Repeated cesarean sections. *How many is safe?*

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Cesarean section (CS) is one of the most common procedures in obstetric practice, which is a life-saving procedure for mother and the newborn, but carries the risk of complications like infections, hemorrhage, and so forth. It is suggested that one of the significant risks of cesarean delivery is the need for a secondary cesarean delivery. Repeat cesarean sections (RCS) cause increased risk of morbidity and mortality, and the decisions for RCS are not always based on clinical grounds. Nonclinical factors, including the setting in which health care takes place sometimes, influence the obstetrician's clinical decisions. The reported complications of RCS are uterine scar rupture, bladder injury, and placental site abnormalities. A repeat cesarean delivery carries significantly more risk in terms of placenta previa, placenta accreta, uterine rupture, injury to internal organs during surgery, excessive blood loss, need for hysterectomy, and maternal death. Uygur et al[1] reported that there was no difference in morbidity and mortality between one and 3 RCS, and Alchalabi et al[2] reported that women with 3 or more previous cesarean sections were at significantly higher risk of blood transfusion, and post-operative pyrexia. This retrospective study was carried out with the following aims in mind; firstly to estimate the increasing maternal morbidity and complications associated with RCS, and secondly to find the ideal number of RCS that could be labeled as safe.

We performed a retrospective study from January 1997 to December 2006 at King Fahd University Hospital, Al-Khobar, Kingdom of Saudi Arabia. The medical records of all women who underwent cesarean deliveries during the study period were reviewed. We assessed and compared maternal complications between women who underwent ≤3 CS (group A) with women who had ≥4 CS (group B). Gestational age was either confirmed or recalculated based on an early ultrasound biometry. Demographic data, details of medical and obstetric history, and information on the intraoperative and postoperative events were recorded. In particular, from the operative notes we obtained data on estimated blood loss, blood transfusion, abdominal adhesions, dehiscence of uterine scar, uterine rupture, incidence of cesarean hysterectomy, placenta previa, bladder, and bowel injury. Adhesions were classified as mild, moderate, severe, and inassessable adhesions were defined as the presence of multiple adhesions between the uterus and surrounding tissues or organs. Complications were compared between the 2 groups with student t test, and 95% confidence interval (CI). The model included important clinical variables: maternal age, parity <3 and more than 4, and gestational age, weight of the neonate, blood loss, placental weight, and complications like placenta accrete, placenta previa, and hysterectomy. Significance tests were 2-sided, and $p<0.05$ was considered significant. Statistical analysis was performed with SPSS version 14 (SPSS Inc., Chicago, Illinois, USA).

Three hundred and twenty-two repeat cesarean deliveries were performed during the study period. One hundred and ninety-two women had ≤3 CS (group A), and 130 women had more than ≥4 RCS (group B). Demographic and obstetric characteristics of the 2 groups is presented in **Table 1**. The groups were similar with respect to gestational age and placental weight. The type of anesthesia in the groups was general, epidural, or spinal. There was no significant difference between the 2 groups. Most women were within the 31-40 years age group. As expected, patients who had ≤3 CS were younger than the women who had ≥4 CS. Intra-operatively adhesions were observed in women in both the groups. In group A, the adhesions found were less and of the minimal type, whereas in group B, the adhesions were severe and inassessable. The comparison between both the groups was significant at $p=0.001$ for the minimal adhesions with 95% CI: 0.033, OR<0.1052, for severe adhesions: $p=0.0001$ and and for the inassessable adhesions: $p=0.0001$, 95% CI: -0.3235 and -0.1684. Women who underwent >4 CS had longer duration of surgery and lost significantly more blood than the women who had <3 CS (584 ml versus 789 ml, $p=0.001$ 95% CI: -214.6 and -195.3).

Table 1 - Demographic data of group A and group B.

Parameter	Group A ≤3CS n=192	Group B ≥4 CS n=130	*P*-value
Age, years	32±6.1	41±8.2	0.001
Gravida	3.2±1.1	6.3±2.7	0.001
Gestational age, weeks	37.72±1.59	37.36±3.3	0.2
Duration of surgery, minutes	46.15±2.30	66.8±7.1	0.001
Weight of the baby, kg	3.2±0.5	3.8±0.7	0.3
Placental weight, grams	586.5±76	582±52	0.3
Blood loss, mL	584.7±31.1	789±50.4	0.001
Placenta accreta	2	5	0.05
Placenta previa	1	4	0.001
Hysterectomy	1 (0.52%)	5 (3.8%)	0.001

Two (1%) patients in group A, and 5 (3.8%) in the multiple-cesarean group had placenta accrete. One (0.5%) in group A, and 5 (3.8%) in group B had placenta previa, which was highly significant (p=0.001, 95% CI: 0.928 and 0.994). Five patients in group B, and one in group A required hysterectomy due to excessive bleeding and atony of the uterus. Eighteen women in group A (9.4%), and 22 (16.9%) in group B required blood transfusions.

The results of this study demonstrate that women who undergo RCS of more than 4 are associated with increased risk of surgical difficulties and a slight, but statistically significant, increase in major complications. Maternal age was significantly higher in the women with RCS when compared to women with 3 or less CS. In this study, we have observed that intra-operatively the complications in group B occurred more than in group A. Adhesions were more common in women who had more than 4 CS when compared to women with 3 or less than 3 CS. The increased adhesions have been reported by many authors previously. In our study, the operative time and loss of blood were significantly higher in group B as compared with group A (≤3 CS). Our results show that in women in group B (≥4 CS) abnormal placentation was the major risk factor, which is similar to that reported earlier.[3] Recently Knight et al[4] found that peripartum hysterectomy is strongly related to previous cesarean delivery and the risk rises with an increasing number of previous cesarean deliveries and maternal age over 35 years. In our study, in group B there were 5 hysterectomies compared to one in group A. Silver et al[5] reported that 2.4% of women with RCS had a hysterectomy, whereas in our study we had an incidence of 3.8% of hysterectomies in the developing countries, particularly in the Gulf region. There are many social and cultural requirements for larger families, hence, multiple cesarean sections are not uncommon. Implementation of the aforementioned trend in such populations will obviously lead to an increase in women with multiple cesarean deliveries. Such situations further increase the risk of complications. Reports in the literature have not clarified clearly whether multiple cesarean sections increase the morbidity and mortality or not. Although the safety of cesarean sections has been established, still controversy exists on what number of multiple cesarean sections is safe. As fourth cesarean sections become more common, the obstetricians are challenged to prevent adverse outcomes. It is important that initial cesarean sections should be carefully planned in a society where multiple children is the norm, as future cesarean sections could increase morbidities. It is advisable that women planning to have large families should be carefully counseled regarding increased morbidity and mortality.

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