

## Does the Use of Labor-inducing Drugs Cause Adverse Perinatal Outcomes?

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### Abstract

There have been several studies of adverse perinatal outcomes associated with the indiscriminate use of labor-inducing drugs. However, the present results indicate that the appropriate use of labor-inducing drugs is not unsafe and improves neonatal outcomes in abnormal deliveries.

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**Key words:** labor-inducing drugs, perinatal outcomes

We compared the characteristics and perinatal outcomes of singleton deliveries at  $\geq 37$  weeks' gestation using labor-inducing drugs (oxytocin or gemeprost/dinoprost or both) with those using no labor-inducing drugs managed at Japanese Red Cross Katsushika Maternity Hospital from 2002 through 2008. The protocol for this analysis was approved by the Ethics Committee of the Japanese Red Cross Katsushika Maternity Hospital. In our hospital, labor-inducing drugs have sometimes been used on the basis of the medical indications and the informed consent of patients. As a general rule we do not perform planned deliveries for low-risk pregnancies. The  $X^2$  test was used to analyze categorical variables. Odds ratios (ORs) and 95% confidence intervals (CIs) were also calculated. Differences with  $p < 0.05$  were considered significant.

Exclusion criteria for this study included: 1) planned cesarean deliveries, 2) intrauterine fetal demise before labor, and 3) congenital major anomalies. In this study, we examined 9,169 singleton cases with trial of vaginal delivery at  $\geq 37$

weeks' gestation managed at our hospital. In 2,526 of these cases (27%), labor-inducing drugs were used to induce or augment labor or both. The main indications for labor-inducing drugs were failure of labor to progress (44%), prolonged interval since rupture of membranes ( $\geq 24$  hours) (14%), and fetal heart rate abnormality on cardiotocography (8.2%). Oxytocin alone, oxytocin and gemeprost/dinoprost, and gemeprost/dinoprost alone were used in 63%, 20%, and 17% of these cases, respectively.

**Table 1** shows the clinical significance and perinatal outcomes of singleton deliveries at  $\geq 37$  weeks' gestation with and without labor-inducing drugs. As shown in **Table 1**, the rate of primiparous, elderly women, hypertensive disorders, diabetes mellitus, and heavy for gestational age infants in singleton deliveries with labor-inducing drugs were higher than those without labor-inducing drugs. However, there were no significant differences in the incidence of neonatal asphyxia or low umbilical artery pH between deliveries with and without labor-inducing drugs. In addition, there were no

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## Labor-inducing Drugs and Perinatal Outcome

Table 1 Clinical significance and perinatal outcomes of singleton deliveries at  $\geq 37$  weeks' gestation with and without labor-inducing drugs

	Use of labor-inducing drugs		P-value	Crude OR	95%CI
	No	Yes			
Total	6,643	2,526			
Nulliparity	3,061 (46)	1,886 (75)	< 0.01	3.45	3.1–3.8
Maternal age					
$\geq 35$ years	1,516 (23)	677 (27)	< 0.01	1.24	1.1–1.4
$\geq 40$ years	192 (2.9)	100 (4.0)	0.01	1.38	1.1–1.8
Previous Cesarean delivery	291 (4.4)	26 (1.0)	< 0.01	0.23	0.15–0.34
Hypertensive disorders	126 (1.9)	172 (6.8)	< 0.01	3.78	3.0–4.8
Diabetes mellitus	36 (0.54)	39 (1.5)	< 0.01	2.88	1.8–4.5
Delivery mode					
Emergent Cesarean delivery	415 (6.2)	258 (10)	< 0.01	1.71	1.5–2.0
Breech vaginal delivery	24 (0.36)	33 (1.3)	< 0.01	3.65	2.2–6.2
Vacuum/forceps delivery	276 (4.2)	396 (16)	< 0.01	4.26	3.6–5.0
Placental abruption	35 (0.53)	12 (0.48)	0.88	0.90	0.47–1.7
Neonatal outcomes					
Apgar score (1 min) < 7	79 (1.2)	44 (1.7)	0.051	1.47	1.0–2.1
Apgar score (5 min) < 7	20 (0.30)	9 (0.36)	0.83	1.18	0.54–2.6
Umbilical artery pH < 7.1	140 (2.1)	61 (2.4)	0.41	1.15	0.85–1.6
Umbilical artery pH < 7.0	26 (0.39)	12 (0.48)	0.71	1.22	0.61–2.4
Light for dates infant	429 (6.5)	178 (7.0)	0.33	1.10	0.92–1.3
Heavy for dates infant	151 (2.3)	102 (4.0)	< 0.01	1.81	1.4–2.3
Maternal outcomes					
Perineal laceration $\geq$ grade 3	71 (1.1)	67 (2.7)	< 0.01	2.52	1.8–3.5
Postpartum hemorrhage $\geq 1,000$ mL	208 (3.1)	150 (5.9)	< 0.01	1.95	1.6–2.4
Uterine rupture	1 (0.015)	0 (0)	0.62	—	—
Eclampsia	6 (0.090)	2 (0.079)	0.87	0.88	0.18–4.4

Values are represented as number (%).

significant differences in the incidence of placental abruption or eclampsia between the delivery groups, although the rate of hypertensive disorders in deliveries with labor-inducing drugs was higher than that without labor-inducing drugs. The incidence of severe perineal laceration and that of postpartum hemorrhage in deliveries with labor-inducing drugs were higher than those without labor-inducing drugs and were associated with the increased rates of vacuum/forceps deliveries in primiparous women, older women ( $\geq 35$  years old), and women with complicated pregnancies (perineal laceration  $\geq$  grade 3: adjusted OR, 1.39; 95% CI, 0.93–2.1;  $p=0.10$ ; and postpartum hemorrhage  $\geq 1,000$  mL: adjusted OR, 1.04; 95% CI, 0.80–1.4;  $p=0.76$ ).

Several studies have examined the adverse perinatal outcomes associated with the indiscriminate use of labor-inducing drugs<sup>12</sup>. We

recognize that the present study has severe limitations, such as a small sample size; however the present results support the notion that the appropriate use of labor-inducing drugs is not unsafe and improves neonatal outcomes in abnormal deliveries.

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