

months of life, 3 = 2 months PP or 6 months of life. After assessing mouse weights, echos were performed under anesthesia using the Vevo system. Left ventricle (LV) parameters were measured three times and averaged: ejection fraction (EF), fractional shortening (FS), cardiac output (CO), stroke volume (SV), LV mass index (LVMI), and ascending aortic (AA) diameter and velocity. Two-way and RM ANOVA were used for statistical analysis, followed by Holm-Sidak post hoc test.

RESULTS: 121 murine echos were performed. In WT mice, pregnancy significantly increased LVMI, a measure of LV hypertrophy (Fig. 1A). Pregnancy had no effect on LVMI in the hypertensive eNOS mice (Fig. 1B). EF and FS was not different between the pregnant and NP groups in both WT and eNOS animals. In WT mice, CO, SV, and AA diameter and velocity were persistently increased PP compared to the NP; while in the eNOS mice, they were increased only in the initial PP period (Table 1). Mouse weights were not different among groups.

CONCLUSION: In these animal models, pregnancy persistently adversely impacts CVF in non-hypertensive mice. However, only vascular function is altered after pregnancy in the setting of preexisting hypertension (eNOS). A longer study period is needed to determine if these findings contribute to early-onset of maternal cardiovascular disease.

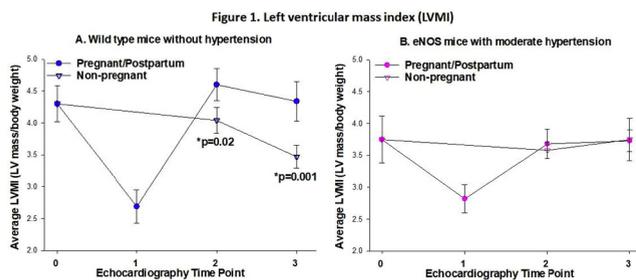


Table 1: Cardiovascular function echocardiography parameters

Parameter	Time Point	WT		P value	eNOS		P value
		Pregnant	Non-pregnant		Pregnant	Non-pregnant	
Ejection Fraction (%)	0	62.4 ± 2.75			60.1 ± 2.18		
	1	66.2 ± 2.81	-		73.8 ± 2.13	-	
	2	65.2 ± 4.78	61.0 ± 2.25	NS	61.4 ± 1.29	57.3 ± 1.80	NS
	3	61.9 ± 1.99	58.9 ± 2.23	NS	58.1 ± 2.84	58.5 ± 1.68	NS
Fractional Shortening (%)	0	33.1 ± 1.95			31.5 ± 1.43		
	1	36.2 ± 1.98	-		42.2 ± 2.00	-	
	2	35.5 ± 3.55	32.3 ± 1.57	NS	32.5 ± 0.92	29.5 ± 1.19	NS
	3	32.8 ± 1.37	30.8 ± 1.51	NS	30.3 ± 1.89	30.4 ± 1.14	NS
Cardiac Output (mL/min)	0	12.4 ± 0.77			14.8 ± 1.35		
	1	19.3 ± 1.19	-		18.3 ± 1.93	-	
	2	18.9 ± 1.75	15.3 ± 0.74	0.034	18.9 ± 1.19	15.5 ± 1.11	NS
	3	17.9 ± 1.15	15.3 ± 0.44	0.029	17.0 ± 1.09	16.4 ± 0.98	NS
Stroke Volume (uL)	0	30.0 ± 1.42			31.8 ± 2.63		
	1	42.2 ± 2.46	-		39.6 ± 2.97	-	
	2	39.8 ± 2.72	32.5 ± 1.31	0.008	39.2 ± 2.38	31.2 ± 1.52	NS
	3	35.7 ± 1.98	31.9 ± 1.00	0.034	32.9 ± 1.75	33.2 ± 1.62	NS
Aortic Diameter (mm)	0	1.41 ± 0.05			1.30 ± 0.02		
	1	1.47 ± 0.03	-		1.42 ± 0.03	-	
	2	1.53 ± 0.05	1.37 ± 0.03	0.017	1.45 ± 0.02	1.19 ± 0.03	0.001
	3	1.51 ± 0.02	1.37 ± 0.04	0.012	1.37 ± 0.02	1.29 ± 0.03	0.046
Aortic Velocity (mm/sec)	0	986 ± 68.7			1037 ± 70.5		
	1	1071 ± 45.0	-		1325 ± 112.5	-	
	2	1320 ± 270.0	960 ± 45.8	0.001	1347 ± 64.0	952 ± 87.6	0.001
	3	1263 ± 34.7	1033 ± 49.6	0.002	1148 ± 62.5	1016 ± 48.4	0.049

Data are presented as mean ± standard error of the mean (SEM). P value < 0.05 was significant. NS = non-significant. N = 5-10 mice per group per time point. WT = Wild type. eNOS = endothelial nitric oxide synthase heterozygous. Time point 0 = Baseline (10 weeks); Time point 1 = gestational day 18.5; Time point 2 = 1 weeks postpartum or 4 months of life; Time point 3 = 2 months postpartum or 6 months of life.

35 Additive risk of chronic hypertension in women with pregestational diabetes



Benjamin Muller, Brittany Austin, Nathan Gilreath, Ryan Cuff, Barbara Head, Eugene Chang, Jeffrey Korte, Matthew M. Finneran

Medical University of South Carolina, Charleston, SC

OBJECTIVE: Pregestational diabetes (PDM) often co-exists with chronic hypertension (cHTN), and both are associated with substantial risk for several adverse perinatal outcomes including fetal death. We sought to quantify the additive risk of a concurrent diagnosis of chronic hypertension and pregestational diabetes on pregnancy outcomes.

STUDY DESIGN: This was a population based retrospective cohort study of all singleton births in the United States occurring >20 weeks' gestation using national live birth and fetal death certificate data from 2018. Patients were grouped by presence of underlying cHTN, PDM, both or none. Baseline demographics and pregnancy outcomes were compared in a univariate analysis. Poisson regression with robust error variance was used to generate adjusted relative risks (aRR) and 95% confidence intervals (CI) for the studied outcome controlling for confounders.

RESULTS: There were 3,590,179 women included in the analysis and 0.8% had PDM, 1.9% had cHTN and 0.2% had both. There were increased risks of all studied outcomes in women with PDM or cHTN compared to women without PDM or cHTN, but these risks were greatest when both co-morbidities were present (Table 1). Women with both conditions had significantly increased risks of both early (aRR 5.08, CI 3.95-6.53) and late (aRR 7.10, CI 5.74-8.77) fetal death (Figure 1). Large (LGA) and small for gestational age (SGA) birthweight was more common in women with only PDM and cHTN, respectively. However, women with both had reduced rates of LGA (25.9% vs 30.2%; p<.001) and increased rates of SGA (8.9% vs 6.3%; p<.001) when compared to PDM alone.

CONCLUSION: Women with both PDM and cHTN have substantially increased risks for adverse perinatal outcomes that appear to be additive to having either condition alone. The fetal growth pattern seen in these patients may represent the combined effect of hyperglycemia and placental insufficiency, which could contribute to the increased rates of fetal death in this population.

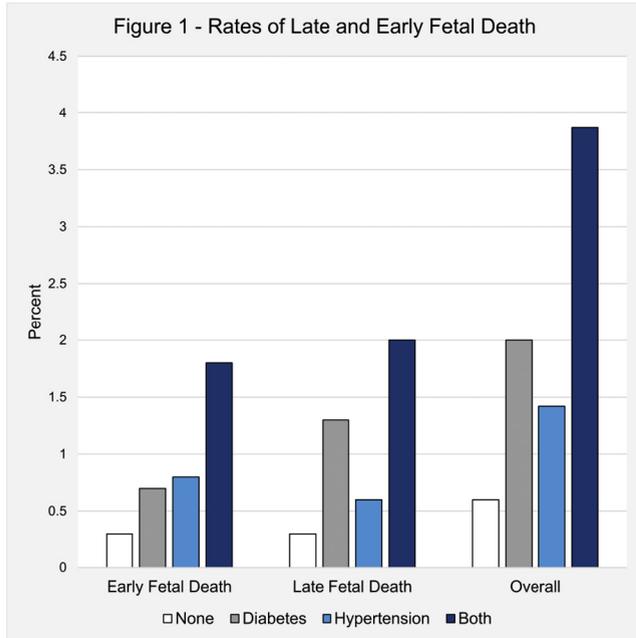


Table 1 – Multivariate analysis for study outcomes

	Diabetes (n=29,348)	Hypertension (n=69,597)	Both (n=5,925)
Preterm <37, w	2.94 (2.87-3.02)	2.48 (2.43-2.53)	4.39 (4.21-4.57)
Preterm <32, w	2.56 (2.37-2.77)	3.26 (3.10-3.42)	5.22 (4.65-5.86)
Fetal death			
Early	2.21 (1.83-2.67)	2.39 (2.11-2.71)	5.08 (3.95-6.53)
Late	4.78 (4.21-5.43)	2.07 (1.82-2.35)	7.10 (5.74-8.77)
Any	3.47 (3.12-3.85)	2.21 (2.02-2.41)	6.06 (5.16-7.11)
NICU admission	3.37 (3.29-3.45)	2.29 (2.24-2.33)	4.37 (4.19-2.55)
Seizures	2.35 (1.41-3.93)	1.86 (1.26-2.74)	3.38 (1.39-8.20)
Surfactant use	4.06 (3.61-4.56)	3.85 (3.54-4.18)	8.17 (6.89-9.68)
Mechanical ventilation >1H	2.98 (2.86-3.09)	2.21 (2.14-2.78)	4.14 (3.88-4.41)
Mechanical ventilation >6H	4.19 (3.94-4.45)	3.01 (2.87-3.17)	6.33 (5.73-6.99)
LGA	2.89 (2.82-2.95)	0.79 (0.79-0.82)	1.99 (1.88-2.09)
SGA	0.70 (0.66-0.73)	1.53 (1.50-1.57)	1.11 (1.01-1.23)

Early fetal death <28 weeks gestation, Late fetal death ≥28 weeks gestation
 H: hours, w: weeks, LGA: large for gestational age, SGA: small for gestational age
 Adjusted for race, bmi, education level, parity