

Cesarean section with relative indications versus spontaneous vaginal delivery: short-term outcomes of maternofetal health

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Summary

Aim: The aim of the study was to compare maternal and perinatal mortality and short-term outcomes of maternal and perinatal health between a cesarean group with relative indications and a vaginal delivery group. **Methods:** A total of 1,119 patients were included; 582 were delivered by spontaneous vaginal birth and 537 delivered by cesarean section without labor. The indication for cesarean section was tocophobia and fear of childbirth for all patients. Maternal and perinatal morbidity and mortality were compared between the groups. **Results:** No maternal mortality was recorded. Maternal morbidity was significantly lower in the vaginal birth group than the cesarean group (7 vs 30, $p < 0.05$). Perinatal mortality (2 vs 0) and perinatal morbidity were not significantly different between the two groups (33 vs 17). The vaginally delivered group had significantly higher newborn hospitalization rates than the cesarean group ($p < 0.05$), but hospitalization time did not differ. Newborns with the first minute Apgar score below 7 were higher in the cesarean group ($p < 0.05$). Fifth minute Apgar scores and umbilical cord pH values were similar. Cesarean neonates weighed more than vaginally delivered ones ($p < 0.05$). **Conclusion:** Short-term maternal complications were more frequently seen in cesarean deliveries with relative indications than spontaneous vaginal deliveries but no difference was found in perinatal mortality and morbidity. There is a clear need for research on health outcomes for mothers and infants associated with cesarean delivery without any medical indication.

Key words: Planned cesarean delivery; Mortality; Morbidity; Short-term outcomes.

Introduction

Cesarean delivery rates continue to rise and rates vary from country to country [1]. It is estimated that 4% of primary cesarean deliveries are elective [2]. The terms “patient choice cesarean” or “maternal request cesarean” are defined as primary cesarean delivery without any obstetric or medical indications. After the first report on prophylactic cesarean at term by Feldman *et al.*, it has become the most controversial topic in obstetric medicine [3]. In reported series cesarean delivery on request ranged from 4% to 18% of all cesareans and 14% to 22% of elective cesareans [4-8]. At the National Institutes of Health State-of-the-Science Conference on cesarean delivery on maternal request in 2006, a panel concluded that there is insufficient evidence to fully evaluate the benefits and risks of cesarean delivery on maternal request and that more research is needed [9, 10]. Risks of cesarean delivery for healthy women are considered very low by many reports, thus making elective cesarean an alternative birth method for women who have tocophobia or fear of childbirth [11-19].

In this study we aimed to compare maternal, perinatal mortality and short-term outcomes of maternal and perinatal health between a cesarean group for which the indication was tocophobia or fear of childbirth and a spontaneous vaginal delivery group.

Methods

This study included a total of 1,119 patients who delivered at the Zonguldak Karaelmas University Faculty of Medicine, Department of Obstetrics and Gynecology, between 2005 and 2010. Data collection was performed retrospectively from the hospital records. The study was approved by the ethical committee of the university. Of the patients 582 delivered by spontaneous vaginal birth and 537 patients delivered by cesarean section without labor; all patients were nulliparas. The indication for cesarean section was tocophobia or fear of childbirth for all the patients. Patients with systemic illnesses as hypertension, diabetes mellitus, renal or cardiovascular disorders were excluded from the study. High-risk pregnancies as intrauterine growth restriction (IUGR), congenital anomaly of the fetus, multiple gestations, preterm labor and cases of oligo- and polyhydramnios were excluded from the study. Maternal and perinatal morbidity and mortality were compared between the groups. Maternal morbidity was accepted as one of the following: postpartum hemorrhage, blood transfusion, fever, wound infection, genitourinary infection, thromboembolic event and operative complications. Perinatal morbidity was accepted as one of the following: birth trauma, neurologic injury, respiratory distress syndrome (RDS), sepsis, intracranial hemorrhage, necrotizing enterocolitis and jaundice. Also infant weight, Apgar scores, umbilical cord pH values and neonatal intensive care unit admission were compared between the groups.

Results

Totally 1,119 patients were included in this study; 582 delivered vaginally and 537 women had cesarean section without labor. The selected patients had no systemic illness or high-risk pregnancies or fetal abnormalities.

Mean gestational age of the women was 37.4 ± 2.9 weeks and 37.6 ± 2.5 weeks for the vaginal delivery group and cesarean group, respectively. All pregnancies were singleton.

There was no maternal death recorded in the 1,119 patients between 2005 and 2010. Maternal morbidity was significantly lower in the vaginal birth group than the cesarean group (7 vs 30, $p < 0.05$) (Table 1).

There were two perinatal deaths in the vaginal delivery group but they were not significant (Table 1). Perinatal morbidity also had no significant difference between the two groups (33 in the vaginal and 17 in the cesarean group) (Table 1). Newborn hospitalization rates were significantly different between the groups (4.7 in the vaginal and 2.9 in the cesarean group, $p < 0.05$) but no significant values were seen in hospitalization days (6.2 for vaginal and 7.8 for cesarean groups) (Table 1).

First minute Apgar scores below 7 were compared between the groups and they were significantly at a lower percentage in the vaginal group than the cesarean group (9.5% vs 14.6%, $p < 0.05$) but no similar difference was noted between the 5th minute Apgar scores (2.6% vs 1.2%) and umbilical cord pH values below 7.10 (14 vs 10) (Table 1). Interestingly, newborn weights were lower in the vaginal group than the cesarean group (3064 ± 580 g in the vaginally delivered babies and 3268 ± 513 g in cesarean delivered babies $p < 0.05$) (Table 1).

Discussion

Rates of elective cesarean deliveries without obstetrical indications are rising worldwide. Unquestionably there is need to assess the risks of maternal and perinatal complications associated with elective cesarean delivery. As a result of a small sample size there were no maternal deaths in our study. In earlier studies maternal mortality had a marked increase with cesarean delivery but these studies were performed in the 1960s to 1970s and do not only reflect the actual risk of cesarean itself but also reflect preexisting disease [20-22]. Maternal mortality or morbidity was not evaluated in patient subgroups, like elective cesarean, cesarean after labor or emergency cesarean. Lilford *et al.* compared elective versus non elective cesareans with respect to vaginal deliveries and showed that maternal mortality rate from elective cesarean was 23 per 100,000 procedures in contrast with 6 per 100,000 vaginal deliveries [23]. The relative risk (RR) of death from elective cesarean was 3.8. In a recently published review of the literature Vadnais *et al.* found overall maternal mortality rate to be 6 to 54 deaths per 100,000 live births from analysis of nine publications [24]. The RR of direct obstetrical death with cesarean delivery for any reason compared with vaginal delivery ranged from 3 to 13. Also RR of death with elective cesarean delivery as compared with vaginal delivery was reported as 0.77. A meta-analysis of eight studies which compared elective repeat cesarean versus trial of labor with a prior cesarean delivery reported three maternal deaths out of 27,504 women but could not find a signifi-

Table 1. — Maternal and fetal outcomes.

	Vaginally delivered (n = 582)	Cesarean section (n = 537)	p
Age (years, mean \pm SD)	26.9 \pm 5.2	27.2 \pm 5.2	NS
Gestational age (weeks, mean \pm SD)	37.4 \pm 2.9	37.6 \pm 2.5	NS
Maternal mortality (n)	0	0	
Maternal morbidity (n)	7	30	< 0.05
Perinatal mortality (n)	2	0	NS
Perinatal morbidity (n)	33	17	NS
Newborn hospitalization (%)	4.7	2.9	< 0.05
Newborn hospitalization time (days \pm standart deviation)	6.2 \pm 3.4	7.8 \pm 6.4	NS
First minute APGAR < 7 (%)	9.5	14.6	< 0.05
Fifth minute APGAR < 7 (%)	2.6	1.2	NS
Umbilical cord Ph < 7.10 (n)	14	10	NS
Newborn weight (g \pm standard deviation)	3064 \pm 580	3268 \pm 513	< 0.05

cant difference in maternal mortality based on method of delivery [25]. The Report on Confidential Enquiries into Maternal Deaths 1997 to 1999 reported 8.23 direct maternal deaths per 100,000 total cesarean deliveries and 1.69 maternal deaths per 100,000 vaginal deliveries. Cesarean deliveries were classified as emergent, urgent, scheduled, elective, perimortem, and postmortem. The RR of mortality with scheduled cesarean delivery compared with vaginal delivery was 0.8 and this was statistically insignificant [26]. The greatest risk was for emergency cesarean delivery (12.0). The authors reported increased RR with scheduled and elective cesarean (RR 2.8), and also with emergency and urgent cesarean (RR 4.3) when compared with vaginal delivery between 2000-2002 [27]. Liu *et al.* compared 46,766 planned cesareans with 2,292,420 planned vaginal deliveries. No women died in-hospital in the planned cesarean group but 41 women died in the planned vaginal delivery group (1.8 per 100,000 deliveries, $p = 0.87$); the highest in-hospital maternal mortality rate was recorded in the emergency cesarean delivery group [28]. An ideal study to assess maternal mortality rate would require a large number of women. Moreover it would require many years of follow-up to evaluate long-term complications and effects of primary elective cesarean delivery.

In our study maternal morbidity was accepted as one of the following: postpartum hemorrhage, blood transfusion, fever, wound infection, genitourinary infection, thromboembolic event and operative complications. Postpartum complications were significantly higher in the cesarean group than the vaginally delivered group (30 vs 7, $p < 0.05$). In the literature some studies were against and some were for cesarean section. Two studies that evaluated rehospitalization within 60 days of delivery found women delivered by cesarean or operative vaginal delivery were more likely than those delivering spontaneously to be readmitted for uterine infection, surgical wound complications, genitourinary conditions, cardiopulmonary disorders, thromboembolic phenomena or appendicitis. However these studies had limitations in

identifying cesareans as elective or in labor [29, 30]. Allen *et al.* studied maternal morbidity between 1998 and 2001 in Nova Scotia Atlee Perinatal Database [17]. Overall complication rates were similar in elective cesarean (7%) and spontaneous vaginally delivered women (6.2%). Cesarean in labor and assisted vaginal delivery had a higher rates of morbidity (16.3% RR 0.4, 95% CI 0.3, 0.6 and 12.9% RR 0.6, 95% CI 0.4, 0.7). The term breech trial, a randomized multicenter study comparing planned cesarean versus planned vaginal delivery of breech presentation at term, found no significant differences in specific complications including hemorrhage, genital tract injury, wound breakdown, infections or depression [12]. Mozurkewich and Hutton reported increased risks of febrile morbidity, transfusion and hysterectomy at elective repeat cesarean versus trial of labor in the metaanalysis of controlled trials [25]. Liu *et al.* compared low-risk planned cesarean versus planned vaginal delivery and reported an increased risk of most of the complications in the cesarean except for hemorrhage requiring transfusion (odds ratio 0.4, $p = 0.005$) and uterine rupture (odds ratio 0.4, $p = 0.048$) [28]. The planned cesarean group had a significantly longer duration of hospital stay. Wax examined five retrospective cohort studies [31-35] of planned cesarean versus planned vaginal delivery of breech presentation fetuses in a metaanalysis [36] and found that including cystitis as a morbidity indicator, adverse maternal outcomes ranged from 12%-28% in planned cesareans and 8%-23% in planned vaginal deliveries. Excluding cystitis and performing a fixed effect metaanalysis there was no difference seen in morbidity by planned delivery route. Compared with planned cesarean, planned vaginal delivery also incurs a somewhat increased risk of hemorrhage, attributable to operative vaginal delivery and unplanned cesarean in labor. In contrast, planned cesarean is consistently associated with more frequent infectious morbidity, cystitis, and endometritis than planned vaginal delivery. Despite these differences in morbidity-specific risks, composite morbidity is similar in women undergoing planned vaginal and planned cesarean delivery. A Cochrane Database Systematic Review of three randomized trials [12, 37, 38] comparing planned cesarean with planned vaginal delivery noted somewhat increased overall maternal morbidity in the planned cesarean group (9.1% vs 8.6%, RR 1.29; 95% CI 1.03, 1.61) [39]. A recently published indication matched cohort study found the incidence of total complications 2.2 times higher in the cesarean group [40]. The cesarean section group had a RR of 5.6 for postpartum hemorrhage. Rates of puerperal infection or postpartum fever did not show significant differences. Most common problems after one-year discharge such as anemia, reproductive tract infection, wound complications and waist/back pain did not find differences between the two groups.

The effects of elective cesarean delivery on the fetus are less clear than for the mother. Performing elective cesarean will result in iatrogenically premature infants but on the other hand continuing pregnancy may end with

stillbirth. Nielsen *et al.* observed that the Swedish cesarean rate rose from 5.5% to 12.4% between 1973 and 1981, while at the same time a decline in perinatal mortality of 12 per 1,000 to 7.1 per 1,000 [41]. However the authors concluded that decrease in perinatal mortality could not only be explained by increasing cesarean rate; neonatal practice changes, antenatal steroids, tocolytics and antepartum fetal surveillance are the other influencing factors. Signore *et al.* calculated that approximately 1,440 elective cesareans would have to be performed to prevent one perinatal death by a decision analysis method [42].

In our study we could not find significant differences between the two groups in perinatal mortality and morbidity. The vaginally delivered group had significantly higher newborn hospitalization rates than the cesarean group, but hospitalization time did not differ. Newborns who had a first minute Apgar score below 7 were higher in the cesarean group ($p < 0.05$). Fifth minute Apgar scores and umbilical cord pH values were similar. Cesarean babies were heavier than vaginally delivered ones ($p < 0.05$). The first suggestion of elective cesarean was if it could avoid neurologic injury or not. Cerebral palsy effects 2-3 per 1,000 births and 10% could be attributable to intrapartum events [43]. Despite the marked increase in cesarean rate, cerebral palsy rates remained stable. Therefore cesarean is not neuroprotective for the fetus [44, 45]. Towner *et al.* reported that infants delivered by prelabor cesarean showed no differences in frequencies of subdural, intraventricular, subarachnoid hemorrhage, facial nerve, brachial plexus injury or seizures compared with spontaneous vaginally delivered infants [46]. Also prelabor cesarean was associated more with common occurrences of CNS depression, feeding difficulty and mechanical ventilation. Puza *et al.* found that in contrast to rising cesarean rate during several years nerve palsies and fractures did not decrease [47]. Labor is responsible for clearing greater than 75% of liquid filling the fetal lungs during vaginal delivery in sheep [48]. Vaginally delivered infants establish final lung volumes more rapidly than those delivered by cesarean [49, 50]. After 37 weeks of gestation respiratory distress syndrome and transient tachypnea of the newborn are seen in order of decreasing frequency after prelabor cesarean, cesarean in labor, and labor with vaginal delivery [51]. Hook *et al.* reported an incidence rate of 7% for respiratory problems in a cesarean delivery group compared with 4% in a vaginal delivery group ($p < 0.03$) [52]. Vaginal delivery remains the mode of delivery associated with the lowest risk of neonatal respiratory distress [53].

This study has some limitations such as small sample size, not evaluating long-term morbidity, capacity of future fertility, risk of ectopic pregnancy, stillbirth and spontaneous abortion, risk of abnormal placentation and future hysterectomy. Moreover pelvic floor, anal and urinary incontinence were outside of the interest of this study. Short-time maternal complications were seen more frequently in cesarean delivery with relative indications

than in spontaneous vaginal delivery but no difference was found in perinatal mortality and morbidity. There is clear need for research on health outcomes for mothers and infants associated with cesarean delivery without any medical indications.

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