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Maternal and neonatal morbidities associated with cesarean delivery without labor compared with induction of labor around term

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Objective
We aimed to compare the maternal and neonatal morbidities associated with elective cesarean delivery (CD) without labor and those associated with induction of labor (IOL) at ≥38 weeks of gestation.

Methods
This retrospective observational study from 2013 to 2020 included singleton pregnancies in nulliparous women at ≥38 weeks of gestation. Maternal and neonatal morbidities associated with elective CD without labor were compared with those associated with IOL.

Results
Altogether, 395 women were recruited. Among these, 326 underwent delivery through IOL, while 69 underwent elective CD. The elective CD group exhibited higher maternal age, lower gestational age at birth, and lower neonatal birth weight than the IOL group (P<0.001). Moreover, the elective CD group exhibited longer hospital stay, higher rate of uterotonic agent usage, and lower rate of antibiotic usage after discharge. However, no differences were observed in postpartum bleeding, readmission, or number of outpatient visits (>3) after discharge between the groups. Perinatal morbidities were similar between the groups except the incidence of meconium-stained amniotic fluid. Elective CD exhibited similar rates of complications related to composite maternal morbidity when compared with IOL, but had a lower risk of complications related to composite neonatal morbidity (relative risk, 0.45; 95% confidence interval, 0.24-0.85).

Conclusion
Elective CD and IOL had similar rates of composite maternal morbidity but the former exhibited some benefits against obstetric wound infection. The elective CD group exhibited a decreased risk of composite neonatal morbidity despite lower gestational age at birth and higher maternal age.

Keywords: Induced labor; Cesarean section; Infant health; Postpartum period

Introduction

Elective cesarean delivery (CD) without labor is one of the most frequent obstetric interventions performed for the convenience of patients or obstetric providers, even in the absence of obstetric indications. Common indications for elective CD include maternal request and increased risks associated with vaginal delivery (abnormal presentation, history of uterine surgery, and other underlying medical conditions).

The advantages of elective CD without labor include lack of fear associated with pain, process, length, and/or compli-

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cations of labor and vaginal delivery and lack of concerns regarding the need for emergency CD and the risks associated with it [1,2]. The biggest potential advantage of elective CD is scheduled birth, which can prevent sudden disruption of patients' lives and providers' work. Studies have shown that the lowest incidence of perinatal morbidity and mortality is at approximately 39-40 weeks of gestation [3]. Since the risk of intrauterine demise is absent once the fetus is delivered, the risk of other complications or stillbirth in elective CD is low [4]. From the point of view of scheduled delivery and neonatal morbidity, a reasonable alternative for elective CD is induction of labor (IOL), which represents the most frequent interventional procedure in obstetric medicine and is reportedly performed in 20-25% of all pregnancies [5,6]. However, induction may fail and lead to an unscheduled cesarean birth. It may also be associated with an increased length of labor, potential patient/provider impatience, and a long latent phase [7,8]. Concomitantly, CD without labor may also be associated with an increased risk of placental attachment disorders [9], uterine rupture in subsequent pregnancies [10,11], maternal morbidity [12,13], and a longer recovery period [14].

The effect of CD without labor on adverse maternal and perinatal outcomes has received increasing attention in the public and scientific literature [15-18]. However, the merits and safety of elective CD and elective d with planned vaginal delivery remain largely unaddressed.

In a contemporary society, pregnant persons' right to be actively involved in choosing their preferred route of delivery is widely accepted by both clinicians and patients, and performing a CD based on a well-informed patient's request is considered medically and ethically acceptable [19].

Since elective interventions including CD and IOL are being performed more frequently, their implications on maternal and neonatal risks have gained importance. The risks and benefits of elective CD need to be balanced with the risks and benefits of IOL while deciding the route of delivery.

The present study aimed to investigate and compare the maternal and neonatal morbidities associated with elective CD without labor and those associated with IOL at ≥38 weeks of gestation.

Materials and methods

This observational retrospective study was conducted between January 1, 2013 and December 31, 2020 at the National Health Insurance Service Ilsan Hospital, Republic of Korea. The study was approved by the institutional review board of the National Health Insurance Service Ilsan Hospital (#NHIMC 2021-02-027).

All women at ≥38 weeks of gestation were eligible for inclusion in this study. The following inclusion criteria were applied: 1) nulliparous women; 2) uncomplicated, live, singleton pregnancy; and 3) fetal gestational age ≥38 weeks. Patients with the following conditions were excluded from the study: 1) placenta previa, 2) non-reassuring nonstress test (NST), 3) pregnancies with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, 4) fetal birth weight <2,500 g, 5) women with spontaneous labor before admission for delivery, and 6) diabetes or gestational diabetes with insulin control. We divided the eligible women into the IOL group or elective CD without labor group. The latter group underwent planned CD. Maternal and neonatal morbidities were evaluated and compared between the groups.

After admission to the delivery room for labor induction, IOL was attempted with oxytocin (intravenous injection of 10 IU/mL pitocin; Jeil Pharmaceutical Co., Ltd, Daegu, Korea) or prostaglandin E2 (intravaginal administration of 10 mg propess; Bukwang Pharm Co., Ltd, Seoul, Korea). Once the patients started experiencing spontaneous labor pain, augmentation with pitocin was attempted if labor was inadequate to progress further. Prostaglandin E2 was administered vaginally and removed 24 hours after insertion or earlier in case of onset of active labor, rupture of membranes, or abnormal cardiotocography findings (uterine tachysystole or other abnormalities in the fetal heart rate pattern).

To evaluate maternal morbidities, data regarding the method of delivery (vaginal or cesarean), maternal age, gestational age, hemoglobin levels, rate of CD, length of hospital stay, outpatient visits after discharge (>2), and readmission within <1 month after discharge were obtained from the institutional electronic medical records.

To evaluate neonatal morbidities, we investigated the 1-minute Apgar score, 5-minute Apgar score, neonatal intensive care unit admission rate, meconium-stained amniotic fluid status, and intubation status.

For statistical analyses, demographic and clinical character-

istics were compared between the groups using Student's *t*-test for continuous variables and chi-square test or Fisher's exact test for categorical varaibles. All *P*-values were two-tailed, with statistical significance set at $P<0.05$. All analyses were performed using IBM SPSS Statistics version 23.0 (IBM Corp., Armonk, NY, USA).

Results

Altogether, 716 nulliparous women with fetal gestational age ≥38 weeks were recruited. After excluding 274 women who were admitted with spontaneous labor, 11 with placenta previa, two with non-reassuring NST, one with twin pregnancy, one with SARS-CoV-2 infection, and 32 with neonatal weight <2,500 g; the remaining 395 women were included in the final analysis.

Among the 395 women included in the study, 69 were in the elective CD without labor group and 326 were in the IOL group. The flowchart of the study is depicted in Fig. 1.

The demographic data and clinical outcomes are summarized in Table 1. The elective CD without labor group exhibited higher maternal age (34.7±4.2 vs. 31.5±4.5 years, $P<0.001$) and lower gestational age at birth (38.2±0.5 vs. 39.2±0.8 weeks of gestation, $P<0.001$) than the IOL group. Fetal body weight did not differ between the groups (Table 1).

No significant differences were observed in pre-pregnancy maternal body mass index (BMI), BMI at term, and neonatal birth weight between the groups (Table 1).

The reasons for selecting IOL or CD are presented in Table 2. The most common reason for IOL was elective without medical indication (56.7%), and the most frequent indication for CD was maternal request before labor (47.8%). The IOL group included mild cases of oligohydramnios, intrauterine growth restriction, and pregnancy-related hypertension; but those who remained pregnant until 38 weeks. No significant difference was observed in terms of underlying medical conditions (hypertensive disorder and diabetes) between the

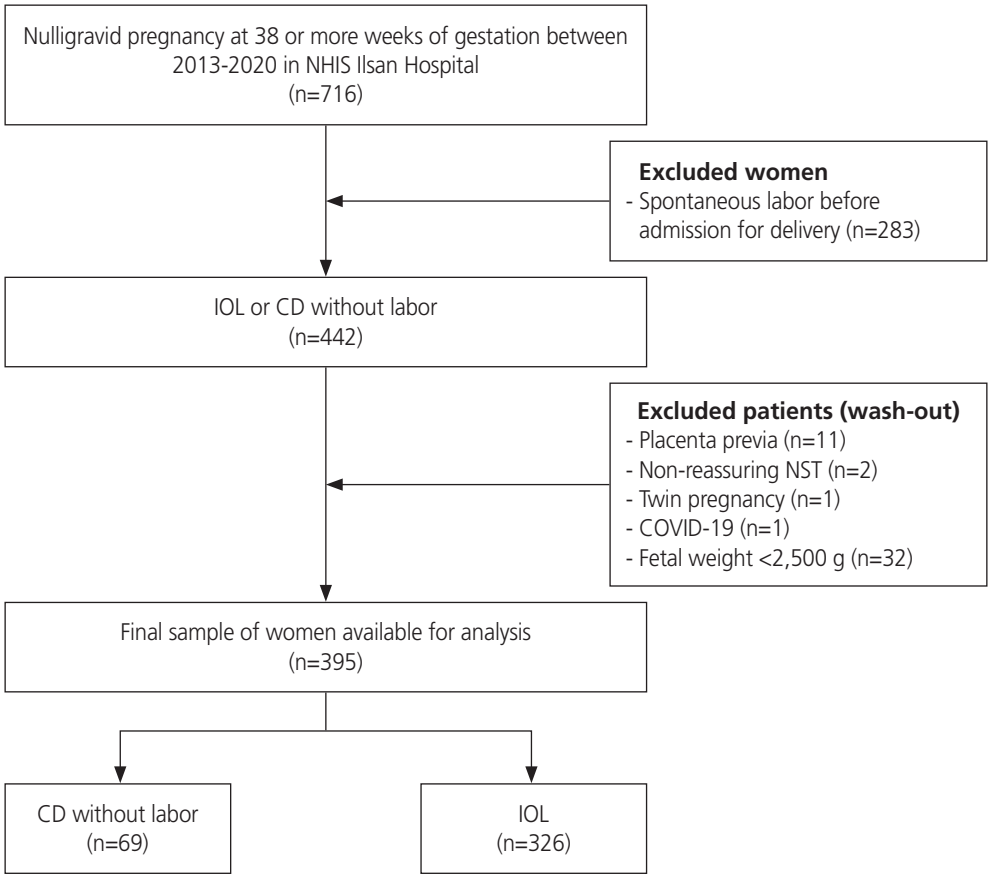

Fig. 1. Flowchart of study design. NHIS, National Health Insurance Service; IOL, induction of labor; CD, cesarean delivery; NST, nonstress test; COVID-19, coronavirus disease 2019.

Table 1. Characteristics of women by CD without labor and IOL

Characteristic	Planned CD (n=69)	IOL (n=326)	*P*-value
Age (yr)	34.7±4.2	31.5±4.5	<0.001[a]
Gestational age at birth (weeks)	38.3±0.5	39.2±0.8	<0.001[a]
Weight gain in pregnancy	13.3±5.3	13.4±5.1	0.950
BMI in pre-pregnancy (kg/m^2)	21.6±3.2	22.1±3.8	0.370
BMI at term (kg/m^2)	26.7±3.5	27.2±4.1	0.370
Birth weight (g)	3166±332	3262±368	0.48
Cesarean delivery rate	69 (100.0)	64 (19.6)	-
Hypertensive disorder	2 (2.9)	18 (5.5)	0.367
GDM[b]	5 (7.2)	16 (4.9)	0.432

Values are presented as mean±standard deviation or number (%).
CD, cesarean delivery; IOL, induction of labor; BMI, body mass index; GDM, gestational diabetes mellitus.
[a]Statistical significance; [b]Women without insulin control.

groups (Table 1).

Maternal hospital stay was longer in the elective CD without labor group (6.6±0.8 vs. 4.3±1.5 days, *P*<0.001). The rate of antibiotic usage after discharge was higher in the IOL group (14.5% vs. 39.5%, *P*<0.001). In contrast, the rate of uterotonic agent usage after discharge was higher in the elective CD without labor group (27.5% vs. 17.2%, *P*=0.046). Despite these differences in the usage of pharmaceutical agents, there were no differences in postpartum bleeding, transfusion rate, number of outpatient visits, and readmission rates after discharge between the groups (Table 3). Moreover, there was no statistically significant difference in the rate of postpartum uterine artery embolization due to massive hemorrhage.

In terms of neonatal morbidities, the rate of meconium-stained amniotic fluid was higher in the IOL group (14.3% vs. 4.3%, *P*=0.025), while gestational age at birth was lower in the elective CD group (38.2±0.5 vs. 39.2±0.8, *P*<0.001). However, there were no differences between the groups in terms of Apgar score <7 at 5 minutes, rate of neonatal intensive care unit admission, intubation, brain damage, and respiratory distress syndrome (Table 4).

The results of logistic regression analysis of maternal and neonatal outcomes are presented in Table 5. The rate of antibiotic usage after discharge was higher in women who underwent elective CD without labor. However, the incidence of meconium-stained amniotic fluid was similar between the groups.

Multivariate logistic regression after adjusting for maternal age, gestational age, pre-pregnancy BMI, gestational diabetes, and hypertension revealed that pregnant women in both the groups had similar complication rates related to composite maternal morbidity including transfusion, embolization, uterotonic agent usage, and antibiotic usage (relative risk [RR], 0.68; 95% confidence interval [CI], 0.37-1.23; *P*=0.201). The elective CD group had a lower risk of complications related to composite neonatal morbidities including admission to intensive care unit, meconium-stained amniotic fluid, transient tachypnea of the newborn, brain damage, intubation, and Apgar score <7 in 5 minutes (RR, 0.45; 95% CI, 0.24-0.86; *P*=0.014).

Table 2. Reason for IOL or CD (n=395)

	Value
Reason for IOL (n=326)	
Elective	224 (68.7)
Oligohydramnios	30 (9.2)
IUGR	24 (7.4)
High blood pressure	22 (6.7)
GDM[a]	13 (4.0)
Premature rupture of membranes	13 (4.0)
Reason for CD in elective CD (n=69)	
Maternal request (before labor)	38 (55.1)
Breech presentation	23 (33.3)
Previous myomectomy status	8 (11.6)

Value are presented as number (%).
IOL, induction of labor; CD, cesarean delivery; IUGR, intrauterine growth restriction; GDM, gestational diabetes mellitus.
[a]Diabetic woman without insulin control.

Table 3. Comparisons of maternal morbidities rates

	Planned CD	Induction	*P*-value
Length of stay (days)	6.6±0.8	4.3±1.5	<0.001[a]
OPD visits[b] >3	12	49	0.62
Readmission[c]	7	9	0.61
Hgb decreased after delivery (g/dL)	1.65±1.1	1.71±1.2	0.65
Transfusion	4	15	0.67
Postpartum embolization	0	2	0.51
Uterotonic agent after discharge	19	56	0.046[a]
Antibiotics use after discharge	10	139	<0.001[a]

Values are presented as mean±standard deviation or number.
CD, cesarean delivery; OPD, outpatient department; Hgb, hemoglobin.
[a]Statistical significance; [b]Within 50 days of discharge; [c]Within 30 days of discharge.

Table 4. Comparisons of neonatal morbidities rates

	Planned CD	Induction	*P*-value
Fetal body weight (g)	3,167±333	3,262±368	0.480
Gestational weeks at birth	38.2±0.5	39.2±0.8	<0.001[a]
5 minutes Apgar <7	3 (4.3)	23 (7.1)	0.410
NICU hospital days	1.2±2.1	1.8±2.6	0.730
NICU hospital days ≥7	1 (1.4)	15 (4.6)	0.230
Intubation rate	1 (1.4)	17 (5.2)	0.170
Meconium stained AF	3 (4.3)	46 (14.1)	0.025[a]
TTN, RDS	2 (2.9)	6 (1.8)	0.570
Brain damage	0 (0.0)	5 (1.5)	0.300
Clavicle fracture	0 (0.0)	3 (0.9)	0.420

Values are presented as mean±standard deviation or number (%).
CD, cesarean delivery; NICU, neonatal intensive care unit; AF, amniotic fluid; TTN, transient tachypnea of newborn; RDS, respiratory distress syndrome.
[a]Statistical significance.

Table 5. Logistic regression of maternal and neonatal complications of planned CD compared to IOL

	Induction	Planned CD	OR (95% CI)		*P*-value
			Unadjusted	Adjusted[a]	
Maternal complication					
Postpartum uterotonic agent	57 (17.3)	19 (27.5)	0.50 (1.01-3.34)	1.64 (0.81-3.34)	0.172
Antibiotics after discharge[b]	130 (39.5)	10 (14.5)	0.26 (0.13-0.52)	0.32 (0.15-0.69)	0.003[e]
Neonatal complication					
Meconium stained AF	47 (14.3)	3 (4.3)	0.28 (0.08-0.92)	0.48 (0.13-1.73)	0.260
Maternal and neonatal composite complication					
Composite maternal morbidity[c]	171 (52.0)	28 (40.6)	0.63 (0.37-1.08)	0.68 (0.37-1.23)	0.201
Composite neonatal morbidity[d]	160 (48.6)	20 (29.0)	0.43 (0.25-0.76)	0.45 (0.24-0.85)	0.014

Values are presented as number (%) unless otherwise indicated.
CD, cesarean delivery; IOL, induction of labor; OR, odds ratio; CI, confidence interval; AF, amniotic fluid.
[a]Adjusted for maternal age, gestational age, pre-pregnancy body mass index, diabetes mellitus, and hypertension; [b]Within 30 days; [c]Transfusion, embolization, uterotonic agents, antibiotics; [d]Neonatal intensive care unit, meconium/transient tachypnea of newborn/respiratory distress syndrome, brain damage, intubation, 5-minute Apgar <7; [e]Statistical significance.

Discussion

The present study revealed that both elective CD and IOL groups were associated with similar rates of postpartum bleeding episodes, number of outpatient visits, and readmission rates after discharge. However, the elective CD group had a lower rate of obstetric wound infection. In terms of neonatal outcomes, elective CD was associated with a decreased risk of composite neonatal morbidity despite lower gestational age at birth and higher neonatal weight.

CD has become a safer and more common procedure, and women are playing a more active role in their obstetric care. Hence, many women request planned CD without labor (CD upon maternal request). Prevalence of cesarean births on maternal request without medical or obstetrical indications varies widely across countries, ranging from 0.2% to 42% of all deliveries [20]. For example, in China, maternal request has become the most common reason for non-indicated CD without labor in developed areas [21].

Our study showed similar rates of postpartum hemorrhage between elective CD and IOL despite reports indicating that the rate of postpartum hemorrhage is usually higher in CD than in vaginal deliveries. In contrast, some studies have shown that the risk of early postpartum hemorrhage and composite maternal morbidity was lower in elective CD when compared with planned vaginal delivery [22,23], but with similar rates of postpartum hemorrhage and transfusion. In our IOL group, women with failed vaginal deliveries who switched to intrapartum cesarean section during labor exhibited higher transfusion rates.

According to the results of the present study, usage of uterotonic agents was higher in the elective CD group. Uterotonic agents were administered to these patients to treat postpartum hematomas during outpatient follow-up. In the elective CD group, intrauterine hematoma or hematometra may have occurred from an incompletely effaced cervix due to the absence of labor.

Use of antibiotics was higher in the IOL group. At 1 week after discharge, wound examination showed that the perineum bore down in a sitting position compared to the abdomen with a cesarean incision, which may have delayed wound healing, although the wound size was larger in the elective CD group.

Since cesarean birth before the onset of labor reduces or eliminates fetal/neonatal morbidity and mortality associated with the process of labor and vaginal birth [24,25], many pregnant women choose CD. According to Zanardo et al. [26] and Hansen et al. [27] neonatal respiratory problems including respiratory distress syndrome and transient tachypnea of the newborn are more common after planned cesarean section than after vaginal delivery, which may lengthen the neonatal hospital stay. In the present study, most of the neonatal morbidities exhibited similar incidence rates between the groups, although the incidence of meconium-stained amniotic fluid was higher in the elective CD group. In a long-term follow-up of children delivered by cesarean section, Keag et al. [28] reported that these children were at an increased risk of asthma up to the age of 12 years.

Though it was reported that maternal and neonatal adverse outcomes of IOL were similar to those in a spontaneous labor group in uncomplicated nulliparous women [29], IOL may also be associated with increased length of labor, increased length of hospital stay, potential patient/provider impatience, neonatal morbidity including poor fetal lung maturation (if IOL is performed before 38 gestational weeks), and need for CD if IOL fails [7,8]. Particularly, delivery by intrapartum CD during IOL may carry a higher risk of maternal morbidity than elective CD without labor [30].

Some authors have interpreted the available data to conclude that elective CD is safer than planned vaginal delivery [31], which is consistent with the findings of our study.

The present study has several strengths. We collected data from the electronic medical records of a single institution using a uniform, standard protocol. Therefore, we were able to obtain complete patient records and thoroughly analyze patient information. Moreover, to minimize the effect of parity, we enrolled only the women who delivered their first child and excluded those with prior CD. Maternal and neonatal risks associated with first cesarean birth in nulliparous women could be different from those associated with second or subsequent cesarean births. Additionally, risks associated with IOL in nulliparous women could also be different from those in multiparous women.

Despite its strengths, this study has several limitations. It included a small number of women, which may not be sufficient to generalize the data. Since this was a retrospective observational study, it was impossible to eliminate the possibility of confounding bias. The indications for IOL were heterogeneous and looked like a poor fetal condition before delivery in the IOL group when compared with the elective

CD group. However, there was no difference in the incidence of hypertensive disorder and gestational diabetes between the groups, and maternal age and lower gestational age at birth in the elective CD group could be risk factors for poor maternal and neonatal outcomes. Most of the patients with uncontrolled blood pressure and those on insulin therapy for diabetes had labor pain before 38 gestational weeks. Therefore, most of the women included in this study were low-risk pregnant women. We did not consider subsequent pregnancy-related complications including uterine rupture, placenta previa, or long-term neonatal complications.

In conclusion, IOL and elective CD without labor were associated with similar rates of composite maternal morbidity. Elective CD had the advantage of a lower rate of obstetric wound infection, but was also associated with longer hospital stay and greater usage of uterotonic agents. Regarding neonatal outcomes, elective CD had a decreased risk of composite neonatal morbidity despite lower gestational age and lower neonatal body weight. To optimize pregnancy outcomes, this information should be considered by women contemplating the preferred mode of delivery and also by the obstetricians counseling them. Furthermore, we should consider patient-specific issues that can affect the choice of delivery route. These include comorbidities, BMI, future reproductive plans, and an individual's personal philosophy about childbirth.

In the future, properly designed long-term and large-scale studies are needed to further evaluate the effects of CD without labor on the long-term outcomes of mothers and neonates.

Conflicts of interest

No potential conflict of interest relevant to this article was reported.

Ethical approval

The study was approved by the National Health Insurance Service Ilsan Hospital Institutional Review Board (#NHIMC 2021-02-027) and performed in accordance with the principles of the Declaration of Helsinki.

Patient consent

Informed consent was waived due to the retrospective design of the study.

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All the authors who contributed to this study are included in the author's list.

Data availability statement

The datasets generated and/or analyzed in the present study are available from the corresponding author upon reasonable request.

References

1. O'Donovan C, O'Donovan J. Why do women request an elective cesarean delivery for non-medical reasons? A systematic review of the qualitative literature. Birth 2018;45:109-19.
2. Jenabi E, Khazaei S, Bashirian S, Aghababaei S, Matinnia N. Reasons for elective cesarean section on maternal request: a systematic review. J Matern Fetal Neonatal Med 2020;33:3867-72.
3. De Los Santos-Garate AM, Villa-Guillen M, Villanueva-García D, Vallejos-Ruíz ML, Murguía-Peniche MT. Perinatal morbidity and mortality in late-term and post-term pregnancy. NEOSANO perinatal network's experience in mexico. J Perinatol 2011;31:789-93.
4. Paterson-Brown S. Should doctors perform an elective caesarean section on request? Yes, as long as the woman is fully informed. BMJ 1998;317:462-3.
5. Martin JA, Hamilton BE, Ventura SJ, Osterman MJ, Kirmeyer S, Mathews TJ, et al. Births: final data for 2009.

Natl Vital Stat Rep 2011;60:1-70.
6. Calder AA, Loughney AD, Weir CJ, Barber JW. Induction of labour in nulliparous and multiparous women: a UK, multicentre, open-label study of intravaginal misoprostol in comparison with dinoprostone. BJOG 2008;115:1279-88.
7. Clark SL, Miller DD, Belfort MA, Dildy GA, Frye DK, Meyers JA. Neonatal and maternal outcomes associated with elective term delivery. Am J Obstet Gynecol 2009;200:156.e1-4.
8. Luthy DA, Malmgren JA, Zingheim RW. Cesarean delivery after elective induction in nulliparous women: the physician effect. Am J Obstet Gynecol 2004;191:1511-5.
9. Silver RM, Landon MB, Rouse DJ, Leveno KJ, Spong CY, Thom EA, et al. Maternal morbidity associated with multiple repeat cesarean deliveries. Obstet Gynecol 2006;107:1226-32.
10. Lydon-Rochelle M, Holt VL, Easterling TR, Martin DP. First-birth cesarean and placental abruption or previa at second birth. Obstet Gynecol 2001;97(5 Pt 1):765-9.
11. Jackson S, Fleege L, Fridman M, Gregory K, Zelop C, Olsen J. Morbidity following primary cesarean delivery in the danish national birth cohort. Am J Obstet Gynecol 2012;206:139.e1-5.
12. Declercq E, Barger M, Cabral HJ, Evans SR, Kotelchuck M, Simon C, et al. Maternal outcomes associated with planned primary cesarean births compared with planned vaginal births. Obstet Gynecol 2007;109:669-77.
13. Liu X, Landon MB, Cheng W, Chen Y. Cesarean delivery on maternal request in China: what are the risks and benefits? Am J Obstet Gynecol 2015;212:817.e1-9.
14. Hannah ME, Hannah WJ, Hodnett ED, Chalmers B, Kung R, Willan A, et al. Outcomes at 3 months after planned cesarean vs planned vaginal delivery for breech presentation at term: the international randomized term breech trial. JAMA 2002;287:1822-31.
15. Allen VM, O'Connell CM, Baskett TF. Maternal morbidity associated with cesarean delivery without labor compared with induction of labor at term. Obstet Gynecol 2006;108:286-94.
16. Allen VM, O'Connell CM, Baskett TF. Maternal and perinatal morbidity of caesarean delivery at full cervical dilatation compared with caesarean delivery in the first stage of labour. BJOG 2005;112:986-90.
17. Hannah ME, Hannah WJ, Hewson SA, Hodnett ED, Saigal S, Willan AR. Planned caesarean section versus planned vaginal birth for breech presentation at term: a randomised multicentre trial. term breech trial collaborative group. Lancet 2000;356:1375-83.
18. Sanchez-Ramos L, Bernstein S, Kaunitz AM. Expectant management versus labor induction for suspected fetal macrosomia: a systematic review. Obstet Gynecol 2002;100:997-1002.
19. Obed J, Bako B, Agida T, Nwobodo E. Caesarean delivery on maternal request: consultants' view and practice in the West African sub region. J West Afr Coll Surg 2013;3:72-83.
20. Begum T, Saif-Ur-Rahman KM, Yaqoot F, Stekelenburg J, Anuradha S, Biswas T, et al. Global incidence of caesarean deliveries on maternal request: a systematic review and meta-regression. BJOG 2021;128:798-806.
21. Zhang J, Liu Y, Meikle S, Zheng J, Sun W, Li Z. Cesarean delivery on maternal request in southeast china. Obstet Gynecol 2008;111:1077-82.
22. National Institute for Health and Care Excellence (NICE). Caesarean section [Internet]. London: NICE; c2021 [cited 2020 Oct 20]. Available from: https://www.nice.org.uk/guidance/ng192.
23. Ecker J. Elective cesarean delivery on maternal request. JAMA 2013;309:1930-6.
24. Towner D, Castro MA, Eby-Wilkens E, Gilbert WM. Effect of mode of delivery in nulliparous women on neonatal intracranial injury. N Engl J Med 1999;341:1709-14.
25. Martinez-Biarge M, Madero R, González A, Quero J, García-Alix A. Perinatal morbidity and risk of hypoxic-ischemic encephalopathy associated with intrapartum sentinel events. Am J Obstet Gynecol 2012;206:148.e1-7.
26. Zanardo V, Simbi AK, Franzoi M, Soldà G, Salvadori A, Trevisanuto D. Neonatal respiratory morbidity risk and mode of delivery at term: influence of timing of elective caesarean delivery. Acta Paediatr 2004;93:643-7.
27. Hansen AK, Wisborg K, Uldbjerg N, Henriksen TB. Risk of respiratory morbidity in term infants delivered by elective caesarean section: cohort study. BMJ 2008;336:85-7.
28. Keag OE, Norman JE, Stock SJ. Long-term risks and benefits associated with cesarean delivery for mother, baby, and subsequent pregnancies: systematic review and meta-analysis. PLoS Med 2018;15:e1002494.
29. Kim HI, Choo SP, Han SW, Kim EH. Benefits and risks of induction of labor at 39 or more weeks in uncompli-

cated nulliparous women: a retrospective, observational study. Obstet Gynecol Sci 2019;62:19-26.
30. Villar J, Carroli G, Zavaleta N, Donner A, Wojdyla D, Faundes A, et al. Maternal and neonatal individual risks and benefits associated with caesarean delivery: multicentre prospective study. BMJ 2007;335:1025.
31. D'Souza R. Caesarean section on maternal request for non-medical reasons: putting the UK national institute of health and clinical excellence guidelines in perspective. Best Pract Res Clin Obstet Gynaecol 2013;27:165-77.