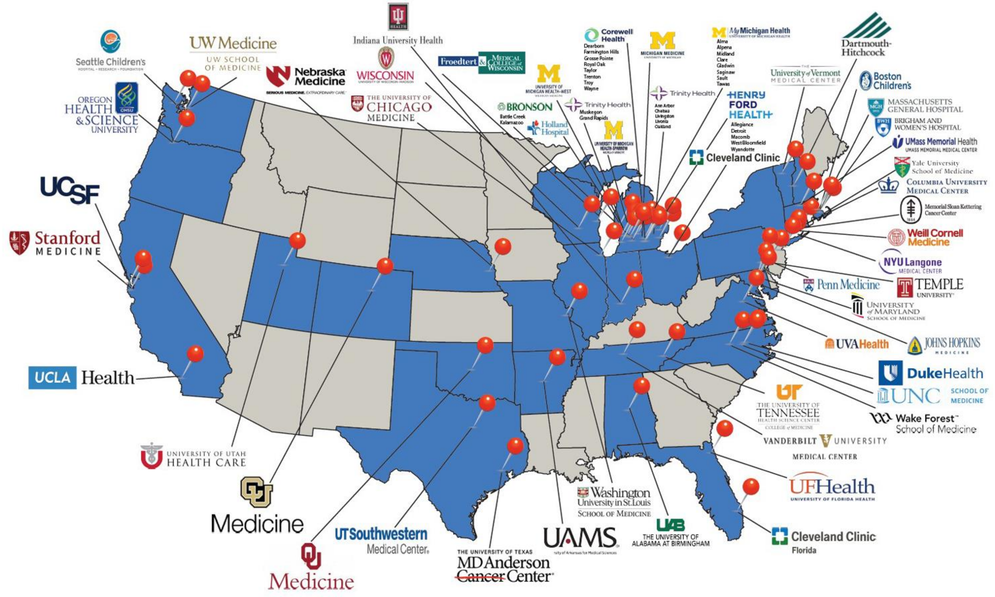
Patients with Fontan circulation are increasingly surviving to adulthood
- Concurrent rise in the rate of deliveries
- 2.4 cases per 1 million in 2000 to 30.3 in 2018

Pregnancy is not strictly contraindicated
- High risk of morbidity and mortality (modified WHO risk class III-IV)

AIM: Describe anesthetic management of parturients with Fontan circulation

METHODS

- Multicenter, retrospective, observational study using MPOG database
- Queried obstetric anesthetic records for deliveries between 2016 and 2023
- Screened for potential Fontan circulation using ICD codes for related congenital heart defects
- Manual review to verify Fontan status and to abstract management and outcome parameters



MPOG
MULTICENTER PERIOPERATIVE OUTCOMES GROUP

RESULTS

DEMOGRAPHICS, COMORBIDITIES AND DELIVERY TYPE

	Tota Cohort, N (%)	Fontan Patients, N (%)
	891,706	68
Age		
Less than 35 yr	668,369 (75.0)	63 (92.7)
35 to 39 yr	177,452 (19.9)	3 (4.4)
40 yr or older	45,885 (5.1)	2 (2.9)
Comorbidities		
Preterm Delivery	54,858 (6.2)	23 (33.8)
Preeclampsia	78,647 (8.8)	6 (8.8)
Chorioamnionitis	55,510 (6.2)	13 (19.1)
Placental Abruption	12,681 (1.4)	6 (8.8)
Placenta Accreta Spectrum	3,806 (0.4)	0 (0)
Delivery Type		
Labor Epidural	488,940 (54.8)	25 (36.7)
Labor to Cesarean	121,760 (13.7)	8 (11.8)
Cesarean Delivery	279,519 (31.3)	35 (51.5)

ADDITIONAL FONTAN CHARACTERISTICS

Temporal Trend

Year	*Frequency per 100,000 deliveries*
2016	9.05
2017	7.42
2018	4.50
2019	10.85
2020	8.78
2021	9.61
2022	3.11
2023	8.95

Home Medications, N (%)

Beta blocker	24 (35.3)
Diuretic	13 (19.1)
Antiplatelet	50 (73.5)
Anticoagulant	32 (47.1)
Pulmonary Vasodilators	1 (1.5)

MANAGEMENT OF PATIENTS WITH FONTAN CIRCULATION

Hemodynamics and Access, N (%)

	Labor Epidural	*Cesarean*
Invasive Arterial BP Monitor	3 (12)	18 (51.4)
Central Venous Catheter	0 (0)	1 (1.5)
Vasopressor Infusion	1 (1.5)	29 (42.6)
Ino-chronotrope Infusion	0 (0)	1 (1.5)
Inhaled Pulmonary Vasodilator	0 (0)	0 (0)

Neuraxial for Cesareans, N (%)

	Labor to Cesarean	*Cesarean*
Labor Epidural	3 (37.5)	14 (40)
Single Shot Spinal	0 (0)	0 (0)
Combined Spinal Epidural	5 (62.5)	12 (34.3)
Sequential CSE	0 (0)	11 (91.7)
General Anesthesia	0 (0)	11 (31.4)

OUTCOMES

	30-Day Mortality (%)	*Length of Stay (IQR)*	*ICU Admission (%)*	*Postop Ventilation (%)*	*Severe Maternal Morbidity (%)**
Total Cohort	131 (0.01)	2 (2,3)	1,549 (0.3)	832 (0.1)	22,652 (2.5)
Fontan Patients	0 (0)	4 (3,5)	6 (8.8)	0 (0)	17 (25)

* Severe Maternal Morbidity as defined by Center for Disease Control, excluding cardioversion and tracheostomy.

CONCLUSIONS

High burden of cesarean deliveries and general anesthetics

- Higher total cesarean rate than background population, similar labor-to-cesarean conversion rates
- 31.4% under general anesthesia, not attributable to failed conversions

Anesthetic strategies mindful of Fontan physiology

- Nearly 50% of patients on anticoagulation
- All neuraxial cesareans either epidurals or sequential CSEs
- High rate of invasive BP monitoring

High rate of morbidity, but major outcomes reassuring

- 25% of cases had positive modified CDC SMM index
- 8.8% ICU admission rate, but no mortality

References

Sobhani *Am J Obstet Gynecol MFM* 2023

Wolfe *Am J Obstet Gynecol MFM* 2021