



Evaluation of Maternal and Neonatal Outcomes in Cesarean Sections Performed in the Second Stage of Labor

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Abstract

Objective: To compare maternal and neonatal outcomes in cesarean deliveries in the first and second stage of labor.

Methods: Sixty-five patients who had caesarean section in the second stage of labor and 90 patients who had caesarean section in the first stage of labor were compared in terms of maternal and neonatal complications. Patient data was obtained from patient files and hospital electronic system records.

Results: Of the 155 patients included in the study, 58.1% (n=90) had a cesarean section in the first stage of labor and 41.9% (n=65) in the second stage of labor. The incidence of intraoperative surgical complication and postoperative endomyometritis was significantly higher in the cesarean section in the second stage of labor compared to the cesarean section in the first stage of labor. There was no significant difference in terms of blood transfusion requirement and neonatal complications between two groups.

Conclusion: Maternal morbidity risk is significantly higher in cesarean sections performed in the second stage of labor than in the first stage of labor.

Keywords: Cesarean section, maternal outcomes, neonatal outcomes, second phase of the labor

INTRODUCTION

The rate of caesarean section in the world is increasing and it has reached 50% today (1). In our country, this ratio was around 6% between 1983-2001 and now it has increased up to 30% (2). The World Health Organization (WHO) reports that the caesarean birth rate should be less than 15% (3). Maternal mortality was reported to be 6/100000 in vaginal delivery and 28/100000 in caesarean delivery in healthy pregnant women without medical and obstetric problems (4). Maternal morbidities are also higher in caesarean deliveries than vaginal deliveries. Complications such as postpartum febrile morbidity, deep vein thrombosis, need for blood transfusion, long hospital stay, organ injuries, intraabdominal adhesions, infertility and chronic pelvic pain are also more frequent in caesarean delivery (5).

Van Ham et al. (6) and Nielsen et al. (7) reported intraoperative surgical complication rates as 11.6% and 14.8% in caesarean deliveries. Regular uterine contractions, presence of membrane rupture, cervical patency more than 3 cm, and engagement are the most important risk factors for intraoperative complication development (7-9). In this study, 155 term primary caesarean section patients were divided into two groups as caesarean section in the “first” and “second” stages of labor, and age, gravida, parity, gestational week, caesarean indication, hospital stay, blood transfusion requirement, maternal outcomes such as intraoperative and postoperative surgical complications, and neonatal outcomes such as fetal birth weight, Apgar score and neonatal intensive care requirement were compared.



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METHODS

Istanbul Okmeydanı Training and Research Hospital Ethics Committee approved this study (no: 253, dated 23.12.2014). This study was performed by examining the records of cesarean section patients at the Obstetrics and Gynecology Clinic of Okmeydanı Training and Research Hospital between 2010 and 2014. Sixty-five patients who had caesarean section in the second stage of labor and 90 patients who had caserean section in the first stage of labor were compared in terms of maternal and neonatal complications. Patients with maternal diseases (hypertension, heart disease, diabetes mellitus, etc.) and those with fetal anomalies were not included in the study group.

Statistical Analysis

The statistical analysis was performed using Number Cruncher Statistical System (NCSS) 2007 program.

RESULTS

The maternal and fetal characteristics of the patients included in the study are presented in Table 1. The mean age of the patients was 27.52±6.42 years (18-40 years), mean gravida was 2.17±1.43 (1-8), mean parity was 0.90±1.21 (0-5), and mean gestational age was 38.32±0.91 weeks (37-40 weeks). The mean length of hospital stay was 2.58±0.78 days (2-7 days). The mean birth weight was 3449.43±403.44 grams (2470-4560 grams). The mean 1-minute and 5-minute Apgar scores were 7.88±0.72 (3-9) and 8.23±0.82 (7-9). Fifty-eight point one percent (n=90) of the cesarean sections occurred in the first stage and 41.9% (n=65) occurred in the second stage of labor.

	Min-max	Mean ± SD	
Age, years	18-40	27.52±6.42	
Gravida	1-8	2.17±1.43	
Parity	0-5	0.90±1.21	
Weeks of pregnancy	37-40	38.32±0.91	
Length of hospital stay (days)	2-7	2.58±0.78	
Birth weight (gr)	2470-4560	3449.43±403.44	
1-minute Apgar	3-9	7.88±0.72	
5-minute Apgar	4-9	8.23±0.82	
		n	%
Birth weight	<4000 gr	138	89
	≥4000 gr	17	11
Birth stage	1 st stage	65	41.9
	2 nd stage	90	58.1
Min: Minimum, Max: Maximum, SD: Standard deviation			

Findings related to maternal and fetal mortality and morbidity after cesarean section are presented in Table 2. Maternal complications were as follows: blood transfusion in 25 patients, B-Lynch sutures due to atony hemorrhage in one patient, T-shape incision in one patient, hematoma in two patients, extended incision in nine patients, bladder injury in two patients and postpartum endometritis in 18 patients. Neonatal complications included need for intensive care in 23 newborns and 2 neonatal deaths.

The cesarean indications are given in Table 3.

There was no statistically significant difference between the two groups in terms of age, gravida, parity, gestational week, hospital stay, 1-minute and 5-minute Apgar scores and birth weight (p>0.05) (Table 4).

Surgical complications and postpartum endometritis were found to be higher in cesarean sections in the second stage of labor (p=0.06; p<0.01). The difference between two groups in terms of neonatal intensive care need, neonatal mortality and maternal blood transfusion rates was not statistically significant (p>0.05) (Table 5).

The indications of the patients who had cesarean section in the first stage of labor were fetal distress, cephalopelvic disproportion (CPD) and obstructed labor, respectively. The indications of the patients who had cesarean section in the second stage of labor were CPD, obstructed labor and fetal distress, respectively (Table 6).

	n	%
Blood transfusion	No	130
	Yes	25
Surgical complication	No	140
	Yes	15
B-Lynch suture	1	6.7
Hematoma	2	13.3
Extended incision	9	60.0
Bladder injury	2	13.3
T-shape incision	1	6.7
Postpartum hysterectomy	-	-
Postpartum endometritis	18	11.6
Maternal mortality	-	-
Need for neonatal intensive care	23	14.8
Neonatal mortality	2	1.3

DISCUSSION

In the United States, the cesarean section rate of 2% was under discussion in 1958, whereas it was increased to 24.1% in 1986 (10). Although there has been a decrease in cesarean rates in the 1990s due to the increase in maternal morbidity and increase in operating costs with no change in infant mortality, the rate of caesarean section in USA is approximately 22% (10). According to the data of the Ministry of Health in Turkey, the rate of caesarean section was 14% in 1998 and it was reported as 50.4% in 2013. In the retrospective studies conducted in our country, the rate of caesarean section varies between 18% and 33% (11-13).

The main reason for the increase in cesarean section rates is the expansion of indication groups, including previous cesarean section, CPD, breech presentation, fetal distress and obstructed labor. In addition, elective caesarean section preferences have increased because of the thought of less pain, less harm to the pelvic organs and more benefits for the fetus (14). Increased cesarean indications increase recurrent cesarean section cases. The most common caesarean section indication in our country is recurrent cesarean section and the rate is 30% (15).

In many clinics, fetal distress indication is performed by fetal electronic monitoring. This method has a high false positive rate and intrapartum fetal monitoring application

	n	%
CPD	49	31.6
Fetal distress	34	21.9
Obstructed labor	30	19.4
Dense meconium	13	8.4
Breech presentation	10	6.5
Other indications (HPV, large baby etc.)	39	25.2
Anhydramnios	6	3.87
Placental detachment	4	2.58
Previous lumbar surgery	1	0.65
HPV	5	3.23
Precious pregnancy	1	0.65
Cord prolapse	3	1.94
Chorioamnionitis	1	0.65
Macrosomia	9	5.81
Meconium + large baby	1	0.65
Transverse presentation	4	2.58
Umbilical hernia surgery	1	0.65
Incompatible patient	2	1.29
Face presentation	1	0.65

CPD: Cephalopelvic disproportion, HPV: Human papillomavirus

also contributes to the increase in cesarean rate (15, 16). In a Cochrane database review, the authors reported that fetal

		Birth stage		p
		1 st stage (n=90)	2 nd stage (n=65)	
Age	Mean ± SD	28.04±6.57	26.80±6.19	a0.235
	Min-max (median)	18-40 (28)	18-40 (27)	
Gravida	Mean ± SD	2.19±1.53	2.15±1.30	b0.693
	Min-max (median)	1-8 (1.50)	1-6 (2)	
Parity	Mean ± SD	0.94±1.29	0.85±1.10	b0.973
	Min-max (median)	0-5 (0)	0-4 (0)	
Weeks of pregnancy	Mean ± SD	38.33±0.93	38.29±0.89	b0.793
	Min-max (median)	37-40 (38)	37-40 (38)	
Length of hospital stay (days)	Mean ± SD	2.49±0.70	2.71±0.86	b0.057
	Min-max (median)	2-5 (2)	2-7 (3)	
1-minute Apgar	Mean ± SD	7.88±0.71	7.89±0.75	b0.742
	Min-max (median)	6-9 (8)	3-9 (8)	
5-minute Apgar	Mean ± SD	8.26±0.86	8.20±0.77	b0.321
	Min-max (median)	6-9 (8)	4-9 (8)	
Birth weight; n (%)	<4000 gr	82 (91.1)	56 (86.2)	c0.330
	>4000 gr	8 (8.9)	9 (13.8)	

SD: Standard deviation, Min: Minimum, Max: Maximum, aStudent's t-test, bMann-Whitney U test, cPearson chi-square test

		Birth stage		p
		1 st stage (n=90)	2 nd stage (n=65)	
Postpartum endometritis	No	85 (94.4)	52 (80.0)	a0.006**
	Yes	5 (5.6)	13 (20.0)	
Neonatal intensive care need	No	75 (83.3)	57 (87.7)	a0.451
	Yes	15 (26.7)	8 (12.3)	
Neonatal mortality	No	88 (97.8)	65 (100.0)	b0.510
	Yes	2 (2.2)	-	
Blood transfusion	No	78 (86.7)	52 (80.0)	a0.265
	Yes	12 (13.3)	13 (20.0)	
Surgical complication	No	86 (95.6)	54 (83.1)	a0.010**
	Yes	4 (4.4)	11 (16.9)	

aPearson chi-square test, bFisher's exact test, **p<0.01

monitoring increased the cesarean section frequency by 40%, but did not significantly reduce the incidence of admission and cerebral palsy in the neonatal intensive care unit (17). In our study, fetal distress indication was in second place among the indications for primary cesarean sections with a rate of 21.9%. This rate is reported to be 21.6% at Şişli Etfal Hospital (18), 16.3% in Obstetrics and Gynecology Clinic of Dicle University Faculty of Medicine (19) and 19.1% in Obstetrics and Gynecology Clinic of Yüzüncü Yıl University Faculty of Medicine (20). The primary cesarean section rate is 9.7% in the United States (21).

In a study in which 34995 cases were included, intrapartum fetal monitoring was evaluated and it was determined that more cesarean decisions were made in the group in which all pregnant women were monitored compared to the selective

monitorization group, but there was no difference in perinatal results (22). In our study, there was no statistically significant difference between the groups in terms of 5-minute Apgar score and need for neonatal intensive care unit.

In the studies, no cause-effect relationship was found between the increase in cesarean rates and the decrease in perinatal mortality and morbidity. It was reported that the factors affecting perinatal mortality are only the presentation of the fetus, maternal diseases leading to pregnancy complications, number of fetuses, ethnicity and maternal age (23). Respiratory distress syndrome type-II incidence rate in vaginal deliveries after 37th gestational week is 5.3, whereas this rate is 35.5% for cesarean sections not in labor and 12.2% for cesarean section in labor (24). In another study in neonates between 37-42 weeks of gestation, an increase was observed in all morbidities in cesarean sections not in labor compared to spontaneous, elective or induced vaginal deliveries. The ventilator requirement is 4.51 times, the asphyxia is 4.91 times, the sepsis is 1.40 times, and the intensive care unit stay was 1.98 times more (25). In our study, neonatal mortality rate was calculated as 14.8% and neonatal mortality rate was calculated as 1.3%. Need for neonatal intensive care unit and neonatal mortality were comparable between those with cesarean section in the 1st stage and those with cesarean section in the second stage of labor.

Although significant decrease in perinatal mortality and morbidity has been observed with widespread use of ultrasonography, it is a fact that this practice increases the cesarean rates. There is a 15% margin of error in the predicted fetal weight in the last trimester. Although the term “fetal macrosomia” varies according to the populations, the type of delivery also varies according to the maternal pelvis structure. Deciding on only the expected birth weight increases the cesarean rate. In our study, the rate of those who underwent cesarean with the indication of macrosomia was 1.94%. The reason for this low rate is that cesarean delivery due to this indication is made without entering into the active stage.

CPD causes prolongation of labor, physical and psychological fatigue of the mother, fetus to remain under stress or even traumatization, varying degrees of damage to the birth canal and more workload and concern to the person who follows the birth. Therefore, nowadays, the people who are interested in birth seek to predict CPD and find a treatment without delay to prevent any harm to the mother or the fetus. CPD cannot always be predicted and cesarean section with CPD diagnosis is increasing (26). CPD indication rate among patients who underwent cesarean section was reported as 5.6% by Yumru et al., (15) and 7.3% by Kara (27). In a study conducted in a university hospital in Senegal, CPD was

Table 6. Evaluation of indications according to birth stage of cesarean section

		Birth stage		p
		1 st stage (n=90)	2 nd stage (n=65)	
CPD	No	71 (78.9)	35 (53.8)	a0.001**
	Yes	19 (21.1)	30 (46.2)	
Fetal distress	No	68 (75.6)	53 (81.5)	a0.374
	Yes	22 (24.4)	12 (18.5)	
Obstructed labor	No	74 (82.2)	51 (78.5)	a0.559
	Yes	16 (17.8)	14 (21.5)	
Dense meconium	No	81 (90.0)	61 (93.8)	a0.394
	Yes	9 (10.0)	4 (6.2)	
Breech presentation	No	84 (93.3)	61 (93.8)	b1.000
	Yes	6 (6.7)	4 (6.2)	
Other indications (HPV, large baby etc.)	No	59 (65.6)	57 (87.7)	a0.002**
	Yes	31 (34.4)	8 (12.3)	
Anhydramnios		6	0	
Placental detachment		3	1	
Previous lumbar surgery		1	0	
HPV		4	1	
Precious pregnancy		1	0	
Cord prolapse		2	1	
Chorioamnionitis		1	0	
Macrosomia		6	3	
Meconium + large baby		0	1	
Transverse presentation		4	0	
Umbilical hernia surgery		1	0	
Incompatible patient		2	0	
Face presentation		0	1	

CPD: Cephalopelvic disproportion, HPV: Human papillomavirus
^aPearson chi-square test, ^bFisher's exact test, **p<0.01

the leading cause of caesarean section with a rate of 31% (28). In our study, the rate of caesarean section with CPD indication was the leading cause with a rate of 31.6%. The reason for this is that the patients included in the study were selected from caesarean section cases after the beginning of active labor. The reason for increased CPD in the second stage of labor is the avoidance from labor with intervention (vacuum-forceps).

In a WHO report published in 2002, maternal mortality due to caesarean section was reported to be 41/100.000 in the United States and 160-220/100,000 in developing countries (29). The WHO perinatal health-related questionnaire showed that caesarean delivery increased the need for postpartum antibiotic use and maternal blood transfusion, but caused no significant reduction in maternal morbidity and mortality (30). Operative complications are more common in emergency cases than in elective cases (31). In our study, the rate of surgical complication in patients undergoing caesarean section in the first stage of labor was 4.4% and in patients in the second stage was 16.9%.

In their study, Bagratee et al., (32) suggested that prophylactic antibiotic use in caesarean operations did not reduce postpartum complication rates such as febrile morbidity, wound infection, endometritis, pneumonia and postoperative infection morbidity. In contrast, Killian et al., (33) reported that less infection rates were detected in patients who received antibiotics in their study. Smail and Hofmery (34) reported less frequent endometritis, wound infection and urinary infection in antibiotic users. In a study by Ehrenkranz et al., (35), the rate of infection in caesarean deliveries was found to be 0.9% for those who received antibiotic prophylaxis and 3.7% for those who did not. In our study, the postpartum endometritis rate was also found to be 11.6%. Endometritis rate was found to be 5.6% in the first stage of labor and 20% in the second stage.

Lydon-Rochelle et al., (36) stated that caesarean delivery increases the risk of endometritis, wound infection and thromboembolism, and therefore, the length of hospital stay increases due to these complications. In our study, the mean hospital stay was 2.58 days, with a mean of 2.49 days in the first stage of labor and 2.71 days in the second stage of labor.

Haas et al., (37) noted that the most common intraoperative complication in caesarean delivery was uterocervical laceration and associated blood loss. In our study, intraoperative uterocervical laceration rate was 9.7%. This rate was 4.4% for caesarean section in the first stage of labor and 16.9% for caesarean section in the second stage.

CONCLUSION

Maternal morbidities such as intraoperative uterocervical laceration and postpartum endometritis, which may increase the need for blood transfusions in caesarean section performed in the second stage of labor, are significantly higher in the 2nd stage of labor. Therefore, in the presence of the necessary conditions, intervention (vacuum-forceps) delivery in the second stage of labor should be considered as an alternative to caesarean delivery. It may be encouraging to provide appropriate working conditions and environment that will allow physicians to make decisions based on obstetric conditions, away from legal concerns.

Ethics

Ethics Committee Approval: Istanbul Okmeydanı Training and Research Hospital Ethics Committee approved this study (no: 253, dated 23.12.2014).

Informed Consent: Retrospective study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: F.D.Y.Y., V.M., B.C., G.P., A.P., Concept: F.D.Y.Y., Design: F.D.Y.Y., V.M., Data Collection or Processing: F.D.Y.Y., .M., B.C., G.P., A.P., Analysis or Interpretation: F.D.Y.Y., B.A., Literature Search: F.D.Y.Y., B.A., Writing: B.A.

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