

302 Term induction of labor: a possible cause for subsequent preterm birth?

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OBJECTIVE: It is estimated that >20% of women undergo induction of labor (IOL), and this continues to rise. Simultaneously, the preterm birth (PTB) rate remains largely unchanged. Previously published work from our institution demonstrates the rate of spontaneous PTB (SPTB) in women with a prior term delivery is 5.7%, which is lower than the national average (Edlow et al. AJOG 2007). The objectives of this study were to 1) determine the rate of SPTB in a subsequent pregnancy among women who previously underwent a term IOL and 2) evaluate the association between different methods of term IOL on subsequent SPTB risk.

STUDY DESIGN: A retrospective cohort study of women with 2 deliveries (a term IOL and a subsequent delivery) between 2005 & 2010 at the Hospital of the University of Pennsylvania was performed. Maternal medical, obstetrical, and delivery information for both pregnancies were obtained through chart abstraction. The rate of SPTB among pregnancies following term IOL was calculated. Associations between methods of IOL and SPTB rate were calculated using χ^2 analyses or fisher's exact tests.

RESULTS: The study included 413 women. For method of IOL, 94 (23%) had a cervical foley, 172 (42%) had only prostaglandin, and 147 (36%) had only pitocin. The overall SPTB rate among subsequent pregnancies after term IOL was 7.5%. The rate of SPTB when cervical foley was used vs. medical IOL agents was 9.6% vs. 6.9% (RR 1.39[0.66-2.91], p=0.39). When analyses were restricted to women whose first pregnancy was a term IOL (N=278), the SPTB rate in subsequent pregnancies was 6.5%. Among these women, the SPTB rates were 8.9% vs. 5.5% (RR 1.60[0.64-3.99], p=0.31) for those who had a cervical foley vs. medical IOL agents respectively.

CONCLUSION: The observed SPTB rate of 7.5% in women who had a term IOL is higher than the previously published 5.7%. Interestingly, the risk is differentially increased when comparing mechanical vs. medical IOL agents. Further research is needed to evaluate the impact of IOL and methods of IOL on subsequent PTB risk in order to ensure the increasing IOL rate is not causing unnecessary harm.

303 Comparison of neonatal mortality in cases of planned vaginal delivery versus planned cesarean delivery from 26 to 29 weeks gestation

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OBJECTIVE: To compare neonatal death rates in preterm singleton breech deliveries from 26/7 to 29/7 weeks gestation in centers with either a policy of planned vaginal delivery (PVD) or planned cesarean delivery (PCD).

STUDY DESIGN: Women with spontaneous preterm singleton breech deliveries were identified from the databases of five perinatal centers and classified as PVD or PCD according to the centers management policy from 1999 to 2008. Women were excluded in cases of induced preterm delivery including preeclampsia, abruptio placentae, hypertensive diseases leading to delivery, intra uterine growth restriction or in cases of diagnosed antenatal abnormalities. Adjusted odds ratios and 95% confidence intervals were calculated. Factors included in the multivariate model were: centre, preterm premature rupture of mem-

branes (pPROM)<24 weeks gestation, gestational age at delivery and prenatal corticotherapy.

RESULTS: Of 142 782 deliveries during the study period, 632 (0.4%) women delivered breech from 26/7 to 29/7 weeks gestation. 130 were included in the PVD group and 173 in the PCD group. Maternal characteristics were not different between the two groups. Thirteen percent of neonates had an Apgar score <7 at 5 minutes in the PCD group versus 26% in the PVD group; p=0.007. The rate of head entrapment was of 7% in the PCD group versus 12% in the PVD group, p=0.07. Rates of intra-ventricular hemorrhage or periventricular leukomalacia were not different between the two groups. The neonatal mortality was 8% in the PCD group versus 13% in the PVD group, p=0.19. In the multivariate model, a pPROM before 24 weeks gestation was an independent risk factor of neonatal death (aOR : 4.9, 95%CI 1.8-13.7) but not a planned vaginal delivery (aOR : 2.1, 95%CI 0.41-7.4).

CONCLUSION: Risk of neonatal death was not associated with any particular policy of mode of delivery.

Table: Perinatal morbidity and mortality according to the planned mode of delivery

	Planned cesarean delivery n=130	Planned vaginal delivery n=173	OR (95%CI)	aOR(95%CI)*
Birthweight (mean±SD, g)**	1119±205	1225±259	-	-
pH < 7.15 # (%)	5 (5)	19 (14)	2.92 (1.05-8.11)	2.36 (0.38-15.8)
5-min Apgar score < 7 # (%)	17 (13)	44 (26)	2.30 (1.25-4.26)	1.88 (0.68-5.23)
Head entrapment # (%)	7 (6)	20 (12)	2.24 (0.92-5.47)	10.1 (2.21-46.2)
Difficult extraction # (%)	23 (18)	25 (15)	0.75 (0.41-1.40)	1.43 (0.48-4.27)
Neonatal sepsis # (%)	13 (10)	30 (17)	1.89 (0.94-3.78)	0.73 (0.24-2.27)
Bronchopulmonary dysplasia # (%)	36 (30)	52 (35)	1.24 (0.74-2.07)	1.98 (0.80-4.91)
Periventricular leukomalacia # (%)	4 (3)	9 (5)	1.73 (0.53-5.78)	0.46 (0.08-2.48)
IVH grade 3 or 4 # (%)	7 (5)	14 (8)	1.54 (0.61-3.95)	1.49 (0.32-6.28)
Necrotizing enterocolitis # (%)	8 (6)	16 (9)	1.55 (0.64-3.75)	2.26 (0.69-7.46)
Neonatal mortality # (%)	11 (8)	23 (13)	1.65 (0.78-3.54)	2.14 (0.41-7.43)

*: All aOR were adjusted on gestational age at delivery, prenatal corticotherapy, rupture of membrane before 24 weeks gestation and the centre

** : non significant

304 Shoulder dystocia: risk factors and outcomes in 453 consecutive cases

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OBJECTIVE: Shoulder dystocia (SD) is an uncommon and unpredictable event complicating 0.2–3% of all vaginal deliveries. We sought to examine the current risk factors and perinatal outcome of all cases of shoulder dystocia in a single institution over a six year period.

STUDY DESIGN: This is a prospective observational study carried out at a large tertiary referral center serving a single urban population over a 6 year period from 2005-2010. Shoulder dystocia was defined as failure to deliver the shoulders at the first attempt in singleton cephalic vaginal deliveries. Details of maternal demographics, intrapartum characteristics and neonatal outcomes were recorded prospectively on a computerized database for analysis.

RESULTS: During the study period there were 51,919 deliveries and 453 cases of SD, giving an incidence of 8.7/1000 births. The mean maternal age was 30.8 +/- 5.3 years. Almost 70% (n=311) occurred at a gestation of greater than 40 weeks. The majority of cases of SD (69%, 312/453) occurred following spontaneous onset of labor. The mean birthweight was 4187g (2920-5780g). Twenty-four babies (5.7%) had an Apgar score of less than 7 at 5 minutes, and 21 (4.6%) had a cord pH < 7.1. In total 61 babies (13.5%) required admission to the neonatal unit. 30 women (6.6%) suffered anal sphincter injury and 20.8% had blood loss of greater than 500ml at delivery. There were 83 cases of Erbs palsy (18%) the vast majority of which resolved spontaneously and 5 cases of hypoxic ischemic encephalopathy (2 mild, 3 moderate).

CONCLUSION: We consider this robust and significant data relating to contemporary antecedents and outcomes of SD. As a complication

which carries a significant risk of persistent neurological injury for the infant and consequent medicolegal implications for the clinician, continuous audit and high levels of awareness and training for all birth attendants should now be standard practice.

305 The influence of parity on maternal and neonatal outcomes in shoulder dystocia

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OBJECTIVE: Shoulder dystocia (SD) is an obstetric emergency which may have adverse long term effects for both mother and baby. It is an unpredictable event however some risk factors have been identified. We sought to examine the influence of parity on adverse outcomes in a large series of consecutive cases of SD.

STUDY DESIGN: This is a prospective observational study carried out from January 2005 to December 2010 at a tertiary referral centre where over 9000 women delivery annually. Shoulder dystocia was defined as failure to deliver the shoulders at the first attempt in singleton cephalic vaginal deliveries. Details of maternal demographics, intrapartum characteristics and neonatal outcomes were recorded prospectively on a computerized database. Maternal and neonatal outcomes were compared in nulliparous versus multiparous labors.

RESULTS: During the study period there were 51,919 deliveries and 453 cases of SD, giving an incidence of 8.7/1000. Of the cases examined 214/453 (47.4%) cases occurred in nulliparas and 239/453 (52.6%) in multiparas. Nulliparous patients with SD were more likely to be induced (37% vs. 26%; $p = 0.02$), had significantly smaller babies (4019 +/- 423g vs. 4338 +/- 475g; $p < 0.001$) and longer labors (501 219 min vs. 277 219 min ; $p < 0.001$). Nulliparous mothers were significantly more likely to suffer anal sphincter damage (9.8% vs. 3.8%; $p = 0.01$). Infants born to nulliparous mothers following SD were more likely to have an Apgar score < 7 at 5 min (7.9% vs. 2.9% $p = 0.02$), with a trend towards higher neonatal unit admission rates (16.8% vs. 10.5%; $p = 0.05$). However no significant difference was noticed in either the incidence of Erbs palsy or hypoxic ischemic encephalopathy.

CONCLUSION: Though significant differences were noted in intrapartum characteristics and short term perinatal morbidity when multiparous and nulliparous groups were compared, no difference was seen in long term adverse neonatal outcome.

306 Prediction of cesarean section in women with an unfavorable cervix at term

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OBJECTIVE: To identify indicators that quantify the risk of cesarean section in women with an unfavorable cervix in whom labor is induced.

STUDY DESIGN: This was a secondary analysis of the randomized controlled trial, the PROBAAT study (NTR 1646), that compared induction of labor with a transcervical Foley catheter with induction with prostaglandins in term women with an unfavorable cervix. We prospectively collected the outcome (cesarean section) and its potential predictors (the Bishop score with its five components, maternal and pregnancy characteristics). Potential predictors associated with cesarean section in univariable analysis ($p \leq 0.50$) were included in a multivariable model. Backward selection was used to develop a prediction model, predictors with a $p \leq 0.157$ remained in the final model. We used ROC analyses and calibration plots to assess the predictive accuracy of the model.

RESULTS: We included 1036 women. The overall cesarean section rate was 21%. Independent predictors of the risk for cesarean section were maternal age (years) (OR 1.06, 95% CI 1.03-1.10), maternal height (cm) (OR 0.94, 95% CI 0.91-0.96), BMI (OR 1.65 to 2.97 in different categories, overall p -value 0.057), nulliparity (OR 7.14, 95% CI 11.1-4.35), indication for labor induction (Table 1, overall p -value 0.09), and no dilation (OR 1.35, 95% CI 1.89-0.98). The final model using these parameters had an area under the ROC-curve of 0.75 (95% CI 0.71-0.79), with good calibration (Figure 1).

CONCLUSION: In women with an unfavorable cervix in whom labor is induced, the risk of cesarean section can be predicted by combining maternal age, BMI, maternal height, parity, reason for labor induction, and dilation. This prediction model could be a useful tool for clinical decision making and patient information.