

Family-Centered Cesarean Delivery

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Study Objective: We implemented a pilot of family-centered cesarean delivery (FCCD) for healthy, term pregnancies (October-December, 2012). This project describes patients' and operative teams' experiences, and compares outcomes between FCCD patients versus patients who underwent routine cesarean delivery (October-December 2011).

Methods: Pilot patients were surveyed via telephone post-discharge on satisfaction with the delivery. FCCD operative teams were surveyed individually immediately post-FCCD on job performance concerns. A retrospective, cohort study, pilot versus historical cohort, matched 2:1, compared intra-operative parameters. We conducted Chi square or Mann-Whitney analysis ($p < 0.05$).

Results: Eighteen patients underwent FCCD; all reported complete satisfaction, and 12 described their experience: "Like night and day from last c-sec. This was a wonderful experience!"

Two (12.5%) of the infant care team and 1 (6.7%) circulating nurse expressed discomfort due to a lack of experience with FCCD. No negative impact on job performance was reported. Length of FCCD was not significantly longer [median = 79 (47-126) vs. 67 (42-107) minutes]. No FCCD babies ($n = 36$) had temperatures requiring intervention (cooling or warming) as compared to 6 (16.7%) comparison babies ($p = 0.066$). One (2.8%) comparison baby was admitted to the NICU (respiratory distress).

Conclusions: Due to this success, we have instituted mandatory training and routinely offer FCCD.

Key Words: Family-centered cesarean delivery

Introduction

Background and Knowledge

It is well established that early skin-to-skin contact (SSC) between mother and child provide both with a variety of benefits.¹ Improved breast feeding rates, stability of neonatal temperature, increased maternal and infant sleep, reduced infant crying, improved maternal-infant bonding, and improved maternal satisfaction have all been demonstrated when early SSC is initiated. The benefits of early SSC have led many hospitals in the United States to recommend protocols to ensure immediate skin-to-skin contact after the vaginal birth of healthy neonates. The practice is also endorsed by the World Health Organization and the United Nations Children's Fund (WHO/UNICEF), the American Academy of Pediatrics (AAP), and the American Congress of Obstetricians and Gynecologists (ACOG).^{2,3,4}

Although the benefits of early SSC after delivery have been extensively studied over the last decade, implementation of SSC has been traditionally reserved for vaginal deliveries. During that time, recommended policies regarding cesarean deliveries have gone largely unchanged.⁵ Only recently has research been published that supports early SSC during normal cesarean deliveries.

Standard care protocols during cesarean delivery include allowing only one additional support person in the operating room and strategically hanging drapes to prevent the mother and support person from seeing the surgery as it takes place. It is also routine for newborns to be handed off directly to waiting nursing staff after cutting the umbilical cord. In some instances, the warmers that

neonates are placed in after surgery are not in the operating room. Thus, an infant who is immediately separated from its mother may remain separated for one to four hours or longer. Reunion may not occur until the mother is in the post-anesthesia recovery room or a room on the maternal and child floor.

While these standard procedures are clearly necessary in cases of concern for maternal or infant well-being prior to delivery, the case for such a prolonged separation during routine planned cesarean deliveries is unclear. Furthermore, many mothers that undergo cesarean delivery report disappointment and dissatisfaction with their birth experience.⁶

Cesarean delivery is a common procedure that accounted for 32.8% of all births in the United States in 2011. In North Carolina, the state with the 10th highest rate in the nation, the rate of delivery by cesarean section is 31%.⁷ In these deliveries, many mothers and infants are not given the opportunity for early SSC upon birth. However, recent research has suggested methods to increase early SSC initiation in cases of routine cesarean deliveries.

First described in 2008, “the natural caesarean” involves the application of early skin-to-skin contact techniques in cases of routine cesarean delivery.^{8,9,10} Research suggests similar benefits to traditional early SSC, including improved breast feeding, maternal-infant bonding, and increased patient satisfaction without any increased risk for hypothermia.^{11,12,13}

Local Problem

The Mission Hospital Birthing Center in Asheville, North Carolina delivers over 4,000 babies annually (3,745 in 2011).¹⁴ The hospital offers a variety of birth options for expecting mothers, including tubs for laboring and delivering. It is also considered a Baby-Friendly Hospital as of April 2010, making it the first hospital in the state to receive such a designation. Such hospitals are required to demonstrate adherence to guidelines that call for initiation of early skin-to-skin contact in support of immediate postpartum breast feeding.¹⁵

The rate of cesarean section at Mission Hospital in 2011 was 33.3%, one-half percentage point higher than the national average. This equates to 1,246 infants born at Mission Hospital in 2011 that were not given the opportunity for immediate SSC.⁷ In order to address this deficit and to better observe Baby-Friendly Hospital guidelines, we implemented a pilot of family-centered cesarean delivery (FCCD) that expands on Smith et al.’s natural cesarean technique. From October through December of 2012, women with healthy, term pregnancies who were scheduled for routine cesarean sections were given the option of following a FCCD birth plan. FCCD involves allowing the mother and support person to witness the delivery, immediately putting the infant on the mother’s chest to quickly initiate SSC, and encouraging postpartum breast feeding as soon as possible.

Intended Improvement

The pilot FCCD program was implemented specifically to:

1. Create a family-centered birth experience (rather than a surgical experience) in order to improve patient and family satisfaction with the birth experience;
2. Support early, if not immediate, skin-to-skin contact;
3. Facilitate breast feeding and bonding between mother and newborn;
4. Assuage operating and neonatal care teams’ concerns regarding infant and maternal safety;
5. Ensure that operating and neonatal care teams had unimpeded ability to conduct the delivery and immediate newborn care, respectively.

Study Questions

1. How quickly do we implement immediate skin-to-skin contact?
2. How often do FCCD patients initiate breast feeding prior to hospital discharge?
3. A) How satisfied are FCCD parents with this birth experience?
B) How satisfied are FCCD patients with this birth experience vis-à-vis a previous cesarean birth?
4. How do operating teams and infant care teams rate their experiences with FCCD?
5. A) How do maternal and infant outcomes compare between FCCD patients and historical, routine cesarean patients?
B) How do intraoperative parameters compare between FCCD deliveries and deliveries of a historical cohort?

Methods

Planning the Intervention

The collaborative established quality care indicators to measure specific study questions, including: initiation of skin-to-skin contact; breast feeding intention and rates of breast feeding at discharge; patient satisfaction within 1 week of discharge; provider satisfaction and concerns at time of delivery; and maternal and neonatal safety and outcome data. The collaborative also identified inclusion criteria: healthy mothers and infants of gestational age >38 weeks agreed upon by both the physician and the neonatal assessment nurse (NAN); allowances were made to include women with controlled gestational diabetes and breech infants with stable biometrics. Exclusion criteria included: serious maternal and/or fetal medical comorbidities, prenatally diagnosed major anomalies, unstable biometrics, or preterm gestational age. Further, skin-to-skin contact would not be allowed, at the discretion of the NAN, for any infant for whom an immediate pediatric assessment was warranted including infants who were: exhibiting respiratory distress or cyanosis; exhibiting hypotonia or weak cry subsequent to being born as demonstrated through meconium-stained amniotic fluid; exhibiting symptoms of perinatal depression; born in the context of markedly elevated infection risk; or had undiagnosed fetal anomalies that might lead to cardiorespiratory compromise.

The collaborative developed a one-page data collection sheet to prospectively record information about the delivery, maternal and infant intra-delivery parameters and postpartum parameters (see Table1). Members of the collaborative team reviewed indicators regularly and made adjustments to the clinical care process as necessary.

Table 1. Data Collection Instrument

De-Identified Quality Indicators October – December 2011	
Patient Information	Reason for C/S _____ Scheduled _____ Repeat _____ Gestational age _____ Does patient intend to breast feed? _____
NAN	Time of delivery _____ Temp q 10 mins @ _____ @ _____ @ _____ @ _____ Apgar @1min _____ @5min _____ @10min _____ Admit to NICU Yes _____ Reason _____ Issues with the newborn post delivery and time of issue _____ _____ skin to skin immediate _____ Delayed _____ Reason _____ Total mins skin to skin < 5mins 5-20 mins > 20
Intra Op	Maternal temp and BP: preop _____ intraop _____ PACU _____ Nausea: intra op _____ Emesis _____ Reverse Trendelenberg Yes _____ No _____ Reason _____ Time of skin incision _____ Time of closure _____
Post Delivery	Post Op findings that were not identified pre-op _____ LOS _____ Readmit No _____ Yes _____ Why _____ LOS for readmit _____
Breast Feeding	Breast Feeding at Discharge: YES NO Unknown Breast Feeding at 4 wks postpartum: Exclusive Partial None

Methods of Evaluation

Skin-to-Skin Contact: The neonatal assessment nurse (NAN) completed the data collection sheet to record time to skin-to-skin contact following delivery, as it was this team member’s responsibility to make the immediate infant assessment and place the infant on the mother’s chest while instructing the support person on safety precautions.

Breast Feeding: The resident physician on the operating team completed the patient information section of the data form, including the patient’s intention to breast feed. The Labor and Delivery Clinical Nurse Manager completed the information on breast feeding at discharge while surveying the patient for satisfaction.

Patient Satisfaction: Pilot patients were surveyed via telephone within 1 week of delivery regarding their satisfaction with their birth experience. The Labor and Delivery Clinical Nurse Manager made two attempts to contact each patient.

Delivery Team Concerns: Pilot operative teams were surveyed individually immediately following FCCD on perceived impact on job performance.

Mother and Infant Safety and Outcomes: A retrospective cohort study compared intra-operative parameters and outcomes of FCCD versus a historical cohort, which was matched 2:1 for delivery

(scheduled repeat, scheduled primary, and failed labor). Intraoperative indicators of the FCCD patients were recorded prospectively by the appropriate team member during the cesarean delivery. Postpartum parameters of the FCCD patients were gathered retrospectively from patients' charts by the primary author of this project (SF). Data sheets were de-identified prior to sending them for data analysis (SG).

A random table of numbers was used to identify patients who gave birth in 2011 to include in the traditional, routine cesarean delivery cohort (TCD). Charts were reviewed and all data was extracted manually on paper using a unique study number as an indirect identifier.

Analysis

Researchers used descriptive statistics to analyze survey data. Survey results were aggregated and presented as frequency (percent). A Chi-square or Mann-Whitney analysis with categorical and continuous outcomes, respectively, was used to compare FCCD to TCD.

Ethical Issues

The Mission Hospitals Institutional Review Board approved this project.

Results

Beginning in October 2012, the option for a natural cesarean delivery was offered to eligible, consenting women undergoing routine cesarean delivery performed by physicians of MAHEC OB/GYN Specialists at Mission Hospital. Ultimately, 18 women were enrolled in the pilot program.

The 18 FCCD patients delivered via scheduled repeat [15 (83.3%)], scheduled primary [2 (11.1%)], or primary for failed induction of labor [1 (5.6%)]. All patients were between 37 and 40 weeks gestation (median = 39 weeks; see Table 2). Ten patients (55.6%) chose to watch their babies' birth.

**Table 2. Characteristics of Deliveries:
Family-centered Cesarean Delivery (FCCD) and Traditional Cesarean Delivery (TCD)**

	FCCD N = 18 N (%)	TCD N = 36 N (%)
Cesarean Delivery		
Repeat scheduled	15(83.3)	30 (83.3)
Primary scheduled	2 (11.1)	4 (11.1)
Failed IOL/FIL	1 (5.6)	2 (5.6)
Medical Complications		
Breech	4 (22.2)	4 (11.1)
Polyhydramnios	1 (5.6)	1 (2.8)
Mild gestational diabetes	0	2 (5.6)
Mild preeclampsia	1 (5.6)	0
Room Temperature at Delivery (F ⁰)		
Median (min-max)	74 (70-76.1)	NA
Reverse Trendelenberg	10 (55.6)	NA
Skin-to-Skin		
Immediate	14 (77.8)	NA
Delayed	3 (16.7)	
Unknown	1 (5.6)	
Contact Duration		
5-20 mins	5 (27.8)	
> 20 mins	2 (11.1)	NA
Unknown	11 (61.1)	

Skin-to-Skin Contact

All 18 patients experienced SSC immediately [14 (77.8%)] or after a slight delay to allow for brief evaluation at an infant warmer [4 (22.2%)].

Breast Feeding

Breast feeding was initiated by 14 (77.8%) women in the FCCD group. There was no significant improvement in breast feeding initiation, however, as 26 (72.2%) women undergoing TCD initiated breast feeding in the hospital (p=0.437).

FCCD Patient Satisfaction

Ten FCCD patients (55.6%) responded to telephone survey questions. All reported complete satisfaction with the FCCD (see Table 3). One FCCD respondent elaborated:

As my baby was pulled out the curtain dropped and I said, "It's a boy!" His bottom lip was stuck so far out I said, "Look at that lip! He's mad!" My son was brought to me placed on my chest where I could help soothe and warm him, and then try to nurse for the first time. I was not a witness to this miracle, I was a participant. I was not trying to bond with a baby on a TV screen. I was holding my son and enjoying the experience with my husband.

Table 3. Post- Family-Centered Cesarean Delivery Satisfaction Surveys

	n/N (%)
Patients' experience vs. previous delivery experience	10/10 (100)
Positive	
Did you feel informed?	Yes 9/10 (90) Somewhat 1/10 (10)
What was your support person's response to this type of delivery?	Positive 9/10 (90) Negative 1/10 (10)
Overall Satisfaction	Excellent 9/10 (90) Great 1/(10)
Families' description of experience vs. previous delivery experience.	
<p>"Like night and day from last c-sec. This was a wonderful experience." "Loved it-nice to have immediate bonding." "Really good from my last baby experience." "Liked it more." "Much more positive experience. Great bonding." "Wonderful! A lot better experience. Excellent!" "Loved the experience of baby being brought to her first." "Best astonishing experience." "Great- nice skin/skin."</p>	
Families' Suggestions for Improvement	
<p>"Drop drape sooner." "Did not drop drape low enough." "Spinal wore off too quick." "Surprised about spinal-stuck 3x." "Could not get close enough to see her." "Enjoyed-didn't get to cut cord."</p>	

One patient reported that her support person had a negative experience, as he was unable to get close enough to see his baby being born. Two additional patients reported problems with not dropping the surgical drape soon enough or not being close enough to witness their infant being born.

Nine families compared their FCCD vis-à-vis previous traditional cesarean deliveries favorably, describing the experience as “Astonishing!”, “Like night and day from last c-sec. This was a wonderful experience!” and “Much more positive experience. Great bonding.”

FCCD Delivery Team Concerns

No OB or anesthesia providers or operating room scrub technicians reported any concerns or negative impact on their work. Two (12.5%) of the infant care team and 1 (6.7%) of the circulating nurses expressed concerns related to discomfort with a lack of experience with the FCCD protocol.

Maternal and Infant Safety and Outcomes

Outcomes for the 18 FCCD pilot patients were similar to those for the 36 TCD patients in the comparison group (see Table 4). The length of time from delivery of the infant to skin closure was longer for FCCD than TCD [FCCD median = 64 (36-100) versus TCD median 51 (32-80) minutes; $p=0.049$]. No differences in maternal temperatures ($p=0.192$) or abnormal blood pressures ($p=0.462$) were observed. One mother in each group was readmitted; one FCCD mother was readmitted for a deep vein thrombosis (DVT), and one TCD mother was readmitted for an incisional hernia.

All infants' Apgar scores at 1 and 5 minutes were less than 7 regardless of delivery type (FCCD vs. TCD; $p=0.857$; $p=0.716$, respectively). No FCCD infants had recorded temperatures requiring cooling or warming intervention compared with 6 (16.7%) of TCD infants, the majority of whom required cooling. This was not, however, statistically significant ($p=0.066$). No FCCD infants and 1 (2.8%) TCD infant was admitted to the NICU (respiratory distress).

Table 4. Outcomes by Type of Cesarean Delivery

	FCCD N = 18 N (%)	TCD N = 36 N (%)	P
Length of Time (minutes)			
Skin Incision to Closure	79 (47-126)	67 (42-107)	0.106*
Delivery to Closure	64 (36-100)	51 (32-80)	0.049*
APGAR			
1- minute Median (min-max)	8 (7-9)	8 (7-9)	0.857*
5- minute Median (min-max)	9 (8-9)	9 (8-9)	0.716*
Admit to NICU	0	1 (2.8)†	0.476‡
Infant Temperatures			
Temperature 1	98 (96.9-99.3)	98.1 (96.5-100.8)	0.905*
Duration 1 (Minutes)	14 (2-36)	16 (0-45)	0.353*
Temperature 2	98.3 (97.4-99.4)	98.6 (96.4-100.1)	0.349*
Duration 2 (Minutes)	42 (9-92)	48 (28-105)	0.072*
Temperature 3	98.3 (97.4-99.4)	98.5 (97.5-99.6)	0.579*
Duration 3 (Minutes)	74 (17-117)	76 (55-133)	0.275*
Temperature 4	98.5 (97.5-99.1)	98.5 (97.6-99.4)	0.934*
Duration 4 (Minutes)	104 (25-151)	107 (85-147)	0.389*
Abnormal Infant Temperatures Requiring Intervention§			
Any	0	6 (16.7)	0.066‡
< 96.8°	0	1 (2.8)	0.476‡
> 99.5°	0	5 (13.9)	0.092‡
Maternal Temperature			
Pre-op	97.6 (95-98.6)	98 (96-100.4)	0.272*
Intra-op	97.2 (95-99)	98 (96-100.4)	0.192*
PACU	97.9 (97.4-98.6)	98 (96.8-99.2)	0.854*
Abnormal Maternal Blood Pressure			
Pre-op	0	4 (11.1)	0.142‡
Intra-op	2 (11.1)	2 (5.6)	0.462‡
PACU	4 (22.2)	7 (19.4)	0.811‡
Breast Feeding at Discharge			
Yes	12 (66.7)	25 (69.4)	0.437
Partial	2 (11.1%)	1 (2.8)	
No	4 (22.2%)	10 (27.8)	
Readmission - Maternal	1 (5.6) DVT	1 (2.8) Incision hernia	0.248‡

Note. * Mann-Whitney test.

†Baby admitted for respiratory distress. Delivered via scheduled cesarean @ 39 wks gestation with no reported maternal or fetal complications.

‡ Chi square analysis.

§ Any abnormal values at any of the four temperature readings.

†Baby admitted for respiratory distress. Delivered via scheduled cesarean @ 39 wks gestation with no reported maternal or fetal complications.

‡ Chi square analysis.

Discussion

Summary

Results from our pilot program were favorable, with all respondents from the FCCD group reporting their overall experiences as positive. Suggestions for improvement of the FCCD process included dropping the surgical drape sooner so that patients and support persons could witness the birth.

Several team members expressed concerns regarding unfamiliarity with the protocol. This could be remedied with routine orientation and training for healthcare team members, including interactive demonstrations and practice sessions.⁵

No statistically significant differences in infant and maternal safety and outcomes were noted between the FCCD and TCD cohorts. No adverse effects were reported in the FCCD group, suggesting that this new approach to cesarean deliveries is a safe alternative to traditional cesarean section delivery protocols.

Overall, the results from the pilot were favorable, and success led us to institute mandatory training at MAHEC OB/GYN Specialists. We also now routinely offer FCCD to patients scheduled for routine cesarean deliveries.

Relation to Other Evidence

The results of our FCCD pilot program were similar to those published in other studies. In two studies with larger cohorts, complication rates remained similar to or lower for patients undergoing FCCD than TCD, and overall increased patient satisfaction with the birth was reported by mother and support persons who elected FCCD. Grassley et al. and Magee et al. report that increased satisfaction with FCCD protocols were noted particularly in women who had had previous cesarean births.^{5,16}

Barriers, challenges and negative experiences reported by FCCD participants in our cohort were also similar to those published by others. Barriers reported by other studies included positioning of the surgical drape and difficulties with operating equipment obstructing viewing of the birth by mothers and support persons. Nurses in one study also expressed concerns similar to those reporting by circulating nurses and infant care team members in this study, which resulted in reassessing and adjusting or practicing protocols with all team members roleplaying various scenarios (i.e., playing the part of the mother one time, and a nurse at another time).¹⁶

Successful results in two other studies have led the participating hospitals to offer FCCD as a standard care option to eligible patients and to institute local training for other institutions wishing to implement FCCD programs.^{5,16} The pilot program in one study plans to hold a rural perinatal nursing conference to teach FCCD in four states.¹⁶

Limitations

The pilot project took place at one institution with a small number of participants, making the generalizability of our results limited. In addition, we only had a 55.6% patient response rate to the telephone survey. Further data collection would be necessary to better understand patients' experiences.

In addition, it is unclear to what extent SSC may have contributed to sustained rates of breast feeding in the FCCD cohort of our pilot program because patients were contacted 1 week post-discharge. Further research is needed to evaluate whether FCCD increases breast feeding in the long term by following up with patients multiple times postpartum.

Conclusions

Our family-centered approach to cesarean deliveries adheres to best practices for Baby-Friendly hospitals by encouraging early skin-to-skin contact and breast feeding. Because of the high level of success and low adverse effects associated with this pilot program, we now regularly offer FCCD to patients and have implemented a mandatory training program at MAHEC OB/GYN Specialists.

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