PERINATAL JOURNAL

Original Article

Perinatal Journal 2018;26(3):112–116

Myomectomy during cesarean section: is it a safe procedure?

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Abstract

Objective: To evaluate the relationship between intraoperative and postoperative complications of the myomectomy procedure performed during cesarean section.

Methods: Our study included 280 patients who had undergone cesarean section at Obstetrics and Gynecology Clinic of Düzce University. The study group was comprised of 45 patients who had undergone myomectomy during cesarean section. The remaining 235 patients having had only cesarean section constituted the control group.

Results: When the groups were compared, the duration of the operation was longer in the group with both myomectomy and cesarean section (49.5 min *vs.* 44.3 min; p=0.002). No statistically significant difference was found between the groups in terms of postoperative hemoglobin levels, decrease in hemoglobin levels or intraoperative and postoperative complications.

Conclusion: Myomectomy during cesarean section was not associated with increased blood transfusion, postpartum hemorrhage or postoperative complications and only differed from the cesarean section group in the duration of the operation. Myomectomy during cesarean section performed by experienced surgeons can be a safe surgical procedure.

Keywords: Cesarean section, hemorrhage, myomectomy, leiomyoma.

Özet: Sezaryen doğum esnasında miyomektomi: Güvenli bir uygulama mı?

Amaç: Sezaryen doğum esnasında yapılan miyomektomi uygulamasının intraoperatif ve postoperatif komplikasyonları arasındaki ilişkiyi değerlendirmek.

Yöntem: Çalışmamıza, Düzce Üniversitesi Kadın Hastalıkları ve Doğum Kliniği'nde sezaryen doğum gerçekleştirmiş 280 hasta dahil edildi. Çalışma grubu, sezaryen doğum esnasında miyomektomi olan 45 hastadan oluştu. Sadece sezaryen doğum gerçekleştiren kalan 235 hasta ise kontrol grubunu oluşturdu.

Bulgular: Gruplar karşılaştırıldığında, hem miyomektomi hem de sezaryen olan grupta operasyon süresi daha uzundu (49.5 dk'ya karşı 44.3 dk; p=0.002). Postoperatif hemoglobin seviyeleri, hemoglobin seviyelerinde azalma veya intraoperatif ve postoperatif komplikasyonlarda azalma bakımından gruplar arasında istatistiksel olarak anlamlı fark yoktu.

Sonuç: Sezaryen esnasında miyomektomi, artmış kan transfüzyonu, postpartum hemoraji veya postoperatif komplikasyonlarla ilişkilendirilmemiştir ve sezaryen olan grupla sadece operasyon süresi bakımından farklılık göstermiştir. Sezaryen esnasında deneyimli cerrahlar tarafından gerçekleştirilen miyomektomi güvenli bir cerrahi uygulama olabilir.

Anahtar sözcükler: Sezaryen doğum, hemoraji, miyomektomi, leyomiyom.

Introduction

Leiomyomas are the most common uterine neoplasms and are detected using various imaging modalities in almost 40% of women during their reproductive period.[1] Most of these women are asymptomatic, but 1 in 4 requires treatment.[2] The incidence of uterine leiomyomas during pregnancy varies depending on the time of assessment. In various publications this rate ranges from 0.37% to 12%.[3–5] Given that maternal age for pregnancy is increasing and that the incidence of myoma increases with age, obstetricians are more likely to encounter pregnant patients with myomas and be required to treat complications related to them.[6,7]

Myomectomy during cesarean section (C/S) is still a controversial subject. The main concern here is the

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Received: July 23, 2018; **Accepted:** October 23, 2018

Please cite this article as: Başbuğ A, Yıldırım E, Yavuzcan A, Ellibeş Kaya A, Göynümer FG. Myomectomy during cesarean section: is it a safe procedure? Perinatal Journal 2018;26(3):112–116.

Available online at:
www.perinataljournal.com/20180263003
doi:10.2399/prn.18.0263003
QR (Quick Response) Code:

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excessive bleeding and increased morbidity that may occur during the operation.[8] Many sources still object to routinely performed myomectomy during C/S for these reasons.[9,10] Recent literatures states that, however, studies and meta-analyses have been carried out suggesting that C/S myomectomy is a safe surgical procedure and that positive results may be obtained for subsequent pregnancy outcomes.[11,12] For this reason, this combined surgical procedure has been introduced more frequently by many surgeons.[13]

In this study, we aimed to examine C/S myomectomy cases performed at our center and evaluate the effects of this procedure on intraoperative and postoperative morbidity.

Methods

This study is a retrospective cohort study conducted at a single medical center. Cesarean section patients admitted to the Düzce University Medical Faculty Hospital between January 2015 and June 2018 were included in the study. Records of patients who were operated on within this period were obtained from patient files and the hospital's automation system. This study was approved by the local ethics committee (IRB no. 2018/0069).

Study population was divided into 2 groups. Group 1 included those who had undergone myomectomy during C/S and Group 2 (control group) included those who had undergone C/S only. Patient data recorded included age, gravida, parity, gestational week of operation, duration of operation, length of hospital stay, indications for cesarean section and localization and number of myomas. Informed consent was obtained from patients diagnosed with myomas before the cesarean section.

Our primary goal in this study was to evaluate the effect of myomectomy performed during C/S on intraoperative and postoperative outcomes. For this purpose, we evaluated blood loss during the operation, uterine atony, major organ injuries and need for blood transfusion or relaparotomy.

Estimated blood loss was calculated according to the formula:

> Δ hemoglobin concentration = baseline hemoglobin concentration – postoperative 6th hour hemoglobin concentration

The duration of surgery was calculated in minutes – from skin incision to skin closure. The decision for blood transfusion was made according to the patient's symptoms, including tachycardia, hypotension or changes in postoperative hemoglobin level.

All C/S operations were performed using transverse lower uterine segment incisions, while myomectomy was carried out using the serosal incision technique. If the myoma was close to the C/S incision, it was excised from that incision, otherwise it was removed from a different incision.

Between the dates mentioned above, there were 4280 births in our hospital and 2300 of them were via C/S. Forty-five of these patients had undergone myomectomy during C/S and these were included in the study group. The control group was randomly selected and included 10% of the patients having had only C/S.

The operations were performed by surgeons experienced in the field of myomectomy operations and trained in the management of postpartum hemorrhage.

Statistical analysis

Descriptive statistics for continuous variables were expressed as mean ± standard deviation or median (minimum–maximum) and nominal variables were expressed as number and percentage (%). For each group, differences in mean values and differences in median values were evaluated using the Student's t-test and Mann-Whitney U-test, respectively. The chi-square distribution test was used to compare categorical data, with p-values of ≤0.05 considered as statistically significant. Statistical analysis was performed using SPSS for Windows version 22 software (SPSS, Inc., Chicago, IL, USA).

Results

Between January 2015 and June 2018, a total of 4280 deliveries occurred in our hospital, of which 2300 were delivered via C/S. Myomectomy was performed during C/S in 1.95% (n=45) of the 2300 C/S cases. The characteristics of these patients are summarized in **Table 1**. There were no significant differences found between the two groups in terms of baseline characteristics.

When cesarean indications were considered, a previous cesarean was the first among all indications (37.8% *vs.* 48.1%), followed by non-cephalic presentation and cephalopelvic disproportion (**Table 2**). The groups were similar in terms of indications for C/S.

When the myomectomy during C/S group was compared with the C/S group, the duration of operation in the C/S myomectomy group was longer and this difference was statistically significant (49.5 min *vs.* 44.3 min; p=0.002). Preoperative, postoperative and Δ hemoglobin concentrations were similar, with no statistically significant difference found between the groups (p=0.056, p=0.548, p=0.177, respectively). Although the need for transfusion was greater in the C/S myomectomy group, this difference was not statistically significant (6.7% *vs.* 2.6%; p=0.152). There was no difference between groups in terms of hospitalization time. No relaparotomy, visceral organ injury or major vascular complications developed in either group (**Table 3**).

A hematoma developed in the suture line of the myomectomy site in two patients in the C/S myomectomy group. One of these patients had a myoma 6 cm in diameter on the anterior wall which was removed transendometrially. No additional surgical intervention was performed on these patients and with only expectant management, these hematomas were spontaneously resolved over time.

Discussion

The end result of our study was that the myomectomy performed during C/S was not associated with a decrease in hemoglobin level, an increase in the need for transfusion, increased uterine atony or postoperative morbidity, and only differed from the C/S group in the prolongation of the operation time.

Most myomas are asymptomatic during pregnancy. In symptomatic pregnancies, pain, a feeling of pelvic pressure, or vaginal bleeding may occur due to myoma size or degenerative changes associated with pregnancy. Obstetric complications such as abortion, preterm birth, placental abruption, dystocia and increased frequency of Cesarean deliveries may also be associated with the uterine leiomyomas seen in pregnancy.[14] Akkurt et al. reported that C/S myomectomy may have positive effects on subsequent pregnancies, that myoma recurrence was not common after the operation and that there was no serious operation-related adhesion formation.[15] In this respect, C/S myomectomy can have a number of advantages. The incision required for myomectomy during C/S will be smaller than the incision made for the non-pregnant uterus, and technically it may be easier to identify the cleavage plane to be used for myomectomy.[16,17] Due to the increased elasticity of the pregnant uterus, the suturation process can be performed more easily without damaging the tissue, and at the same time postpartum uterine contractions and uterine involution contribute to reduction of hemorrhaging.[18] In our study,

Table 1. Baseline characteristics of patients.

	Myomectomy group (n=45)	Non-myomectomy group (n=235)	p-value
Age (year)	30 (21–44)	30 (19–41)	0.987
Gravidity	3 (1–7)	3 (1–9)	0.649
Parity	1 (0–4)	1 (0–5)	0.871
Abortion	0 (0–4)	0 (0–4)	0.542
BMI (kg/m^2)	32 (22–44)	32.5 (19–46)	0.987
Gestational age (week)	37 (29–40)	37 (31–41)	0.741

Values are stated as median (minimum–maximum).

Table 2. Indications for C/S in both groups.

	Myomectomy group (n=45)	Non-myomectomy group (n=235)	p-value
Previous C/S	17 (37.8%)	113 (48.1%)	0.103*
Maternal request	4 (8.9%)	30 (12.8%)	0.621
Non-cephalic presentation	9 (20%)	27 (11.5%)	0.143*
Cephalopelvic disproportion	9 (20%)	33 (14.0%)	0.360
Fetal distress	6 (12.3%)	22 (9.4%)	0.412

Values are stated as number (%). *<.05 indicates statistical significance.

Table 3. Intraoperative and postoperative outcomes.

	Myomectomy group (n=45)	Non-myomectomy group (n=235)	p-value
Operation time (min)	49.53±13.63	44.31±9.72	0.002*
Preoperative Hb level (g/dl)	11.22±1.64	11.72±1.07	0.056
Postoperative Hb level (g/dl)	10.05±1.17	10.17±1.35	0.548
Δ Hemoglobin level (g/dl)	1.59±0.66	1.40±0.44	0.177
Uterine atony	3 (6.7%)	7 (3.0%)	0.222
Transfusion requirement	3 (6.7%)	6 (2.6%)	0.152
Relaparotomy	0	0	N.A
Visceral organ injury	0	0	N.A
Major vascular complications	0	0	N.A
Hospital stay (hours)	37.54±10.02	36.26±10.96	0.439

Values are stated as mean±SD or as number (%). *<.05 indicates statistical significance. **N.A:** not available.

we did not find any difference in terms of postoperative hemoglobin levels or estimated blood loss between the C/S myomectomy patients and the C/S patients without myomas.

Another advantage of the myomectomy performed during C/S is that two separate operations are performed in one session. Moreover, the possible risks of re-operation are prevented, while at the same time the cost is also reduced.[19] As a matter of fact, in their study, Liu et al. reported that 40% of the myoma cases where myomectomy was not performed during C/S, were re-operated on within 6 to 38 months postoperatively.[20]

Some factors to consider for myomectomy during C/S include the number, size and localization of the myomas, the possible effects on uterine contractility, the experience of the surgeon and the facilities at the health institution where the operation is performed. For this reason, in order to safely perform C/S myomectomy, experience in appropriate surgical techniques should be attained and training in surgical and medical methods to reduce bleeding should be obtained. If these considerations are taken into account, myomectomy can be performed safely during C/S. Senturk et al. in their evaluation of 212 C/S myomectomies reported that at first they applied this procedure to the smaller myomas, and after gradually gaining more experience, they excised the larger and more numerous myomas during the C/S. In that study, they also evaluated 66 C/S myomectomy patients having myomas of 5 cm or more in diameter along with 31 non-myomectomy patients and reported that no differences were found between the C/S myomectomy group and the non-myomectomy group in terms of lowered hemoglobin levels, necessary blood transfusions or operation-related complication rates.[21] We achieved similar results in our study.

Intraoperative hemorrhage is the most common complication of C/S myomectomy.[11] For this reason, some sources suggest applying vasopressin infusion, bilateral uterine artery ligation or uterine tourniquet to reduce blood loss.[22,23] We applied oxytocin infusion and methylergonovine injection, but did not use any of the above methods in our patients. Only 6.7% of the patients with C/S myomectomy required blood transfusions and there was no difference in the hemoglobin level drop between C/S myomectomy and the non-myomectomy operations; nevertheless, the small sample size used in this study could have led to insufficient statistical power to detect differences between groups, resulting in a type II error. Dedes et al. did not report significant differences in estimated blood loss, decline in hemoglobin, and need for additional uterotonics.[24] Hence, it remains unclear whether the number, site, and size of leiomyomas should influence decision-making. Future studies with multivariable analyses of these characteristics should specifically investigate the effect of myomectomy during cesarean delivery on intraoperative and postoperative outcomes.

Hatırnaz et al. reported that the disadvantages of the C/S myomectomy include increased operative time, extensive myometrial damage and possible post-operative adhesion formation, which they stated are more often related to the serosal surface incision for myomectomy. Therefore, they described the endometrial surface myomectomy incision techniques they performed in order to reduce these complications and which shortened the operation time compared to the classic C/S myomectomy. They were also able to reduce blood loss and adhesion formation on the endometrial surface.[13] Two of our patients had undergone endometrial myomectomy with anterior placement of intramural myomas, and one of them developed a hematoma in the myoma localization, but this hematoma was monitored under expectant management. The patient did not need a blood transfusion and the resulting hematoma was spontaneously resorbed.

The study we conducted had some limitations. These mainly included the retrospective nature of the study, the relatively low number of patients involved. We performed a power analysis on the data relative to the transfusion requirement. This data indicate that a sample of 220 patients in each arm could detect an efficacy of myomectomy between the groups, with 80% power and an error of 5%. There were 235 patients in the non-myomectomy group but we had 45 patients in the myomectomy group. Therefore we planned to include all eligible patients in myomectomy group. Lack of information on long-term patient outcomes and subsequent pregnancies was among the limitations of the study. Another limitation was that patients who had myomas detected during C/S and did not undergo myomectomy were not included in the study. In our view, the strongest aspect of our study was that the operations were performed by surgeons trained in surgical treatment of obstetric hemorrhage and having a high volume of surgical experience.

Conclusion

Myomectomy C/S carried out by experienced surgeons may be a safe surgical procedure and can be applied without increasing intraoperative and postoperative complications. Moreover, in this instance, the patient does not need a second operation after C/S. Large-scale prospective randomized controlled studies are needed that include long-term outcomes and the method of delivery in subsequent pregnancies.

Conflicts of Interest: No conflicts declared.

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