

≤7.1 and 5 min Apgar score ≤ 7 decreased significantly at P2 compared to P1, p=0.016 and p=0.031, respectively). Composite neonatal outcome decreased significantly at P2 compared to P1, 10.6% vs. 19.5%, respectively, P=0.002. No differences in the rate of composite maternal outcome at P1 compared to P2 were observed. Worse neonatal outcome was dependent on time period (P1), OR=2.12, 95% CI=1.27-3.55, p=0.004 and on gestational age at delivery, OR=0.68, 95% CI= 0.62-0.760, p<0.001, by using logistic regression model.

CONCLUSION: Introduction of a management protocol to shorten decision-to delivery interval in emergent CS for NRFHR was associated with improved early neonatal outcome without change in maternal complications.

Comparison of maternal and neonatal outcome before (P1) and after (P2) implementation of management protocol to shorten decision-to delivery interval for emergent CS for NRFHR

Parameter	Emergent CS at P1 n=292	Emergent CS at P2 n=301	p-value
Pregnancy and labor characteristics			
Mean Gestational age (weeks)	38.9 ± 2.5	39.1 ± 2.2	NS
Diabetes mellitus	19 (6.5%)	15 (5%)	NS
Preeclampsia	33 (11.3%)	20 (6.6%)	0.047
Patient in active labor (> 4 cm)	141 (48.3%)	167 (54.2%)	NS
FGR (< 10th percentile)	67 (22.9%)	54 (17.9%)	NS
Preterm Labor (<34 weeks)	14 (4.8%)	13 (4.3%)	NS
Mean DDI (minutes)	21.7 ± 9.1	12.3 ± 3.8	<0.001
DDI<20 minutes (%)	163/285 (57.2%)	282 (93.7%)	<0.001
Duration of operation (minutes)	35.2 ± 11.8	34.6 ± 18	NS
General anesthesia	70 (24%)	139 (46.2%)	<0.001
*Maternal composite intraoperative complications	39 (13.4%)	35 (11.6%)	NS
** Maternal composite postoperative complications	39 (13.4%)	27 (9%)	NS
Neonatal outcome			
Cord pH ≤ 7.1	31 (10.6%)	16 (5.3%)	0.016
5 minute Apgar score ≤ 7	17 (5.8%)	7 (2.3%)	0.031
#Composite neonatal outcome	57 (19.5%)	32 (10.6%)	0.002

DDI, Deliver-decision-interval; FGR, fetal growth restriction.

*re-laparotomy, uterine atony, large hematomas; **fever, endometritis, blood transfusion, wound infection, pelvic abscess, venous thromboembolism; # respiratory distress, necrotizing enterocolitis, sepsis, transfusion, ventilation, seizure, hypoxic-ischemic encephalopathy, phototherapy, death.

29 Does a postpartum hemorrhage patient safety program result in sustained changes in management and outcomes?

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OBJECTIVE: To determine whether the introduction of a postpartum hemorrhage (PPH) checklist and education program was associated with sustained changes in clinical practice and outcomes.

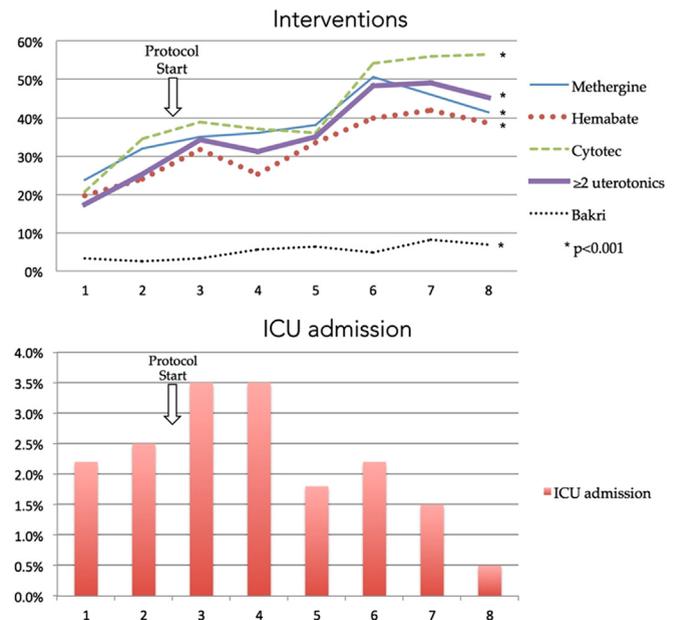
STUDY DESIGN: This was a longitudinal cohort study of women with PPH at a single tertiary-care hospital from August 2007 to August 2011. In August 2008, a multidisciplinary PPH patient safety protocol was implemented which included 1) educational sessions regarding blood loss (EBL) estimation and 2) introduction of a checklist for PPH management. Clinical interventions as well as patient outcomes were abstracted from the medical record and compared across 6-month epochs using tests of trend.

RESULTS: A total of 2751 women experienced PPH over the study period. Maternal characteristics that are known to be associated with the risk of PPH (i.e., multiple gestation, birth weight, placenta previa, chorioamnionitis, labor length, and rates of cesarean delivery) were similar during this period. After the introduction of the patient safety protocol, we observed a significant increase over time in the use of uterotonics and Bakri balloon placement (p<0.001 for

each, Figure). Other PPH interventions including use of B-lynch suture, transfusion of packed red cells and fresh frozen plasma, use of uterine artery embolization, and postpartum hysterectomy did not change. Additionally, frequency of EBL >1500 mL was documented to increase (p=0.002) and rates of admission to the ICU decreased (p=0.021).

CONCLUSION: After the introduction of a multidisciplinary PPH program, we observed a sustained increase in the use of uterotonics and Bakri balloon placement. There was also a significant increase in the frequency of EBL >1500 mL after blood loss estimation training. These changes were associated with a concomitant decrease in frequency of ICU admissions.

Postpartum hemorrhage interventions and ICU admissions, in 6-month epochs



30 Hospital-level variation in labor induction and cesarean delivery

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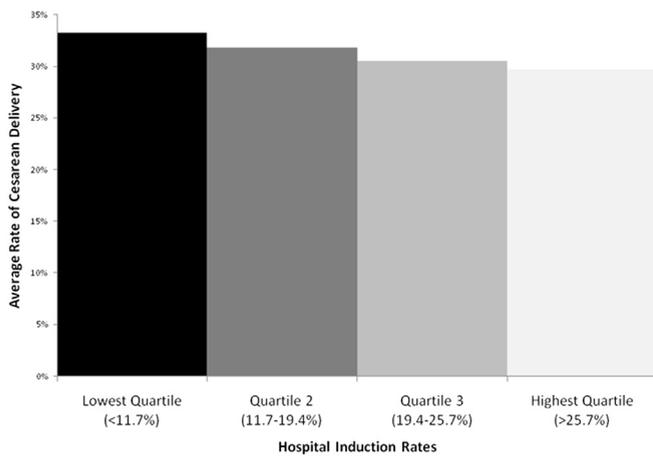
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OBJECTIVE: The overuse of labor induction is widely believed to be a driver of the increasing cesarean delivery rate. Yet, there is surprisingly little data to support this hypothesis. Therefore, we analyzed whether hospitals that have higher rates of labor induction have higher rates of cesarean delivery.

STUDY DESIGN: Using the 2010 National Inpatient Sample, we calculated hospital rates of cesarean delivery, including total, primary, and low risk (term, vertex, singleton, without a prior cesarean) and rates of labor induction including total and elective. Inductions were classified as elective if they were at term without medical indication (as defined by the Joint Commission). Pearson coefficients were used to determine whether hospital induction and cesarean rates were correlated. We then built logistic regression models to determine the degree to which the hospital rate of labor induction was independently associated with an individual's risk of cesarean delivery.

RESULTS: There were 813,693 deliveries at 604 hospitals. Hospital rates of cesarean delivery varied from 5.1 to 75.7% (mean 30.5%) and rates of labor induction varied from 0 to 50.4% (mean 19.1%). Induction and cesarean delivery rates were correlated (Figure), however in the opposite direction than predicted; hospitals with higher inductions rates had lower rates of cesarean delivery (Pearson -0.157; $p < 0.001$). This held even when considering only low risk cesareans and elective inductions (Pearson -0.080; $p = 0.048$). In logistic regression, individuals at hospitals in the lowest quartile for labor induction had a 4.4% increased odds of cesarean delivery (CI 1.026-1.062; $p < 0.01$), independent of other obstetric risk factors and hospital characteristics.

CONCLUSION: In a large, nationally representative sample, we found that hospitals with the highest rates of labor induction actually had the lowest rates of cesarean delivery. Induction of labor may be resource-intensive; however, we find little evidence to support that it is associated with higher rates of cesarean delivery.



31 Obesity and the risk of stillbirth: a population-based cohort study

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OBJECTIVE: Obesity in pregnancy is linked to stillbirth. However, it is unclear what impact increasing prepregnancy BMI has on the risk of stillbirth after 36 weeks of gestation. Therefore, we examined the association between maternal prepregnancy body mass index (BMI) and the risk of stillbirths based on the timing of occurrence of stillbirth (gestation week), with a focus on gestational ages between 37 and 42 weeks.

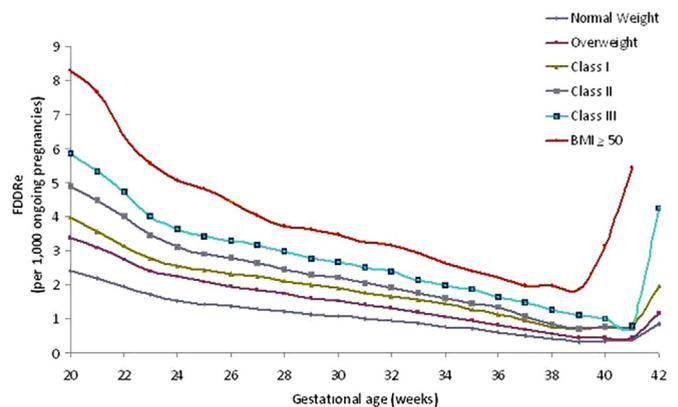
STUDY DESIGN: This is a retrospective cohort study using Washington database from 2003 to 2011 and Texas database from 2005 to 2011. Maternal prepregnancy BMI (kg/m²) was categorized as follows: normal (18.5-24.9), overweight (25.0-29.9), obese class I (30.0-34.9), obese class II (35.0-39.9) and obese class III (40-49.9). Additionally BMI ≥ 50 was analyzed separately. We calculated the hazard ratio (HR) of stillbirth associated with obesity for the following gestational periods: early preterm (32-33 weeks), late preterm (34-36 weeks), early term (37-39 weeks) and late term (40-42 weeks). The results are adjusted for the effects of maternal age, race, smoking and

other obstetric complications. We also estimated the risk of stillbirth for ongoing pregnancies (FDDRe) based on gestational age.

RESULTS: Of the 2,868,482 singleton births, the risk of stillbirth was 3.2 per 1000 ($n=9,030$). The HR for stillbirth increased gradually with gestational age for overweight, class I and class II groups and sharply for class III and the BMI ≥ 50 group (Table 1). After 39 weeks, the HR of stillbirth is 2.6 (95% confidence interval (CI): 1.6-4.1) for class III and 6.8 (95% CI: 3.1-14.7) for BMI ≥ 50 . The FDDRe for each obese class declines until 39 weeks and increases thereafter. At 41 weeks, compared to normal weight, the FDDRe is 2.1 times greater for class III and 13.5 times greater for BMI ≥ 50 (Figure 1).

CONCLUSION: Increasing BMI is associated with a greater burden of stillbirth across all gestational ages, but the association appears stronger at term gestations. Women that are extremely obesity are at considerably increased risk of stillbirth.

FDDRe, risk of fetal death for remaining pregnancies risk expressed as per 1000 births



Hazard ratio by gestation period

Obesity Class	Overall (n=2864165)		30-33 Weeks (n=38899)		34-36 Weeks (n=186113)		37-39 Weeks (n=1838880)		40-42 Weeks (n=774311)											
	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI										
	Crude	Adjusted	Crude	Adjusted	Crude	Adjusted	Crude	Adjusted	Crude	Adjusted										
Overweight	1.40	1.29	1.23	1.36	1.40	1.35	1.17	1.56	1.38	1.26	1.09	1.46	1.37	1.23	1.07	1.40	1.35	1.27	0.98	1.66
Class I	1.67	1.45	1.36	1.54	1.29	1.21	1.01	1.44	1.71	1.51	1.27	1.79	1.78	1.46	1.25	1.71	2.25	2.08	1.57	2.77
Class II	2.07	1.68	1.55	1.81	1.50	1.38	1.11	1.73	1.68	1.43	1.14	1.79	2.16	1.99	1.60	2.48	2.96	2.57	1.61	4.09
Class III	2.50	1.82	1.66	2.00	1.65	1.41	1.08	1.83	1.57	1.25	0.94	1.66	2.95	1.99	1.60	2.48	2.96	2.57	1.61	4.09
BMI ≥ 50	3.60	2.09	1.71	2.56	1.75	1.51	0.83	2.77	1.78	1.29	0.69	2.43	3.12	1.78	1.04	3.05	9.06	6.79	3.14	14.70

Baseline comparison group: normal weight. Results adjusted for race, maternal age, pregestational diabetes, chronic hypertension, gestational diabetes, gestational hypertension and smoking.

32 Umbilical cord arterial lactate compared with pH for predicting neonatal morbidity at term: a prospective cohort study

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OBJECTIVE: Recent data suggest a potential role for umbilical arterial lactate as a biochemical measure of neonatal well-being at birth. We tested the hypothesis that umbilical cord arterial lactate is superior to pH for predicting neonatal morbidity at term.

STUDY DESIGN: We conducted a prospective cohort study of all consecutive, non-anomalous, singleton, vertex, term births from 2009-2012. Umbilical arterial lactate and pH were measured