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EFFECT OF CESAREAN SECTION ON MATERNAL REQUEST AND NORMAL VAGINAL DELIVERY ON PREGNANCY OUTCOMES

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ABSTRACT

Objective: To compare maternal medical outcome after Caesarean section on maternal request. and normal vaginal delivery. **Methods:** The prospective observational study of healthy primiparous women in the maternity Hospital, Almadinah, The Kingdom Saudi Arabia, who were either scheduled for a planned Caesarean section (for breech presentation or at maternal request) or admitted for a normal vaginal delivery had used. Data were analyzed according to mode of delivery; either cesarean section or vaginal. **Results:** The total number of subjects are 551 women, ten cases had been dropped, the remaining is 541 women; 242 of those women had a Caesarean section and 299 of them had a vaginal delivery. There were sociodemographic differences between the groups. No difference in mean estimated blood loss or rate of infection was found. The difference in estimated blood loss between women undergoing planned Caesarean section and women who had a vaginal delivery was not more than 7%. Morbidity in the planned vaginal delivery group was mostly due to operative interventions. The Caesarean section group had a longer hospital stay than women who delivered vaginally. **Conclusion:** There is no difference medical outcomes between primiparous women undergoing Caesarean section on request and those undergoing a normal vaginal delivery after analysis according to mode of delivery in short-term. **Recommendation:** Future research in this area regarding long-term risks of Caesarean section and also on the baby outcome should be studied.

INTRODUCTION

There is no evidence that Caesarean section is a better, safer, and less painful way to give birth than normal delivery and the subsequent request or demand for CS without a medical indication are relatively new.[1–5] The rate of CS has obviously increased during the last

decades, in some countries to almost one third of all deliveries.[6-7] In the Kingdom Saudi Arabia, the overall cs rate significantly increased by 80.2% from 10.6% in 1997 to 19.1% in 2006. From the year 2000 to 2015, rates of cesarean deliveries increased in all regions of the world, with the highest rates of cesarean delivery found in Arab countries. In 2017, Among all countries that are part of the Organization for Economic Co-operation and Development (OECD), Turkey, followed by Korea, had the highest rate of Caesarean section births (or C-sections). At that time, the rate of C-sections in Turkey was 531.4 per 1,000 live births. Among global regions, Latin America and the Caribbean had the highest percentage of births that were delivered by C-section, while West and Central Africa had the lowest rates of Cesarean section births. There is no accurate rate for the incidence of cesarean section in Arab country specific on request in relation to vaginal delivery. Both vaginal breech and operative vaginal deliveries showed a significant decrease of 38% and 29%, respectively.[8–10] Most previous studies of medical complications associated with CS have been retrospective and most have shown an increased risk of major complications in women delivered by CS compared with women who delivered vaginally.[8,11–13] There is a randomized study comparing CS and vaginal delivery showed no difference in the rate of major complications, but this study was designed to study neonatal outcome after breech delivery.[14,15] To be more accurate in a study comparing the risks faced by healthy women in delivering by CS or vaginally, the outcomes should be analyzed according to planned mode of delivery, not actual mode of delivery. If actual mode of delivery is studied, the risks associated with a planned vaginal delivery that results in an emergency CS will be overlooked. Comparisons of the outcome of CS with the outcome of vaginal delivery may be influenced by the indication for CS, whether it was performed in labour or before labour, the mother's health and parity, and pre-existing complications of pregnancy. Evaluation of the true risks associated with CS ideally requires a study randomizing healthy women to delivery by planned CS or planned vaginal delivery. To date, retrospective cohort studies or randomized controlled studies of CS for breech presentation have been used as substitutes. There has been a lively discussion in the media regarding the issue of elective CS performed on maternal request without any specific obstetric indication.[15] Few professionals have taken part in the public debate; one probable reason for this is the lack of robust scientific evidence regarding the risks associated with CS in healthy women. WHO Statement on Caesarean Section Rates mentioned that, the effects of caesarean section rates on other outcomes, such as maternal and perinatal morbidity, pediatric outcomes, and psychological or social well-being are still unclear. More research is needed to understand the health effects of caesarean section on immediate and

future outcomes. Therefore, it is important to investigate how women's health may be influenced by the mode of delivery. The aim of this study was to compare maternal outcomes, especially the risk of infection and excess blood loss in healthy primiparous women after CS on request and planned normal vaginal delivery in a prospective observational study.

Ethical clearance

Our concern was patient confidentiality and medical information, this confidentiality would be secured by using only the number and not the patient name in our data collection sheet, and on top all data was protected by password. Ethical clearance was obtained from hospital review board.

MATERIAL AND METHODS

The place of the study is Maternity Hospital, is situated in Al Madinah, Kingdom of Saudi Arabia, and has two labour wards with a total of 8500 deliveries per year. During the study period, January 2010 to June 2011, a total of 20082 deliveries took place and the total CS rate, including both primiparous and multiparous women, was 19%. It was estimated that there would be a 20% complication rate after CS (10% blood loss over 1000 mL and 10% infection), and a 10% complication rate after vaginal delivery (5% blood loss > 1000 mL and 5% infection). The statistical power calculation predicted that 219 women would be needed in each group to detect this difference (power 80%, significance 5%) so the sample size was 551 women were included in the study. Ten women who had been planning vaginal delivery were not delivered at the study hospital and were therefore excluded. Of the remaining 541 women, 242 were planning a delivery by CS and 299, a vaginal delivery. Selective sample was used recruited by the following criteria;

- Healthy and primiparous and a BMI < 30 kg/m2
- Singleton, normal pregnancy
- Maternal request of caesarean delivery or because of breech presentation.
- Maternal refusal to undergo the induction of labor or subsequent failure to such induction and subsequent request of caesarean delivery.

The exclusion criteria are

- Twin pregnancies
- Maternal comorbidity

Primiparous Women who were arranged to undergo a planned CS were asked to participate if they fulfilled the previous inclusion criteria: being healthy and primiparous, and having a singleton, normal pregnancy, a BMI < 30 kg/m2, and a plan for delivery by CS because of breech presentation or because of maternal request. Women were included in the study at between 37- and 39-weeks' gestation. For every woman arranged for a CS, one or two women from the same antenatal clinic and planning a vaginal delivery were also asked to participate. The women in the control group (having normal vaginal delivery) were required to fulfil the same inclusion and exclusion criteria, with term estimated to be within one to two weeks of the estimated dates of the matched women in the study group (planned CS). Women were informed about the study by the researcher and gave their consent by telephone. A questionnaire on sociodemographic background and health was sent to all participants shortly after their inclusion in the study by E mail or hand while her visit to the clinic. If a questionnaire was not returned within three weeks of Emailing, a reminder was sent. In every case for which data were missing or incomplete, the woman was contacted by telephone. Presumed infections were noted in the medical records. The diagnosis of endometritis was verified by the criteria: positive culture and/ or elevated serum C-reactive protein, in addition to the presence of symptoms. Prophylactic antibiotics were administered to women who underwent CS in labour. Anti-thrombotic prophylaxis was not given. After CS, blood loss was estimated jointly by the midwife nurse. The content of drainage bottles was measured and recorded. After vaginal delivery, blood loss was estimated visually by the midwife according to the routine of the hospital. Where there were difficulties in estimating the blood loss or when the loss visually exceeded 500 mL, pads, swabs, and diapers were weighed. These estimations were standard hospital procedure. All data were analyzed according to intended mode of delivery. Sample size was based on the previous incidence of infections and postpartum hemorrhage. Standard descriptive statistics (e.g., mean, standard deviation, and range) were used to summarize the variables. Group differences in age and weight were analyzed using Student t test. For categorical data, chi-square was used, with use of Fisher test if the data were skewed. A significance level of 5% was used. All statistical analyses of the data were performed using the JMP statistical package (SAS Institute Inc., Cary NC). The study design is observational prospective study regarding mode of delivery, blood loss amount, blood transfusion, use of analgesics after delivery, duration of hospital stays, Apgar score, and the health and condition of the newborn were retrieved from the medical records to be sure the baby is life and normal. Two months after delivery, the participants received a

second questionnaire concerning complications in the postpartum period. The study was approved by the Ministry of Health, The Kingdom Saudi Arabia.

The strengths of this study are that it was conducted prospectively and data were analyzed by intended mode of delivery. In addition, it was performed at a one hospital and all participants women were primiparous and received the same basic care. Few patients dropped out of the study, and when data were missing or incomplete, the participants were contacted personally. An obvious limitation of the study is its relatively small size. However, the sample size was sufficient to detect clinically relevant differences in blood loss between the groups, because it was possible to exclude a difference in blood loss of more than 7% between the groups. Because of the small size of the observational study, unusual complications such as thromboembolic events and hysterectomy may have been overlooked. Participants were recruited from the same geographic area, and therefore it may not be possible to generalize our results to other populations.

RESULTS

A total of 541 women were included in the study;242 were planning a delivery by CS and 299, a vaginal delivery. The indications for planned CS were breech presentation (n = 135) and maternal request (n = 112). The first questionnaire (One day after delivery) was completed by 202/242 women (83%) in the planned CS group and by 265/299 women (87%) in the planned vaginal delivery group. The second questionnaire (Two months after delivery) was completed by 225/242 women (93%) in the CS group and 278/299 women (93%) in the planned vaginal delivery group. (Table 1).

Table 1: Design of the study.

Phase	Data collected from (questionnaire& medical records)	Response rates	
		CS group	**Vaginal delivery group**
		n = 242	n = 299
Inclusion (37 to 39 weeks)	Sociodemographic factors, perceived health (questionnaire)	202/242 (83%)	265/299 (87%)
one day after delivery	Delivery data (medical records)	n/a	n/a
Two months after delivery	Complications post-partum	225/242 (93%)	278/299 (93%)

Sociodemographic factors were different in the two groups (women planning delivery by CS and women planning a vaginal delivery). Women planning a vaginal delivery were younger,

less likely to have attended university, and less likely to rate of smoking for their or their husbands than women planning delivery by CS; these observations have been presented in Table 2.

Table 2: Sociodemographic factors.

Factor	Planned CS n = 242	Planned vaginal delivery n = 299	P
Mean age in years (range)	32 .4 (19 to 43)	31 .0 (17 to 42)	< 0 .001
Secondary Education (%)	140/247 (57)	190/290* (65.5)	0 .013
Smokers or husband smokers (%)	26/247* (10.5)	17/285* (6 .0)	0 .008
Pregnant after IVF (%)	18/247 (7 .3)	10/285* (3 .5)	0 .051
Mean weight in kg	63.1	64.6	0 .170

* Some medical files did not contain all data

Both of women scheduled for CS on maternal request and women planning vaginal deliveries, had normal outcomes (normal Apgar score and normal birth weight). women scheduled for CS on maternal request had longer duration of hospital stay, days than women planning vaginal deliveries while amount of blood loss was more among women planning vaginal deliveries than women scheduled for CS on maternal request. At one day after delivery, 100% of women in the planned CS group and 67% in the planned vaginal delivery group required analgesics (P < 0.001). (Table 3).

Table 3: Delivery data & Analgesics.

	Planned CS n = 242	Planned vaginal delivery n = 299	P
Mean gestational week at delivery	38	40	< 0 .001
Mean birth weight, g	3339	3617	< 0 .001
Mean blood loss, mL	584	625	0 .320
Mean Apgar score at 5 minutes	9 .6	9 .6	0 .980
Mean duration of hospital stays, days	3 .7	2 .8	0 .001
Using analgesics	242 (100%)	201 (67%)	(P < 0.001)

Table 4: Complications & sexual intercourse.

	Planned CS n = 242 n (%)	Planned vaginal delivery n = 299 n (%)	P
Blood loss ≥ 1000 mL	25 (10)	41 (14)	0 .38
Blood transfusion	6 (2 .4)	10 (3 .4)	0 .17
Endometritis*	8 (3.3)	8 (2 .7)	0 .12
Urinary infection*	7 (2 .8)	15 (5 .1)	0 .13
Wound infection*	0	1	
Deep vein thrombosis/pulmonary embolism*	0	1	
Intestinal obstruction*	1	0	
Prolonged vaginal bleeding*	1	0	
Urinary retention	0	1	
Anal sphincter injury, 3rd and 4th degree	0	9 (3)	
Instrumental delivery	0	45 (15)	
Emergency CS or CS performed before schedule	24 (10)	46 (15)	0 .09
One or more major complications‡	35 (14)	52 (17.3)	0 .12
resumed sexual intercourse	205 (84) %	290 (97%)	(P < 0.08)

* At three-month follow-up
† For indications, see text
‡ Major complications = infection, blood loss ≥ 1000 mL or blood transfusion, and sphincter injuries (third- and fourth-degree tears).

In table 4: There was no difference in estimated blood loss or the rate of blood transfusion between the planned CS group and the planned vaginal delivery group, nor was there a difference in the incidence of infection. There were few infections in either group, and most of the infections were managed with use of oral antibiotics. The difference in mean blood loss between the groups was 45 mL (95% CI −131 to +41), or 7% (95% CI −21% to +7%). This indicates that CS could lead to either a decrease in blood loss by up to 21% or an increase in blood loss by up to 7%. The possibility of delivery by CS resulting in more than 7% greater blood loss than vaginal delivery can be excluded with 95% confidence. Because of early onset of labour, 26 planned Caesarean sections had to be performed earlier than scheduled. Among women planning a vaginal delivery, 46/299 (15%) had a CS performed in labour. The indications for CS were suspected fetal distress (21 cases), failure to progress in labour (20 cases), preeclampsia or HELLP syndrome (3 cases), and breech presentation (2 cases). One

case of pulmonary embolism and one wound infection occurred after emergency CS in the group Planned vaginal delivery. The incidence of sphincter injuries, including minor injuries, was 11% (32/299). At one day after delivery, 100% of women in the planned CS group and 67% in the planned vaginal delivery group required analgesics ($P < 0.001$). As expected, women in the planned CS group had significantly more abdominal pain and women in the planned vaginal delivery group had more perineal pain ($P < 0.001$). There were no significant differences between the groups when the women were asked about any other sources of pain. Two months after delivery there were no differences in reported pain of any kind. Approximately three quarters of the women in the CS group and most of women in the vaginal delivery group (84) % in the CS group and (97%) in the vaginal delivery group) had resumed sexual intercourse at two months after delivery. Before delivery there were no significant differences between the groups when they were asked about discomfort during intercourse.

DISCUSSION

The aim of this study was to compare medical complications in healthy primiparous women after planned vaginal delivery and planned Caesarean section. The data was analyzed according to intended mode of delivery, there were sociodemographic differences between the two groups; women planned vaginal delivery and women planned Caesarean section, while the previous study found that women in the CS group were less healthy than those in the planned vaginal delivery group17; this may have shifted the results in favor of the vaginal group. Because only primiparous women were included in this study, the results cannot be used to estimate the rate of complications in women with multiple Caesarean sections. The rate of complications in vaginally delivered women in this study may appear to be high but is in accordance with figures for primiparous women in the Saudi Medical Birth registry.[7,24]

There is no differences between the two groups in the rate of complications such as excessive blood loss or infections in the observational healthy primiparous women. Liu S, et al. (2007) reported that visual estimation of blood loss is unreliable.[22] The confidence intervals of the calculated blood loss indicate that this was the case in this study also. The complication rate in the planned vaginal delivery group was higher than previously reported in the studies of Liu S, et al. (2007), Liu S et al. (2005), & Villar J (2005).[9,12,23] If the findings of this study had not been analyzed by intended mode of delivery, some of these complications would have been included in the Caesarean section group, which would have been misleading. It is

possible that previous reports of higher complication rates associated with CS have been influenced by such bias. Higher rates of infection and greater blood loss have been major arguments against permitting planned CS with no medical indication. At this hospital in 2009 the rate of instrumental deliveries in primiparous women was 15.7%, and the rate of third- and fourth-degree perineal tears was 9.4 %. In a Canadian study of healthy nulliparous women, the rate of emergency CS was 14.7%, and 6% of the women who delivered vaginally had third or fourth degree perineal tears.[25] Only one randomized study has investigated differences in maternal complications between women after CS and after vaginal delivery, and no difference in maternal morbidity was found between the two groups.[14] Schindl et al. in 2003 also found there were fewer complications after planned CS than after planned vaginal delivery.25 Both of these studies included nulliparous and multiparous women. Other non-randomized studies have come to different conclusions regarding the rate of complications after CS. Some studies have shown no increase in blood loss after CS, but most show that the risk of infection is higher than after vaginal delivery.[9,23,27] A large database study of infection after vaginal delivery and after CS showed a five-fold higher risk of infection after CS, but this study included women who had an emergency Caesarean section (instead of a planned vaginal delivery) in the CS group.[28] If a large database study is analyzed by intended mode of delivery and selection of primary outcome, the results will the inclusion and exclusion criteria. One recent prospective cohort study was performed in 120 units and involved 13 208 planned Caesarean sections, 18 613 emergency Caesarean sections, 60 927 vaginal deliveries, and 1559 forceps deliveries.[23] The odds ratio for maternal morbidity was 2.0 for women undergoing emergency CS and 2.3 for women undergoing a planned CS. Vaginal delivery was used as reference. The data for this study were not analyzed according to intended mode of delivery. The primary maternal outcome was defined by blood transfusion, hysterectomy, maternal transfer to an intensive care unit, hospital stay of more than seven days, and maternal death. The second maternal outcome was postpartum antibiotic treatment, and the third was perineal lacerations of third and fourth degree. In assessing the relationship between CS and the overall morbidity/ mortality index, the study was controlled for parity, any pathology previous to current pregnancy, any pathology during current pregnancy, hypertensive disorders, vaginal bleeding in the second half of pregnancy, suspected intrauterine growth restriction, and other medical conditions.[22] It is difficult to compare this study with ours since so many units were involved. The increased rate of complications in this study may well be attributed to unusual complications. In a large Canadian retrospective study, maternal morbidity was also higher in women who delivered

by CS.[8] In this study, 2 292 420 women with a planned vaginal delivery were co mpared with 46 766 women who underwent planned CS because of breech presentation. Women with a previous CS, a multiple pregnancy, preterm labour, and certain other obstetric complications were excluded, although parity was not controlled for. This study showed a three-fold increase in severe morbidity in women undergoing CS (overall rates 27.3 cases per 1000 deliveries after CS vs. 9.0 per 1000 after vaginal delivery).[9] The study data were analyzed according to intended mode of delivery. It is obvious that the large size of this study permitted detection of unusual events. In another recent Canadian study of 39 067 healthy nulliparous women analyzed in the same way, no differences in life-threatening maternal complications were found between women delivering by CS and women delivering vaginally.[25] Complications after planned CS in healthy women are therefore rare but serious. A single CS may not have a disadvantageous effect on a woman's health, at least not in the short term. This is in line with a statement from the American National Institutes of Health.[27] Instead, vaginal delivery in a primiparous woman is associated with high risks of CS in labour, instrumental delivery, hemorrhage, and perineal lacerations. Complications in primiparous and multiparous women are usually reported together, and for this reason complication rates seem to be lower than it would if reported separately, since the first vaginal delivery is associated with a higher rate of complications than subsequent deliveries, and the reverse is true for CS.[10,29] A strong argument against liberal policies of delivery by CS is the prospect of adverse medical outcomes in subsequent pregnancies.[30] The consequences for the ensuing deliveries must be considered in decisions about elective CS. Several factors must be considered when counselling pregnant women on how they should give birth. It is very difficult to predict the reproductive future of an individual woman.[31,32] The woman's age, any history of infertility, and time to conception may guide decisions. It is arguably not a good option to deliver a first pregnancy by elective CS if more than three children are planned, since several studies have shown higher rates of complications after three or more Caesarean sections.[10,29,30,33–36] Maternal age and weight and the presence of pregnancy complications are important factors to consider. A study from Finland of 2496 women, all delivered by CS, showed that the complication rate after CS increases after emergency CS, in maternal obesity, in older women, and in women with preeclampsia.[37] Increase the rate of cesarean section, increase in of the frequency of, atopic disease, and risk of autoimmune disorder (eczema, asthma, rhino conjunctivitis, obesities, obesity, diabetes and other).[38]

CONCLUSION AND RECOMMENDATION

There is no difference in short-term medical outcomes between primiparous women delivered by Caesarean section on request and women delivered by vaginal delivery, after analysis according to the mode of delivery. Future research in this area should focus above all on reducing complications in primiparous women delivering vaginally and also effect of cesarean section on the delivered baby. The long-term risks of Caesarean section on the mother and baby should also be studied.

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