

defined as either a score >6 in her overall stress score (1-10) or a positive response for symptomatic stress on PCL-C. Composite maternal morbidity (CMM) included: preeclampsia/GHTN, chorioamnionitis, endometritis, blood transfusion, peripartum hysterectomy, maternal ICU admission, pulmonary edema or maternal death. Composite neonatal morbidity (CNM) included: 5-minute Apgar score ≤ 3 at 5 minutes, respiratory distress syndrome (RDS), use of ventilator/CPAP, newborn sepsis, seizure, stillbirth, or neonatal death. Odds ratios were corrected for possible confounders revealed during univariate analysis. Neonatal outcomes were corrected for gender and GA delivery.

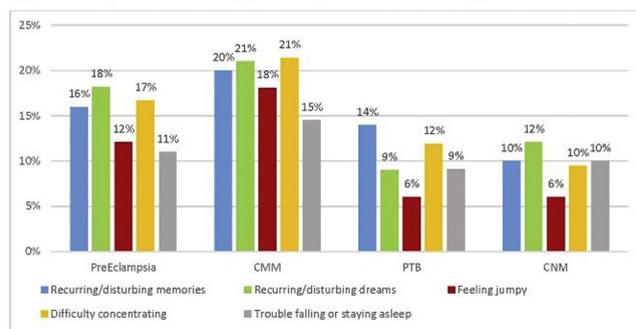
RESULTS: Of 2,121, 456 (22%) pregnant women delivering after Hurricane Harvey responded to our questionnaire with most suffering the storm effects during their second trimester (84%). Severe stress was diagnosed in 226 (49.6%) with only 3.1% seeking professional mental health services. Women reporting self-perceived severe stress were older and more likely to be married. These women were more likely to suffer sleeplessness (2.1 vs 12.4%, p<0.01), anxiety (9.2 vs. 18.1%, p<0.01), panic symptoms (2.2 vs. 7.5%, p<0.01) and hopelessness (2.2 vs. 7.5%, p<0.01) during the 4 weeks after the hurricane made landfall. They were also more likely to report having financial difficulty after the natural disaster (30.4% vs. 40.7%, p=0.03). Interestingly, the rates of perinatal outcomes were similar between both groups (Table) and did not vary by trimester of pregnancy in which stress occurred. Positive responses to individual PCL-C questions were unable to identify women at risk for adverse perinatal outcomes (figure).

CONCLUSION: Women reporting levels of severe stress following Hurricane Harvey had similar perinatal outcomes compared to women not reporting severe stress.

Table. Rates of perinatal outcomes grouped by self-reported stress

Variable	No Self-perceived severe Stress N = 230	Self-perceived severe stress N = 226	aOR (95% CI)
PreE/GHTN – N (%)	36 (15.8)	33 (14.6)	0.91 (0.54 – 1.53)
CMM – N (%)	52 (22.7)	50 (22.1)	0.97 (0.62 – 1.52)
Chorioamnionitis – N (%)	13 (5.7)	10 (4.5)	0.75 (0.32 – 1.77)
Endometritis – N (%)	0	1 (0.4)	-
Rate of Cesarean – N (%)	87 (38.0)	88 (38.9)	1.03 (0.71 – 1.53)
PTB – N (%)	25 (10.9)	25 (11.1)	0.97 (0.54 – 1.78)
SGA – N (%)	26 (11.4)	23 (10.2)	0.87 (0.48 – 1.59)
Newborn Sepsis – N (%)	28 (12.4)	25 (11.1)	0.88 (0.48 – 1.64)
IUFD/Stillbirth – N (%)	0	0	-
Neonatal Death – N (%)	4 (1.8)	3 (1.3)	0.81 (0.16 – 4.06)
CNM – N (%)	36 (15.7)	33 (14.6)	1.0 (0.57 – 1.74)

Figure – Rate of perinatal outcomes by positive response to individual PCL-C questions



17 Photoacoustic imaging of the uterine cervix: a novel method to characterize tissue composition



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OBJECTIVE: Mid-trimester sonographic cervical length is a powerful predictor of spontaneous preterm birth (NEJM 1996) and also identifies primiparous women at risk for cesarean delivery, due to poor progress in labor (NEJM 2008). Cervical remodeling is an important component of the common pathway of parturition. Therefore, assessing changes in cervical biochemistry could provide information about cervical status beyond that provided by cervical length and elastography. Photoacoustic imaging is a non-invasive ultrasound-based technology that captures acoustic signals emitted by the components of cervical tissue in response to laser pulses, which allows for the determination of the collagen-to-water ratio (CWR). The purpose of this study was to determine whether photoacoustic profiling of CWR can distinguish structural changes between pregnant and non-pregnant cervixes.

STUDY DESIGN: This was a prospective cohort study in which cervical biopsies were obtained at the time of hysterectomy in pre-menopausal, non-pregnant women (n=10) and at scheduled cesarean delivery in pregnant women at term who were not in labor (n=10). Specimens were imaged using a probe complemented by a fiber-optic light delivery system. The photoacoustic signals acquired within the range of wavelengths that cover the peak absorption of collagen and water were used to determine the CWR.

RESULTS: 1) A decrease in collagen content and an increase in water content were observed in cervical specimens from pregnant women, compared to those obtained from non-pregnant women (Figure, a, b); 2) the CWR was significantly lower in pregnant than non-pregnant uterine cervixes (23.3% vs 63.1%, respectively; p<0.05); 3) microscopic images from non-pregnant cervixes show compact collagen bundles with minimal edema (Figure, c), confirmed with Sirius Red Stain (Figure, e, f), while specimens of pregnant women demonstrated disorganized loose collagen fibers lacking discrete bundles with intervening edema (Figure, d).

CONCLUSION: Photoacoustic imaging represents a novel technique to characterize tissue composition. We propose that this noninvasive imaging technique could complement sonographic evaluation of cervical length in women at risk for preterm birth, as well as prior to the induction of labor. Moreover, this imaging method could be used to assess response to therapy (progesterone, cerclage, pessary).

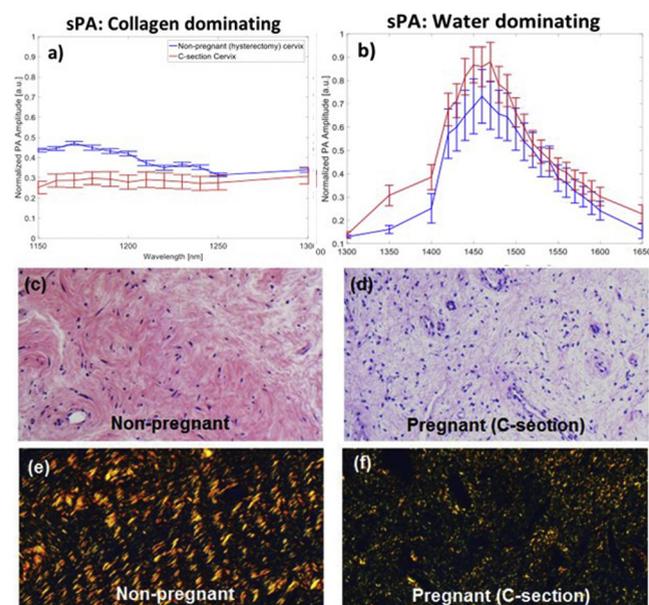


Figure: (a,b) PA signals of human cervix samples at collagen peak absorption and water peak absorption bandwidths; (c,d) H&E staining and (e,f) Sirius Red-stained images of non-pregnant and pregnant cervical tissue samples.

Abbreviations: C-section, cesarean section; H&E, hematoxylin and eosin; PA, photoacoustic

18 Influence of maternal body size on pharmacokinetics of weekly 17 alpha Hydroxyprogesterone Caproate (17OHP)

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OBJECTIVE: Goal of the study is to estimate the pharmacokinetics (PK) of weekly 17OHP in an obstetrical population and evaluate the effect of maternal body size on the PK parameters.

STUDY DESIGN: Prospective population PK study. Plasma samples and clinical variables were collected in pregnant women between 16 and 36 weeks gestational age (GA), carrying singleton pregnancy and receiving 17OHP, 250 mg IM weekly for the prevention of recurrent spontaneous preterm birth. Liquid chromatography mass spectrometry was used to measure 17OHP plasma concentrations. PK parameters and significant clinical covariates were estimated using mixed effect modeling. Population PK parameters were determined by nonlinear mixed effects modeling. Influence of demographic and clinical variables was evaluated by stepwise addition of covariates into the final population model. Four body size indicators were used in the model to predict PK parameters: Lean Body Weight (LBW), Total Body Weight (TBW), Body Mass Index (BMI) and Body Surface Area (BSA). The influence of maternal body size indicators on individual Bayesian PK estimates of 17OHP were evaluated by ANOVA.

RESULTS: Fifty-four pregnant women, ages 18 to 44 years and BMIs 14.5 to 54.6 kg/m², provided 114 17OHP plasma samples concentration for analysis. A 1-compartment model with first order absorption satisfactorily described 17OHP PKs. Compared to other body size indicators, lean body weight (LBW) best explained inter-subject variability, with coefficient of variation for apparent clearance (CL/F) decreasing 24.8% to 17.9% following addition of LBW into the population PK model. Age, race and GA did not influence 17OHP PK. Mean (relative SE) population PK parameters were CL/F 151 (1.3%) L/h/50 kg LBW, apparent volume of distribution 59874 (1.8%) L and absorption rate constant 0.111 (41.5%) h⁻¹. Mean + SD 17OHP CL/F was significantly ($p < 0.001$) higher in subjects with BMI > 35 kg/m² (182+/-31 L/h/50 kg LBW) compared to subjects with BMIs <26 kg/m² (133+/- 30 L/h/50 kg LBW), > 26 to 30 kg/m² (137+/- 30 L/h/50 kg LBW), and >30 to 35 kg/m² (144+/- 26 L/h/50 kg LBW).

CONCLUSION: Population PK analysis indicates 17OHP apparent clearance significantly increases at BMI > 35 kg/m². Higher 17OHP doses are required in subjects with BMI > 35 to achieve similar plasma concentrations compared to BMI < 35.

Table 1: Maternal and Obstetrical Characteristics

Variables N = 54	Median (25 th - 75 th percentile)
Maternal Age (years)	31.5 (27 - 32.3)
GA at delivery (weeks)	38.4 (37.1 - 39.2)
	n (%)
Ethnicity/Race, n (%)	
African America	34 (63.0)
Hispanic	5 (9.2)
White	3 (5.6)
Others	12 (22.2)
BMI Category (kg/m ²), n (%)	
BMI greater than 35	15 (27.8)
BMI less than 35	39 (72.2)
BMI 30 - 35	11 (20.4)
BMI 26 - 30	18 (31.5)
BMI less than 26	10 (18.5)
Number of prior sPTB, n (%)	
One prior sPTB	39 (72.2)
More than one prior sPTB	15 (27.8)

BMI: Body mass index, GA: Gestational age, SAB: Spontaneous abortion, ETOP: Elective termination of pregnancy, sPTB: Spontaneous preterm birth.