

Influence on operative time of immediate skin-to-skin care in low-risk primary cesarean births for breech presentation: Retrospective cohort study

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Abstract

Background: Multiple benefits for both, mother and baby have been reported from immediate skin-to-skin care (SSC). The aim of this study was to analyze the influence of SSC on operative time and blood loss in primary cesarean births for breech presentation.

Methods: A SSC protocol for cesarean birth was implemented in our institution on February 25, 2019. In this single-center retrospective cohort study, we compared the outcomes of planned primary cesarean births for breech presentation at term before and after its implementation.

Results: Data from 110 women who had a cesarean birth for breech presentation at term were analyzed, 55 in each group. Group 1 were women who had immediate SSC and Group 2 were women without immediate SSC. Maternal and surgical characteristics, and neonatal outcomes were similar in both groups. The mean operative time was 3.22 minutes shorter in the immediate SSC group compared with the not immediate SSC group (37.13 ± 12.27 vs 40.35 ± 12.23 minutes; $P = 0.171$).

Conclusions: In conclusion, immediate SSC following a low-risk cesarean birth for breech presentation neither prolongs the operative time nor increases blood loss during the procedure. Although we were unable to demonstrate a significant reduction in the operative time with the immediate SSC protocol, a decrease of 3 minutes was noted.

KEYWORDS

breech presentation, cesarean birth, cesarean section, operative time, skin-to-skin care, skin-to-skin contact, surgical blood loss

1 | INTRODUCTION

According to the United Nations International Children's Emergency Fund (UNICEF) and the World Health Organization (WHO), skin-to-skin care (SSC) is defined as the practice where a baby is placed directly on their mother's bare chest after birth. Essentially, the baby is dried on the mother, wet blankets are removed and both, mother and baby, are covered in a warm blanket and left for at least an hour or until after the first breastfeed.^{1,2}

There is abundant scientific evidence that highlights the benefits of immediate SSC for the baby in cesarean births, such as better thermoregulation,^{3,4} fewer NICU admissions,⁵ promotion of vocal interaction,⁶ higher lactation rate,^{7,8} and less crying.⁹ In addition, multiple benefits have also been reported for the mother, such as less maternal pain perception and anxiety,^{10,11} less oxidative stress,¹¹ less use of medication for pain relief,¹⁰ and greater maternal satisfaction.¹²⁻¹⁴

Immediate SSC is associated with improvement in mother-infant bonding, probably because of the rise in the mother's oxytocin levels during the first hour after birth.^{15,16} This increase in maternal oxytocin levels provides multiple benefits such as antagonizing the fight/flight effect and consequently reducing maternal anxiety, and increasing tranquility, and social receptivity.^{9,17} Moreover, oxytocin favors the uterine involution and controls postpartum bleeding.¹⁸

Immediate SSC after vaginal birth is a common practice; however, immediate SSC in the operating room (OR) during cesarean birth is not widespread, despite evidence supporting this practice.

Immediate SSC in the OR has both defenders and detractors. Detractors of immediate SSC during cesarean birth argue that this practice may increase the operative time and may involve more noise during surgery, which could be a distraction for anesthetists and surgeons at critical moments.^{19,20} As for the baby, it is argued that this practice may prolong both the time needed to prepare the OR and the time from the spinal anesthesia to the baby's birth with the possible consequence of deterioration in parameters such as the pH of the umbilical artery at birth.²¹

Defenders of immediate SSC during cesarean birth argue that in addition to the known benefits for the baby and for the mother, the work environment in the OR improves thanks to the greater satisfaction experienced by the family.¹²⁻¹⁴

Considering the multiple benefits that immediate SSC has for both, the mother and the baby²² the aim of the present study was to investigate whether immediate SSC has an influence on operative time or blood loss in primary cesarean births for breech presentation.

2 | METHODS

2.1 | Study design and population

This is a single-center retrospective cohort study.

The immediate SSC protocol in cesarean births was first implemented in our institution on February 25, 2019. Before its implementation, father-newborn SSC was the standard practice.

To avoid the influence of other cofounders, we decided to include only women having a planned cesarean birth for breech presentation at term. Operative time was defined as the time from incision to last suture. Inclusion criteria were women between 18 and 45 years old, with a body mass index less than 35 kg/m², gestational age >37 weeks without diagnoses of placental malformations or medical/pregnancy complications, and without any previous abdominal surgery, having a planned cesarean birth for breech presentation at term. We excluded those cases with incomplete data in relation to demographic and medical characteristics, and procedures which included tubal ligation as per maternal request.

Maternal and pregnancy characteristics were recorded. We also reviewed surgical protocols, medical records, and nursing documents to record operative time of the cesarean birth, estimated blood loss during surgery, need for additional stitches to achieve hemostasis, changes in hemoglobin levels after the cesarean birth, neonatal umbilical artery pH values, length of stay, lactation at discharge, and the demographic data of the mother and baby. Finally, we recorded whether the surgical procedure had been performed by a resident or a consultant.

There were two study groups:

- Group 1: included all eligible women undergoing immediate SSC following birth by cesarean birth according to our protocol from February 25, 2019 to November 5, 2019. There were 55 women in this group.
- Group 2: included the last 55 eligible women before the implementation of the SSC protocol in cesarean births. These cases were retrieved from July 4, 2018 to February 25, 2019.

2.2 | Immediate SSC protocol

According to our SSC protocol, the baby is laid directly on their mother's bare chest after birth, where the normal adaptations of the baby are assessed by a neonatal nurse and a neonatologist. The baby is dried on the mother's chest and covered in a warm towel during the surgical procedure. The temperature in the OR is maintained between 23 and 24°C. Once the surgical procedure is completed,

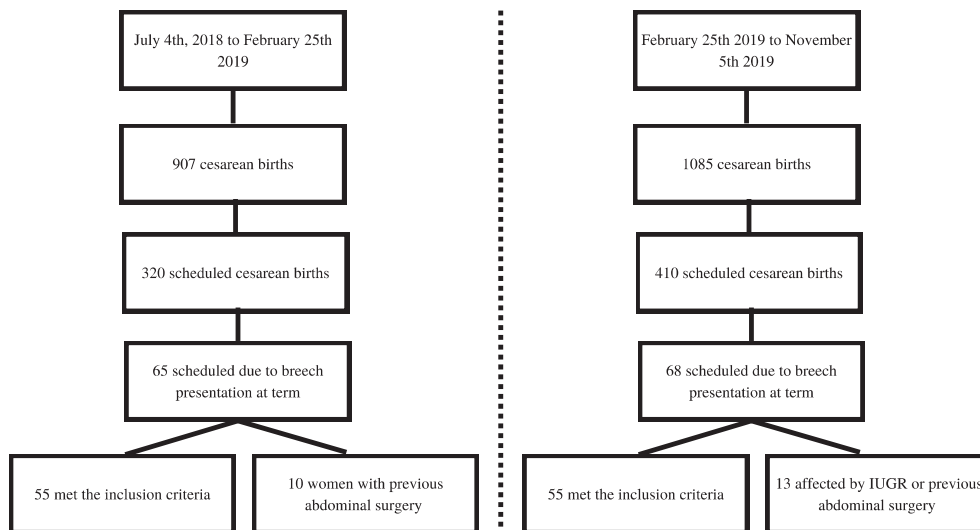


FIGURE 1 Flowchart of the inclusion process. The dotted line represents the implementation of the immediate SSC protocol. IUGR (Intrauterine Growth Restriction).

baby, mother, and their companion leave the OR together and SSC continues during the transfer and for at least 1 hour.

2.3 | Cesarean birth protocol

The cesarean birth protocol has not changed since 2014. The cesarean birth technique according to our protocol is performed as follows: after Pfannenstiel skin incision, first the subcutaneous tissue and then the fascia are incised and bluntly divided, the parietal and visceral peritoneum are opened bluntly, and the uterus is sharply opened through Kerr incision. In cesarean births for breech presentation, the cord is clamped 60 seconds after the birth of the head. The placenta is left in situ whereas the uterus is massaged awaiting spontaneous placental separation. The uterus is closed with a single-layer polyglactin 910 number 1 suture using additional hemostatic stitches if required. Fascial closure is performed by single polyglactin 910 number 1 suture. Subcutaneous fat is approximated by single polyglactin 910 2-0 stitches. The skin is closed either with an intracutaneous suture or transcutaneous skin stapling depending on the consultant obstetrician and woman's preferences.

2.4 | Statistical analyses

Sample size was calculated after analyzing the average time of uncomplicated scheduled cesarean births as a result of breech presentation in our center ($37.2 (\pm 9.17)$ minutes). We estimated that 53 women in each group would be needed to demonstrate a difference of 5 minutes in the operative time

with a confidence level of 0.95 ($1 - \alpha$) and a statistical power of 0.80. A 5-minute difference was chosen because our ORs are scheduled in 5-minute intervals. For practical reasons, we decided to include 55 women in each group.

The distribution of the variables was verified by the Kolmogorov–Smirnov test and by visual assessment of histograms. Numerical variables were expressed as mean (standard deviation) or median (interquartile range, IQR) as appropriate and qualitative variables were expressed as proportions (absolute and relative frequencies). Comparisons between groups were performed by the Student *t*-test, Mann–Whitney *U*-test, two-tailed χ^2 -test, or two-tailed Fisher exact test as appropriate. The level of significance was set at 0.05. All analyses were performed using SPSS version 22.0 (SPSS Inc.).

3 | RESULTS

The flowchart of the inclusion process is presented in [Figure 1](#). Maternal characteristics, surgical data, and neonatal outcomes are reported in [table 1](#). Mean maternal age was $33.48 (\pm 5.11)$ years, and mean Body Mass Index (BMI) was $24.28 (\pm 5.01)$ kg/m². There were 87 nulliparous and 23 parous women. The mean operative time was $38.74 (\pm 12.30)$ minutes.

Data on estimated blood loss were available in 98 (89.1%) out of the 110 participants (50 in the immediate SSC protocol group and for 48 in the no immediate SSC protocol group). Hemoglobin levels after the cesarean birth were available in 98 (89.1%) out of the 110 women (for 46 in the immediate SSC protocol group and for 52 in the not immediate SSC protocol group). The estimated blood loss was 400 (300–500) mL and the difference between the

TABLE 1 Maternal characteristics, surgical data, and neonatal outcomes

	Immediate SSC protocol n = 55	No immediate SSC protocol n = 55	P
Age (y)	32.55 ± (4.51)	34.42 ± (5.52)	0.054
GA (wk)	39.43 (38.29-40.00)	39.00 (38.00-39.57)	0.065
BMI (kg/m ²)	24.83 ± (4.73)	23.85 ± (5.24)	0.361
Nulliparous	44 (80.0%)	43 (78.2%)	0.815
Previous vaginal births	0 (0-0)	0 (0-0)	0.971
Operative time (min)	37.13 ± (12.27)	40.35 ± (12.23)	0.171
Estimated blood loss (mL) ^a	400 (300-480)	400 (302-555)	0.268
Need for additional stitches	8/55 (14.5%)	6/55 (10.9%)	0.567
Hb before CS (g/dL)	12.64 ± (0.96)	12.20 ± (0.94)	0.018
Hb after CS (g/dL) ^b	12.01 ± (1.01)	11.60 ± (1.24)	0.082
Hb difference (g/dL) ^b	0.58 ± (0.97)	0.59 ± (0.78)	0.956
Cesarean birth performed by resident assisted by consultant	24/55 (43.6%)	29/55 (52.7%)	0.340
Intradermal suture	10/55 (18.2%)	8/55 (14.5%)	0.606
Umbilical Artery pH	7.25 ± (0.08)	7.25 ± (0.08)	0.649
Apgar 1	9 (8-9)	9 (8-9)	0.842
Apgar 5	10 (9-10)	9 (9-10)	0.103
Neonatal weight (g)	3147 ± 270	3249 ± 422	0.141
Length of stay (d)	3 (3-3)	3 (3-3)	0.176
Exclusive breastfeeding/ mixed feeding at discharge	37/13 (74.0%)	31/23 (57.4%)	0.076
Mother refuse to initiate breastfeeding	5/55 (9.1%)	1/55 (1.8%)	0.206

Note: Data are presented as means ± (standard deviations) for normally distributed continuous variables, medians (interquartile range) for not normally distributed continuous variables, and absolute and relative frequencies for qualitative variables.

Abbreviations: BMI, Body Mass Index; GA, gestational age.

an = 50 for the immediate SSC protocol group and n = 48 for the no immediate SSC protocol group.

bn = 46 for the immediate SSC protocol group and n = 52 for the no immediate SSC protocol group.

hemoglobin before and after the cesarean birth was 0.59 (±0.87) g/dL. Blood loss in excess of 1000 mL was estimated in no woman.

There were intraoperative surgical complications in six (5.5%) cesarean births. In the immediate SSC protocol group, one hysterotomy extension and one uterine varicose vein injury were diagnosed and one manual removal of the placenta was performed. In the no immediate SSC protocol group one hysterotomy extension was diagnosed and two placentas had to be removed manually. Additional stitches were needed for eight (14.5%) women in the immediate SSC protocol group and for six (10.9%) women in the not immediate SSC protocol group. No woman was suffered with fever, second surgery, or pulmonary embolism during the hospital stay. There was a diagnosis of secondary postpartum hemorrhage for a woman in the no immediate SSC protocol group that was resolved with the administration of oxytocin.

Fifty-three cesarean births were performed by second-year residents assisted by the consultant obstetrician, and 57 by the consultant obstetrician assisted by second-year residents.

There were no significant differences in maternal age, gestational age, body mass index, fetal weight, operative time, estimated blood loss, hemoglobin difference before and after the cesarean birth, umbilical artery pH, Apgar score, proportion of procedures performed by a resident, proportion of intradermic sutures vs staples, length of stay, or lactation rate at discharge between the study groups (Table 1). No baby had an Apgar score less than 7 at 5 minutes. Umbilical artery pH was less than 7.15 in 5 babies in the immediate SSC protocol group and in 8 in the no immediate SSC protocol group. The two worst umbilical artery pH values were 7.08 and both occurred in babies in the immediate SSC protocol group. There were no admissions to the neonatal intensive care unit.

The immediate SSC protocol was temporarily discontinued in six (10.9%) cesarean births in the immediate SSC protocol group. It was discontinued in two cesarean births with umbilical artery pH of 7.08 and in four women the cause was not recorded (probably because of vomiting or maternal discomfort).

Although it did not reach significance, the operative time was 3.22 minutes shorter in the immediate SSC protocol group (37.13 ± 12.27 vs 40.35 ± 12.23 minutes; $P = 0.171$). There was no difference in operative time when the cesarean birth was performed by a second-year resident assisted by the consultant obstetrician as compared with operative time when the cesarean birth was performed by the consultant obstetrician assisted by a second-year resident (38.57 ± 11.53 vs 38.89 ± 13.08 minutes; $P = 0.886$). Operative time was longer in the women that needed additional sutures to achieve hemostasis (48.50 ± 17.24 vs 37.31 ± 10.81 minutes; $P = 0.033$).

4 | DISCUSSION

4.1 | Principal findings

Our results demonstrate that performing an immediate SSC following a low-risk cesarean birth for breech presentation neither prolongs the operative time nor increases blood loss during the procedure. We also showed a decrease of 3 minutes in the operative time when immediate SSC was carried out. Unfortunately, as our study was only powered to detect at least a 5-minute difference, we were unable to show the significance of this finding.

4.2 | Results in the context of what is known

The operative time using immediate SSC protocols has been evaluated in different publications. On the one hand, a retrospective cohort study that analyzed 650 cesarean births between 2011 and 2013 reported an average of 3 minutes and 2 seconds increase in operative time in the SSC group.¹⁹ On the other hand, a randomized controlled trial was carried out in Berlin in which 185 cases were randomized into classical cesarean birth or modified cesarean birth that included immediate SSC, found no differences in the operative time, although this study has been questioned as a result of possible flaws in the design.^{23,24}

The reduction in operative time observed in our study in the immediate SSC protocol group may be because of the better work environment created by the greater satisfaction of the family and the increase in maternal oxytocin

levels.^{12–16} However, reductions in operative time have also been linked to greater haste on the part of obstetricians in uncomfortable environments.²⁵ We do not believe that the reduction in time was because of the discomfort of working with a baby on the mother's chest during the cesarean birth. It would have been interesting to distribute satisfaction questionnaires to the obstetricians to determine if, in general, they preferred the work environment with the immediate SSC protocol.

The operative time in our study was longer than the operative time previously reported by other centers using similar protocols.^{19,23} We believe this difference can be explained because all our planned low-risk cesarean births for breech presentation are performed by second-year residents either as first assistant or as main surgeon.^{26,27} In our institution, the residents perform their first cesarean births during their second-year of training when they learn both how to perform and how to assist the procedure. Conversely, in our study, cesarean births that were performed by residents as main surgeons were performed at almost the same time and even slightly less than those in which the main surgeon was the consultant obstetrician.

Previous studies included different indications for scheduled cesarean births.¹⁹ In contrast, our study was designed to evaluate one single indication: breech cesarean births in women without previous abdominal surgeries and without any diagnosed pregnancy complications. Thus, despite being a retrospective study, we consider that the results of both groups (immediate SSC protocol and no immediate SSC protocol) are comparable.

With respect to the cases in which hemoglobin levels were not obtained after cesarean birth, it is important to note that blood loss was estimated in all these cases, the worst case being 600 ml. Neither of these women presented instability at any time, nor did they require a prolonged hospital stay or transfusions of red blood cell concentrates. We believe that no samples were obtained to determine hemoglobin levels after cesarean birth in these women, despite the fact that our protocol indicates this, because of the small amount of bleeding that occurred during the cesarean birth and the good postpartum evolution. With respect to the cases in which we could not obtain blood loss estimate, we understood from the nurse's clinical notes that it was calculated, although not recorded. None of these cases had complications during or after the intervention. The case without blood loss estimate that had the greatest drop in hemoglobin after cesarean birth went from 12.3 to 10.1 g/dL. To note, no protocolized technique for estimating blood loss has been proven to be perfect, even hemoglobin measurements change over time depending on the physiological equilibration. Furthermore, it seems that in women who have an uncomplicated cesarean birth, these estimates

are of little use,²⁸ especially in our study where none of the women incurred major postpartum bleeding.

Although the hemoglobin level before cesarean birth was significantly lower in the no SSC group, we do not believe this is of clinical relevance and it can be explained because in November 2018, the Spanish Society of Gynecology and Obstetrics published the “Prenatal control of normal pregnancy” guideline.²⁹ In this guideline, special emphasis was placed on the need to perform iron deficiency prophylaxis during pregnancy.

The fact that there were few parous women in our study, 23 out of 110 women, can be explained by the greater success of the external cephalic version in parous women, which reduces cesarean births because of breech presentation.^{30,31}

4.3 | Strengths and limitations

The main weakness of our study is the lack of randomization. Although at first we proposed a randomized controlled trial, this could not be approved by the ethical committee because of the clear advantages provided by the immediate SSC for the baby and for the mother.^{3,7,9–11,16–18,22,23} However, having collected all consecutive women in time order from the introduction of the immediate SSC protocol, both backward and forward and having verified the homogeneity of both groups we believe that the two groups are fairly comparable.

Another limitation is that we have only studied low-risk women with very specific characteristics to avoid bias that could influence operative time and blood loss. Therefore, our results may not be applicable to other types of planned cesarean births. Of note, operative time ranges were wide, even in these ideal conditions.

We did not record the time of the first suckling, which may be influenced by the medication used during a cesarean birth.³²

4.4 | Conclusions

In conclusion, immediate SSC following a low-risk cesarean birth for breech presentation neither prolongs the operative time nor increases blood loss during the procedure. Although we were unable to demonstrate a significant reduction in the operative time with the immediate SSC protocol, a decrease of 3 minutes was noted.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICAL APPROVAL

Ethical clearance was obtained from the institutional ethics committee (PI-3843).

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