89 Neonatal respiratory morbidity and mode of delivery between 34+0 and 36+6 weeks of gestation

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OBJECTIVE: To assess the impact of mode of delivery on respiratory morbidity among late-preterm neonates.

STUDY DESIGN: Singleton pregnancies complicated by premature rupture of membranes (PROM) between 34+0 and 36+6 weeks were studied retrospectively. Pregnancies with corticosteroid administration after 34+6 weeks were excluded. Patients were divided into cesarean section (CS) and vaginal delivery groups, matched 1:3 for gestational age. The primary outcome was the rate of respiratory distress syndrome (RDS). Logistic regression was performed to assess the risk of RDS within groups.

RESULTS: Between 2005 and 2012, 360 patients delivered between 34 and 36 weeks after premature rupture of membranes at St. Orsola-Malpighi Hospital, Bologna (Italy). In 90 cases elective caesarean section was performed for previous CS (n=50), breech presentation (n=31) or maternal medical indications (n=9). No difference was found for antenatal betamethasone within groups. The overall RDS rate was 15%, while it was 30% and 10% in case of CS and vaginal delivery, respectively (p-value 0.0001). CS seems to be a risk factor for RDS (OR 4.2, p-value 0,0001), as does earlier gestational age at delivery (OR 0.9, p-value 0,0001). Table 1 shows the median risks of RDS in the study population according to the logistic regression model.

CONCLUSION: After preterm PROM, CS is associated with a higher risk of neonatal RDS. This is more evident with increasing gestational age, when respiratory morbidity is thought to be less frequent.

Median estimated risk of RDS

	34 weeks	35 weeks	36 weeks
CS (n=90)	53% (50-61)	38% (29-45)	20% (16-27)
Vaginal delivery (n=270)	28% (18-29)	12% (10-15)	6% (4-8)

90 Oral misoprostol vs vaginal dinoprostone for labor induction in nulliparous women at term

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OBJECTIVE: To compare the effectiveness and safety of oral misoprostol to the vaginal dinoprostone insert for the induction of labor of nulliparous women at term.

STUDY DESIGN: Records of women admitted to Lucile Packard Children's Hospital from January 2008 to December 2010 for labor induction with an unfavorable cervix were reviewed. Patients receiving oral misoprostol as the primary induction agent were compared with those receiving vaginal dinoprostone. Multiparous patients and those with multiple or preterm gestations, membrane rupture, or use of other primary induction agents were excluded. The primary outcome was defined as time interval from administration of the primary induction agent to vaginal delivery. Secondary outcomes included vaginal delivery in less than 24 hours, use of secondary ripening or augmentation agents, and maternal and fetal outcomes.

RESULTS: 1016 patient records were reviewed. 680 met inclusion criteria: 483 (71%) received vaginal dinoprostone and 197 (29%) received oral misoprostol. Patients receiving oral misoprostol were more likely to be Hispanic (40% vs. 35%, p=0.04), and to have greater cervical dilation on admission (mean = 0.63 cm vs. 0.98 cm, p<0.001). Time interval from induction to vaginal delivery was shorter with oral misoprostol (27.2 vs. 21.9 hours, p< 0.001). This difference remained significant when controlling for cervical dilation, regional anesthesia, and birthweight. After risk adjustment, the odds of vaginal delivery in less than 24 hours was two times greater with oral misoprostol (OR 2.26, CI=1.42-3.58). Patients receiving oral misoprostol were more likely to deliver vaginally (71% vs. 63%, p=0.04); however no difference was seen after adjusting for possible confounders. There were no differences in any of the secondary maternal or fetal outcomes.

CONCLUSION: In nulliparous women, oral misoprostol as the primary cervical ripening agent resulted in a shorter interval to vaginal delivery.

91 Second trimester cervical length and persistence of placenta previa in the third trimester

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OBJECTIVE: Transvaginal ultrasound prior to 20 weeks identifies placenta previa in 1/20 pregnancies, but only about 10% persist in the third trimester. Prior studies have associated decreased cervical length (CL) in the setting of placenta previa with adverse obstetric outcomes including maternal hemorrhage, preterm birth, emergency cesarean and abnormally adherent placenta. However, the association between CL and persistence of placenta previa has not been evaluated. We sought to test the hypothesis that cervical shortening with associated development of the lower uterine segment in the setting of placenta previa is associated with impaired placental migration away from the internal cervical os, and persistent placenta previa.

STUDY DESIGN: A retrospective cohort study of singleton pregnancies presenting for routine fetal anatomic survey (17w0d- 23w6d). Women with multiple gestations, major uterine anomalies and those without third trimester follow up ultrasound were excluded. The primary outcome was persistence of placenta previa on ultrasound in the third trimester (28w0d-36w6d). CL at the time of the anatomic survey in women with persistence and resolution of placenta previa in the third trimester were compared. The predictive value of second trimester CL for persistent placenta previa in the third trimester was assessed using the receiver-operating characteristics (ROC) curve.

RESULTS: 294 women diagnosed with placenta previa at anatomic survey in the second trimester met inclusion criteria. Of these, 16 (5.4%) had placenta previa on follow-up ultrasound in the third trimester. CL was not significantly different in women with persistent placenta previa compared to those with resolution (45.1±8.8mm versus 43.4± 8.2mm, p=0.42). The area under the ROC was 0.58, and no CL cutoff was significantly associated with persistence of placenta previa (Table).

CONCLUSION: These data suggest that second trimester CL is not predictive of persistence of placenta previa in the third trimester.

Cervical length cutoff	Persistent Previa (n=16)	Resolved Previa (n=278)	p-value
<30mm	1 (6.3%)	10 (3.6%)	0.47
<40mm	3 (18.8%)	88 (31.6%)	0.41
<50mm	14 (87.5%)	219 (78.8%)	0.54

92 Placental pathology, first-trimester biomarkers, and adverse pregnancy outcomes (APO)

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OBJECTIVE: To investigate the association of placental pathology (Path) findings in pregnancies with APO and first-trimester biomarkers.

STUDY DESIGN: This is a prospective study of first-trimester screening for APO. Path were reviewed by two perinatal pathologists blinded to

clinical outcomes. First, we determine the association between Path lesions and APO including: preterm birth [PTB (delivery < 37 weeks)], preeclampsia (PE), gestational hypertension (GH) and small for gestational age (SGA) infants (birthweight <10th percentile). We then compare the mean levels of serum analytes (PAPP-A, PP13, ADAM12s, PLGF), and uterine artery Doppler PI (UADPI) obtained at 11-14 weeks gestation in cases with APO and abnormal placental histology (PlacHist) to a control group without APO or abnormal Path. Path were classified as: lesions of maternal under perfusion (LMUP) including a composite of: infarct, decidual vasculopathy, distal villous hypoplasia); lesions of reduced placental reserve (LRPR)including: avascular villi, perivillous fibrin/intervillous thrombo-hematoma, villitis); and Infectious/inflammatory (INFL) lesions (chorioamnionitis, funisitis/chorionic vasculitis). Statistical analysis was performed using chi-squared, paired t-test and ANOVA.

RESULTS: Among 193 Path reviewed, LMUP were seen in 59 (30.7%); LRPR in 63 (32.85),and INFL in 65 (34.2%). PE was significantly associated with LMUP (p=0.005) and INFL (p=0.003). PTB < 28 weeks was the only sub-group of PTB with a significant association with INFL: 75% versus 31% (p<=0.002). SGA and GH were not significantly associated with any PlacHist abnormality. Significant differences were seen in mean levels of PAPPA, ADAM12s and PLGF in cases of PE and PTB with specific Path lesions compared with controls (Table).UADPI was not significantly different between the cases with APO and abnormal Path.

CONCLUSION: Our findings provide evidence linking placental pathology with mal-secretion of analytes in first-trimester in pregnancies with APO, especially PE.

Placental lesions seen in cases with preeclampsia and preterm birth

APO + placental pathology (n)	PAPPA (MoM)	ADAM12s (pg/ml)	PP13 (pg/ml)	PLGF (pg/ml)
PE + LMUP (18)	0.83±0.4*	529±282	60 ± 32.3	15±8*
Control (115)	1.2 ±0.8	514±257	59 ± 51	22±15
PE+ LRPR(16)	0.87±0.5*	365± 180*	54±37	21±11
Control (109)	1.2±0.8	501±236	58±24	23±17
PE+INFL (4)	0.74±0.1*	473±240	88±30	20±5
Control (96)	1.2 ±0.7	502±234	59±26	19±16
PTB+ LMUP (17)	1.0±0.8	415±217	44±22	16±9*
Control (102)	1.2±0.7	510±260	59±29	22±15
PTB+LRPR (14)	1.2±0.8	381±170*	45±36	19±13
Control (95)	1.2±0.7	523±243	60±24	23±17
PTB+ INFL (15)	1.1±1.0	380±199	50±20	24±15
Control (94)	1.1±0.7	503±244	59±26	20±16

*Significant at $P < .05$.

93 The impact of gestational weight gain on perinatal outcomes in obese women

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OBJECTIVE: To evaluate the relationship between gestational weight gain and maternal and neonatal outcomes in obese women.

STUDY DESIGN: Retrospective cohort study of obese women, defined as having a body mass index (BMI) of >30, delivering singletons >20 weeks between 2000-2009. All included women had a weight documented in the first trimester and within 3 weeks prior to delivery. Women were stratified into quartiles according to the average gestational weight gain in kg/week. Maternal and neonatal outcomes were compared using the chi-squared test and the Mantel-Haenszel test for trend.

RESULTS: 6251 obese women were eligible for the study. As shown in the Table, increased gestational weight gain (>0.53 kg/week; highest quartile of gestational weight gain) was associated with a multitude of adverse maternal and neonatal outcomes, including cesarean delivery, infections, shoulder dystocia, hypertensive disorders, and macrosomia. Minimal weight gain (<0.16 kg/week; lowest quartile of gestational weight gain) was associated with lower birthweights. Several outcomes, such as spontaneous preterm delivery, 5-minute Apgar <5, and fetal demise, displayed a bimodal distribution, with increased rates associated with minimal and increased gestational weight gain.

CONCLUSION: Both minimal and excessive gestational weight gain in obese gravidas is associated with adverse maternal and neonatal outcomes. Obese women with moderate weight gain have the most favorable perinatal outcomes.

Perinatal outcomes (%) in obese women according to gestational weight gain

	Weight gain (kg/week)					
	<0.16 (N=1567)	0.163-0.35 (N=1560)	0.35-0.53 (N=1559)	>0.53 (N=1565)	p	p-trend
Spontaneous PTB	7.9	5.2	4.3	4.7	<0.0001	<0.0001
Indicated PTB	7.7	6.6	5.4	8.6	0.0035	0.305
C-section	25.4	26.9	27.9	34.2	<0.0001	0.0008
Gestational DM	5.9	6.6	6.7	5.6	0.550	0.626
Amnionitis	4.7	5.1	5.9	8.4	<0.0001	0.010
Endometritis	1.1	1.6	1.7	2.5	0.034	0.027
HTN	12.7	14.4	15.8	21.3	<0.0001	<0.0001
Preeclampsia	6.5	6.5	6.5	11.9	<0.0001	0.014
Apgar 5 min ≤ 3	2.8	1.5	1.3	1.9	0.015	0.003
Fetal demise	1.4	0.9	0.6	1.0	0.129	0.048
NICU	11.3	8.5	8.5	12.0	0.0006	0.073
BWT ≥ 4000g	4.3	6.3	8.9	12.4	<0.0001	<0.0001
LGA	10.3	14.1	17.2	21.5	<0.0001	<0.0001
SGA	6.6	5.5	4.4	4.3	0.012	0.004

BWT, birthweight; *DM*, diabetes mellitus; *HTN*, hypertension; *LGA*, large for gestational age; *PTB*, preterm birth; *SGA*, small for gestational age.

94 What is the optimal time to deliver dichorionic diamniotic twins when one twin has intrauterine growth restriction?

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OBJECTIVE: Determining the optimal timing of delivery of a twin gestation involves balancing the risk of complications against the potential morbidity of late preterm/early term birth. Timing of delivery becomes more challenging if one twin has intrauterine growth restriction (IUGR), as this increases the risk of IUFD. We used decision analysis to estimate the optimal gestational age (GA) for delivery of dichorionic diamniotic (DCDA) twin gestations when one has IUGR.

STUDY DESIGN: A decision-analytic model was created using TreeAge to compare the outcomes of delivery at 34, 35, 36, 37 and 38 weeks in a theoretical cohort of DCDA twin pregnancies when one twin has IUGR. Our baseline assumption was that a twin with IUGR was at 7.06-fold increased risk of IUFD. Strategies involving expectant management (EM) until a later GA accounted for the probabilities of spontaneous delivery, indicated delivery, and IUFD during each successive week. GA associated risks of neonatal complications including major neurodevelopmental disability, perinatal and neonatal mortality. Baseline assumptions were derived from the literature. Total quality-adjusted life years (QALYs) were calculated, accounting for both neonatal and maternal utilities. Sensitivity analyses were conducted to evaluate the impact of baseline assumptions on model outcomes.

RESULTS: Our model showed that earlier GAs were associated with increased neonatal morbidity, but lower overall IUFD rates (Table). Balancing these outcomes, the optimal delivery strategy was EM until 35 weeks, which maximized the total QALYs. Sensitivity analysis showed that optimal GA at delivery was sensitive to the increased risk of IUFD associated with IUGR. EM until 35 weeks was the optimal strategy until the increased risk of IUFD in an IUGR twin fell below 5.82-fold, when delivery strategies at later GAs became preferred.

CONCLUSION: Weighing the risks of IUFD against the outcomes of iatrogenic prematurity, the ideal GA to deliver DCDA twins when one has IUGR is 35 weeks.