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Original Article

Complications and outcomes of repeat cesarean section in adolescent women

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Abstract: Aim: The evaluation of the effect of repeat cesarean sections in adolescent pregnancies on the morbidity, obstetric and perinatal results. Materials and methods: We reviewed the patient file and hospital records of patients who underwent at least one cesarean section among adolescent age group pregnant women who gave birth at our clinic between January 2010 and May 2013. The patients were divided into two groups as the patients who underwent the second cesarean section (116 patients) and those who underwent the third cesarean section (36 patients). The demographic data, maternal data and obstetric and perinatal results of the patients were evaluated. Results: A significant difference was present between the patients in the evaluation of the total number of examinations during pregnancy ($P = 0.001$), total maternal weight gain during pregnancy ($P = 0.006$), and the first examination gestational age ($P = 0.006$) and all values were less favorable in the third cesarean group. The gestational week at birth ($P < 0.001$), birth weight ($P < 0.001$), and APGAR score ($P < 0.001$) in the group with the third cesarean section were statistically significantly lower than the second cesarean section. The third cesarean cesarean was found to cause a significant risk increase for placenta accreta risk in adolescent pregnancies ($P = 0.042$). Conclusion: The increasing number of cesarean sections in the adolescent group is seen to be a significant risk factor for low gestational week of birth, low birth weight and related morbidities. The most important reason for the increased morbidity with increasing cesarean sections in the adolescent age has been defined as placenta accreta.

Keywords: Adolescent pregnancy, repeat cesarean section, morbidity

Introduction

Adolescent pregnancies are a public health issue with potential dangers in both social and medical regards. Despite differences between regions, the general incidence of adolescent pregnancies among all pregnancies is 0.9-21% in the world. This rate is between 7.9 and 11.8% for Turkey [1, 2]. Adolescent age group pregnancies have higher maternal and fetal mortality and morbidity when compared with the adult age group [3, 4]. A large number of studies on adolescent pregnancies and potential pregnancy risk factors are available in the literature. Beginning of sexual activity at an early age, insufficient knowledge about the use of contraceptive methods, weak communication with the family, frequent psychological problems such as depression, insufficient body development, and low socioeconomic level are the most common risk factors for adolescent pregnancies [5, 6].

Cesarean section (CS) is an important and common surgical procedure that often saves the life of the mother and the baby. Its safety increased with the positive advances in surgical techniques as well as in patient care. The CS rate was 8% within all births in Turkey according to the Turkey Demographic and Health Survey (TDHS)-1993 but this rate was found to be increased to 37% in studies conducted in 2008 [7]. It is possible that the rate has increased even further today. Increasing maternal age, increased operative delivery, medico-legal reasons and previous CS have made important contributions to this increase. On the other

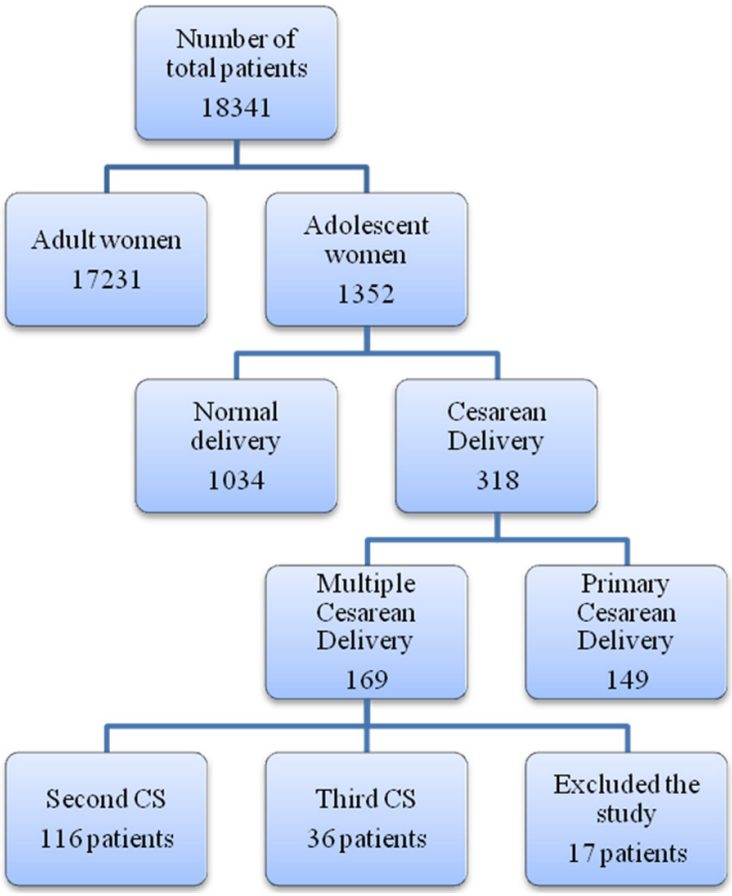

Figure 1. The selection of patients. CS, Cesarean Section.

hand, the CS procedure is important in terms of probable intraoperative and postoperative complications. These complications also increase in relation to the increasing number of CS. The best-known complications are placenta previa and placenta accreta, hysterectomy, and bladder and bowel injury [8-10].

We aimed to investigate the fetal and maternal results of multiple CSs in the adolescent age pregnancies in our study.

Materials and methods

Study design

The present study was prepared by evaluating the charts and hospital records of the patients who underwent at least one cesarean of the adolescent age group pregnant women who had birth in our clinic between January 2010 and May 2013.

Study inclusion criteria

The inclusion criteria were determined as being between the age of 10 and 19 years, having undergone at least 1 cesarean section, not having undergone other abdominal surgery, and the patient data being complete. Multiple pregnancies and births under 20 weeks of gestation or 500 g were not included in the study. We made sure at least 6 weeks had passes after the delivery of the registered patients.

Groups and the investigated parameters

A total of 152 patients who met the defined conditions were included in the study. Two patient groups were formed according to the number of cesarean sections. 36 patients who had undergone the third CS were defined as group I, and the 116 patients who had undergone the second CS (undergo previously one CS) were defined as group II (**Figure 1**). Maternal age, first pregnancy age, marital status, smoking, total weight gain during pregnancy, total number of prenatal obstetrics and gynecology clinic visits, week of starting the pregnancy follow-up, gestational week at birth, the baby's birth weight, 5-minute Apgar score and the presence of pregnancy-related complications (preeclampsia, gestational diabetes mellitus, premature membrane rupture) were evaluated. Intraabdominal adhesions, placenta previa, placenta accreta, uterine atony, hysterectomy, bladder and bowel injury, need for blood transfusion, need for intensive care, postoperative incision. infection presence, endometritis presence and hospitalization length were also investigated.

Description of the variables

Maternal age

Subjects were included in the study based on the age completed at birth (up to 19 years old).

Table 1. Demographic characteristics of the study groups

	Group 1 (n = 36)	Group 2 (n = 116)	*P*
Age (years)	18.32 ± 0.45	18.40 ± 0.39	0.476
Marriage age (years)	14.3 ± 0.6	15.2 ± 0.4	0.001
Marital status	23 (63.9%)	89 (76.7%)	0.127
Smoking (number/day)	3 (8.3%)	5 (4.3%)	0.395

n, number of patients.

Table 2. Obstetric and perinatal outcomes of the study groups

	Group 1 (n = 36)	Group 2 (n = 116)	*p*
Number of examination	4.5 ± 1.4	6.1 ± 1.9	0.001
First examination age (wk)	18,5 ± 6.1	13.6 ± 6.4	0.006
Weight gain (kg)	8.5 ± 3.6	9.7 ± 2.9	0.006
Gestational age in birth (wk)	36.2 ± 2.2	37.6 ± 1.6	< 0.001
< 28	0	0	
28-34	8 (22.2%)	5 (4.3%)	
35-37	14 (38.9%)	40 (34.5%)	
≥ 38	14 (38.9%)	71 (61.2%)	
APGAR	7.1 ± 1.5	8.1 ± 1.2	< 0.001
Birthweight (gr)	2734.7 ± 451.1	3160.5 ± 539.2	< 0.001
GDM	3 (8.3%)	8 (6.9%)	0.722
EMR	5 (13.9%)	8 (6.9%)	0.190
Preeclampsia	2 (5.6%)	6 (5.2%)	1.000

n, number of patients; GDM, Gestational Diabetes Mellitus; EMR, Early membrane rupture.

Gestational week at birth

This was calculated based on the ultrasonographic measurements of the patient at presentation. The expected week of birth was calculated by using the week specified at the present ultrasonography. The gestational week at birth was calculated based on the last menstruation date in the patients who had not undergone ultrasonographic evaluation previously or did not have follow-up. In case of an inconsistency between the last menstruation date and ultrasonographic measurement in the calculation of gestational week at birth for the patients whoknew their last menstruation date and whose ultrasonographic evaluation was performed, the retrospective records of the patients were evaluated and the gestational week at birth was recorded based on the first ultrasonographic measurement.

Intraabdominal dense adhesion

These were the adhesions determined intraoperatively; extending from the abdominal anterior wall to the bladder or uterus anterior wall, nor separating easily and not even dissected as much as possible with the worry that it could cause severe morbidity.

Endometritis

This was a clinical description where puerperal period fever, bad-smelling vaginal discharge and pelvic tenderness were present and no other focus was found after the birth.

Placenta previa

This was the placenta closing the cervix internal os partially or completely on ultrasonographic evaluation performed during the 3rd trimester. It was defined as the placenta closing the uterus lower segment cervix partially or completely during intraoperative observation in patients whose third trimester ultrasonography was not performed.

Placenta adhesion abnormalities

The diagnosis was made with histopathological verification if there was hysterectomy material present and based on intraoperative findings if there was no need for hysterectomy. It was defined as intense bleeding from the adhesion site after the separation in cases where it could not be separated from the adhesion site or could be separated difficult due to various reasons with intraoperative mild traction.

Bladder damage

Accidental bladder damage during intraoperative tissue dissection or directly related to the incision.

Intestinal damage

This was defined as entering the intestinal lumen during the intraoperative tissue dissec-

Table 3. Morbidity indicators and their frequency of the study groups

Morbidity indicators with association of cesarean number (%)	Group 1 (n = 36)	Group 2 (n = 116)	*p*
Dens adhesion	5 (13.9%)	8 (7.8%)	0.322
Placenta previa (n (%))	3 (8.3%)	6 (5.1%)	0.443
Placenta acreata	3 (8.3%)	1 (0.9%)	0.042
Blood transfusion	4 (11.1%)	1 (0.9%)	0.011
NICU	1 (2.8%)	0	0.237
Wound infection	2 (5.6%)	5 (4.3%)	0.670
Bladder Injury	1 (2.8%)	1 (0.9%)	0.419
Uterine atony	2 (5.6%)	5 (4.3%)	0.670
Days of hospitalization	2.8 ± 0.7	2.3 ± 0.6	< 0.001
Bowel Injury	1 (2.8%)	1 (0.9%)	0.419
Endometritis	3 (8.3%)	3 (2.6%)	0.145

n, number of patients; NICU, need for intensive care unit.

tion or seromuscular damage that required repair.

Need for blood transfusion

Blood transfusion was performed in cases where the preoperative Hb value was less than 10 g/dl, intraoperative estimated blood loss was more than 20% of the total blood volume, or the postoperative Hb level was lower than 8.5 g/dl.

Incision site infection

This complication was considered in patients with secretion from the incision site or growth in incision site culture after the 3rd postoperative day.

Results

The demographic characteristics of the groups are presented in **Table 1**, obstetric and prenatal results in **Table 2**, the evaluation of the morbidity data in **Table 3**. When demographic data were evaluated, a statistically significant difference was found between the groups for first pregnancy age, which was significantly lower in the third CS group (14.3 ± 0.6 years vs. 15.2 ± 0.4 years) (*P* = 0.001) (**Table 1**). On the other hand, although the rate of being married officially was lower in the third CS group (23 (63.9%)) compared to the second CS group (89 (76.7%)) no statistical significance was found (*P* = 0.127).

The group with the third CS was found to be significantly more advanced in pregnancy compared to the group with the second CS during the evaluation at the first presentation week of the current pregnancy (18.5 ± 6.1 weeks and 13.6 ± 6.4 weeks respectively) (*P* = 0.006). Similarly, the total number of clinic visits during pregnancy was significantly lower in the group with the third CS (4.5 ± 1.4 vs. 6.1 ± 1.9) (*P* = 0.001). In addition, the total weight gain during pregnancy was statistically significantly lower in the group with the third CS compared to the group with the second CS (8.5 ± 3, 6 kg and 9, 7 ± 2.9 kg) (*P* = 0.006) (**Table 2**).

The gestational week of birth in the group with the third CS was earlier than the group with the second CS and this difference was statistically significant (36.2 ± 2.2 weeks and 37.6 ± 1.6 weeks) (*P* < 0.001). Fetal birth weight was statistically significantly lower in the third CS group than the second CS group and this was correlated with the result (2734.7 ± 451.1 g and 3160.5 ± 539.2 g respectively) (*P* < 0.001). A similar difference was found for APGAR values (7.1 ± 1.5 and 8.1 ± 1.2) (*P* < 0.001). On the other hand, no statistically significant difference was found between the groups in terms of the pregnancy complications of preeclampsia (*P* = 1.000), GDM (*P* = 0.722) and EMR (*P* = 0.190) (*P* > 0.05) (**Table 2**).

Placenta previa was found in 3 (8.3%) patients in the group with third CS and in 6 (5.1%) patients in the group with the second CS. No statistically significant difference was found between the groups (*P* = 0.443). However, a statistically significant difference was found between the group with the third CS and the group with the second CS for the presence of placenta accreta (3 (8.3%) patients and 1 (0.9%) patient, respectively) (*P* = 0.042). No statistically significant difference was found between the groups in terms of dense adhesions (5 patients (13.9%) and 8 patients (7.8%) respectively) (*P* = 0.322). A significant difference was found between the groups in terms of the need for blood transfusion, which was significantly higher in the group with the third CS (4 (11.1%) patients) (*P* = 0.011). Similarly, the duration of hospitalization was found to be increased in correlation with the increasing number of CS and the difference between the

groups was statistically significant (2.8 ± 0.7 days vs. 2.3 ± 0.6 days) ($P < 0.001$) No difference was found between the groups in terms of bladder and bowel damage ($P = 0.419$), endometritis ($P = 0.145$), uterine atony ($P = 0.670$), need for intensive care ($P = 0.237$) and incision site infection (0.670) (**Table 3**). There was no need for hysterectomy in any group during the study.

Discussion

A total of 18341 births took place in our clinic during the study period. The adolescent birth incidence was determined as 7.37%. Our general CS incidence among adolescent pregnant women is 23.52%. The adolescent pregnancy incidence is decreasing day by day thanks to advances in all health care programs. This rate is still higher than in developed countries (20 and 42.9 per 1000 women in the Netherlands [11] and the U.S. [12] respectively), but is lower than in developing countries such as India [13] and Brazil [14] (14.9 and 29 live births per 100 women respectively).

There is a significant increase in the rate of CS birth in general, although the number varies according to the patient's age, place of residence and socio-cultural situation. This increase is more evident in women over the age of 35 and in those living in the city in particular [15, 16]. Although cesarean operations have become safer today, they still have a higher maternal mortality and morbidity than vaginal birth [17]. On the other hand, repeated cesarean sections are related to more severe maternal and fetal complications compared to the first cesarean birth [9]. Repeated cesarean section is not very common in the adolescent period as it is a limited age group. It is therefore difficult to conduct in the adolescent age group the studies performed to evaluate the effects repeated cesarean sections in the adult age group. Another important problem for recurrent cesarean births is the higher cost of cesarean operations compared to normal birth, a factor that is especially significant for developed countries [18].

When the study preliminary data are evaluated, the age at first pregnancy was significantly low, especially in the group with the third CS. This result leads to an increased risk of recurrent pregnancy during adolescent age. Insufficient knowledge on postpartum contraception and the wish to be pregnant again lead to new pregnancies and the need for CS within this period. Yıldırım et al reported that 76% of the adolescent age group pregnancies in Turkey were planned and wanted pregnancies. This is the most important obstacle in the prevention of adolescent age pregnancies [1].

The negative relationship with the increase in the number of cesarean sections is significant in the evaluation of the pregnancy follow-up data (total number of examinations during pregnancy and the beginning week for pregnancy follow-ups). However, no statistically significant difference was found between the groups in terms of preeclampsia, EMR and GDM incidence on follow-up. This is consistent with the literature data where the incidence of pregnancy complications is compared with the adult age group [5].

A woman still needs high levels of energy for her own body during adolescence. A significant part of the energy in put during adolescent pregnant women is therefore spent for the mother's metabolic needs. Most of the pregnancies in this age group are in the low socioeconomic level population and malnutrition is very common. The total weight gained during pregnancy was found to be significantly lower in the group with the third CS (8.5 ± 3.6 kg vs. 9.7 ± 2.9 kg). This result can be explained with malnutrition related to the probable low socioeconomic level, the shot intervals between the pregnancies, and an imbalance of maternal energy intake due to increasing metabolic needs such as breastfeeding and pregnancy.

Gestational week at birth has a direct effect on perinatal results [5]. Gestational week at birth was lower in the group with the third CS (36.2 ± 2.2 weeks) than the group with the second CS (37.6 ± 1.6 weeks) in our study. This result is correlated with literature data evaluating potential maternal and fetal complications of repeating cesarean sections in the adult age group [9]. APGAR score investigation revealed values that were lower in the third CS group than the second CS group and this could be due to the low birth weight and gestational week. The effect of repeat CS on maternal morbidity was evaluated in a large number of studies [9, 10]. Intraabdominal dense adhesions, placenta adhesion abnormalities, placenta previa and

intraoperative organ injuries are important reasons of morbidity. The placenta previa risk was shown to be increased 0.28-2% in patients with at least one previous cesarean in a meta-analysis where 36 studies were included [19]. The placenta previa risk was found to be 5.2 per 1000 births in a cohort study with 9 years of follow-up that included primipars. Evaluation of the risk of placenta previa (OR 1.4; 95% CI 1.1-1.6) and placental abruption (OR 1.3; 95% CI 1.1-1.5) in the second pregnancy follow-up revealed that rate in CS is higher than in normal labor [20]. On the other hand, 3 or more CSs were reported to be a significant risk factor especially for placenta previa in many studies in the literature [9]. However, there are also studies not supporting this finding, especially for placenta previa [21]. Placenta accreta is one of the most important morbidities in repeat CS. The risk is reported to be related to an increasing number of CS and especially placenta previa located on the uterus anterior wall [9]. The rate of concurrent placenta previa and placenta accreta is lower than 11% in the second cesarean, 40.4% in third cesarean and over 60% with a higher number of CSs [9, 22]. However, the generally accepted factor for increased risk is the presence of at least two past cesarean sections [8, 23]. On the other hand, there are articles reporting that placenta accreta and the number of CS are unrelated [24]. No statistically significant difference was found between our groups in terms of the placenta previa incidence. The increasing number of CS was found to be accompanied by a significantly increased risk placenta accreta (P = 0.042). The need for transfusion was also higher in the group with three CSs (P = 0.011). The placenta previa and placenta accrete incidence was 8.3% in the group with the third CS and higher than the rate for the adult age group reported in the literature [9, 10]. This may be because our hospital is a regional center where risky patients are referred. The need for hysterectomy and blood transfusion is closely associated with placenta previa and placenta accretes [10]. There was no need for hysterectomy in either group in our study.

Repeat CS are an especially important risk factor in terms of intraabdominal dense adhesions. Prolonged surgery, other organ injuries, bleeding and increased need for blood transfusion is important related complications. The rate of intraabdominal dense adhesions was statistically significantly different between the second CS and third CS groups (7.8% and 13.9% respectively). This result is lower than in the adult age multiple CS groups in the literature [9]. Bladder injury is a significant complication that is closely associated with adhesions and the rate of 1.97% in this study is higher than the 0.14% reported by Dhanasekaran et al. However, no significant difference was found between our groups. Although a significant difference was present between the groups in terms of bowel injuries, the detection of a value higher than reported in the literature in the group that underwent the third cesarean is noteworthy [9, 25-27].

The risk for uterine atony can increase with the number of births and cause morbidity and mortality [28, 29]. Past cesarean operation is a significant risk factor (OR (95%) 1.3 (0.6-2.8)) [28] No statistically significant difference was found between the group with the second CS and the group with the third CS in terms of uterine atony in our study (9.4% and 5.5%, respectively) (Total incidence 8.6%). However, the incidence in the group with the third CS was higher than in the general population [31, 32]. Uterine atony can be thought of as a complication developing secondary to postpartum bleeding related to placental adhesion abnormalities and placenta previa.

We found CSs in the adolescent age to be a risk factor for placenta previa and placenta accreta when compared with the rate in the general population in our study. However, no increase of placenta previa risk was found for up to three CSs. On the other hand, when compared with literature data in terms of perinatal results [5], the increasing number of CS in adolescent age pregnancies constitutes a risk in terms of very low baby birth weight, low gestational week, and related complications. Our study consisted of patients who had undergone three CS at most and the low number of cases is a limitation in the evaluation of maternal and fetal results. Close prenatal follow-up in current adolescent pregnancies, directing the patients to normal vaginal delivery as much as possible, and even encouraging a normal vaginal birth after a cesarean section will play a critical role in the prevention of unfavorable results.

Disclosure of conflict of interest

None.

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