

P R A C E O R Y G I N A L N E
położnictwo

Cesarean myomectomy for solitary uterine fibroids: Is it a safe procedure?

Miomektomia podczas cięcia cesarskiego: czy jest bezpieczną procedurą?

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Abstract

Objectives: Myomectomy during cesarean is still controversial. Our aim is to assess the safety and feasibility of myomectomy during cesarean section for solitary uterine fibroids in terms of intraoperative and postoperative risks.

Material and methods

Data from 306 patients with leiomyoma undergoing elective cesarean operations were reviewed retrospectively. Eighty-two patients who underwent myomectomy during cesarean section were compared to 224 patients diagnosed with myoma who did not undergo myomectomy. The patients were reviewed for pre- and post-operative hemoglobin values, duration of operation, amount of intraoperative hemorrhage, need for blood transfusion, and duration of hospital stay.

Results: The decrease in hemoglobin values after operation was not significantly different between the groups (1.48 ± 0.7 vs. 1.31 ± 0.68 g/dL; $p = 0.063$). Both the hospital stay and operation durations were significantly longer in the myomectomy group (57.9 ± 19.7 vs. 50.54 ± 20.77 hours, $p = 0.006$; 39.94 ± 12.5 vs. 35.27 ± 9.1 minutes, $p = 0.001$, respectively). The operation duration was significantly shorter in the group with myomas = 3 cm in size (35.41 ± 9.33 vs. 45.58 ± 16.57 vs. 47.05 ± 10.61 minutes; $p < 0.05$).

Conclusions: Cesarean myomectomy did not increase intrapartum or early postpartum morbidity. Thus, we suggest that myomectomy can be performed during cesarean section in selected patients to avoid repeat operations and additional cost.

Key words: **complication / leiomyoma / cesarean / perioperative hemorrhage /**

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Otrzymano: 03.02.2015
Zaakceptowano do druku: 09.03.2015

Streszczenie

Cel pracy: Miomektomia podczas cięcia cesarskiego jest wciąż kontrowersyjna. Celem naszego badania była ocena bezpieczeństwa i wykonalności miomektomii pojedynczego mięśniaka podczas cięcia cesarskiego pod względem ryzyka w trakcie operacji oraz po zabiegu.

Materiał i metoda: Retrospektywnie dane zebrano od 306 pacjentek, które miały wykonane elektywne cięcia cesarskie. Porównano 82 pacjentki, które podczas cięcia cesarskiego miały wykonaną miomektomię z 224 pacjentkami również z rozpoznaniem mięśniakiem, które nie miały miomektomii. Analizie poddano wyniki przed i pooperacyjne hemoglobiny, czasu trwania operacji, wielkości krwotoku śródoperacyjnego, potrzeby przetoczenia krwi i czasu hospitalizacji.

Wyniki: Spadek poziomu hemoglobin po operacji nie różnił się istotnie pomiędzy grupami (1.48 ± 0.7 vs. 1.31 ± 0.68 g/dL; $p = 0.063$). Zarówno czas hospitalizacji jak i czas trwania operacji były istotnie dłuższe w grupie z miomektomią (57.9 ± 19.7 vs. 50.54 ± 20.77 godzin, $p = 0.006$; 39.94 ± 12.5 vs. 35.27 ± 9.1 minut, $p = 0.001$, odpowiednio). Czas trwania operacji mięśniaków wielkości 3cm był istotnie krótszy (35.41 ± 9.33 vs. 45.58 ± 16.57 vs. 47.05 ± 10.61 minut; $p < 0.05$).

Wnioski: Miomektomia podczas cięcia cesarskiego nie zwiększa chorobowości podczas porodu i we wczesnym okresie poporodowym. Sugerujemy, że można wykonywać miomektomię w wyselekcjonowanej grupie pacjentek, tak aby uniknąć relaparotomii i dodatkowych kosztów.

Słowa kluczowe: powikłania / mięśniak / cięcie cesarskie / krwotok okołoporodowy /

Introduction

Leiomyomas are benign tumors seen in 70 to 80% of females of reproductive age worldwide (1). The incidence of association with pregnancy is ~3.2% (range: 1.6 – 10.7%) (2). Leiomyomas have been reported to affect pregnancy in one third of the cases and to increase in size during the first and third trimesters due to altered hormone, especially estrogen, levels during gestation (2). Although they are usually asymptomatic, leiomyomas may affect pregnancy and delivery by causing such complications as abdominal pain, abortion, preterm labor, and malpresentation (3-4).

Scheduling myomectomy during cesarean section may offer several advantages, such as reducing the risks of repeat operation and anesthesia, less time away from work, and reduced overall cost, despite the risks of serious hemorrhage and increased postoperative morbidity. In studies conducted to date, opinions regarding performing myomectomy during cesarean section have been inconsistent; this has been a topic of discussion among obstetricians (5). The fact that females tend to get married at more advanced ages than was the case previously due to their education and careers increases the likelihood that myomas will be encountered during gestation. Thus, in the present study we evaluated the intra- and postoperative risks of performing myomectomy during cesarean section.

Materials and Methods

Data for 306 females with leiomyoma found during follow-up between 2010 and 2014 and undergoing scheduled cesarean section in the Gynecology and Obstetrics Clinic of Tepecik Research and Training Hospital, Izmir, Turkey, were reviewed retrospectively. Eighty-two patients undergoing myomectomy during cesarean operations were compared to 224 patients diagnosed with myoma but not undergoing myomectomy (control group). Cesarean operations were performed under spinal anesthesia by several obstetricians in a single center. All cesarean section myomectomy were performed according to surgeons experience and preferences. Exclusion criteria for the study were presence of multiple myomas, surgical procedures in addition to cesarean myomectomy, presence of coagulation disorders, antenatal hemorrhage, and presence of abnormal attachment of the placenta. Age, gravidity, parity, age of gestation in weeks, size, location, number of the leiomyomas, pre- and postoperative hemoglobin (Hb) values, postoperative hemoglobin changes, duration of operation (from skin incision to closure of wound), duration of hospital stay, and need for transfusion were reviewed.

Myomectomy performed during cesarean operations involved removal of the myoma through a transverse or longitudinal linear incision on the pseudocapsule of the myoma

Table 1. Characteristics of patients' in two groups.

	Myomectomy group (n=82) (Mean ± SD)	Control group (n=224) (Mean ± SD)	p value
Maternal age (years)	32.6 ± 5.8	29.9 ± 5.2	0.001
Gravidity	2.3 ± 1.3	3.0 ± 1.1	0.001
Parity	1.3 ± 1.3	1.5 ± 0.8	NS
Median gestational age, (weeks)	37.8 ± 2.51	37.6 ± 2.17	NS
Diameter of myoma (cm)	3.8 ± 2.6	3.4 ± 2.3	NS

NS, not significant.

Table II. Features of myomas in two groups.

Size	Myomectomy group (n=82) n (%)	Control group (n=224) n (%)
≤ 3 cm	48 (58.6)	142 (63.4)
>3 and <6 cm	17 (20.7)	52 (23.2)
≥ 6 cm	17 (20.7)	30 (13.4)
Myoma type		
Pedunculated	1 (1.2)	3 (1.4)
Subserosal	50 (61)	82 (36.6)
Intramural	29 (35.4)	125 (55.8)
Submucosal	2 (2.4)	14 (6.2)
Myoma location		
Fundal Corpus Anterior	75 (91.5)	119(53.1)
Posterior	3 (3.7)	98 (43.8)
Cervical	2 (2.4)	6 (2.7)
Intraligamentar	2 (2.4)	1 (0.4)

by means of electrocautery. The space remaining behind the myoma and the serosa was sutured with 2/0 or 0 absorbable suture material. Pedicled myomas were removed either by cutting with electric cautery or by suturing. Leiomyoma specimens were sent for pathologic examination. In both groups, ten units of oxytocin were administered postoperatively, followed by 40 units of oxytocin by infusion for 24 h.

Statistical analyses were performed using the IBM Statistical Package for the Social Sciences (SPSS) Statistics software, v.16. The Kolmogorov-Smirnov test was used to examine the normality of the distribution of the data. For intergroup comparisons, the independent samples t-test, which is a parametric test, was used for analysis of normally distributed data. When the myomectomy group was divided into three subgroups, a one-way ANOVA was used for intergroup comparisons. The data are expressed as means ± standard deviation, and p values less than 0.05 were considered to indicate a significant difference.

Results

A total of 306 patients with leiomyoma undergoing cesarean operations were included in the present study. Eighty-two of these patients underwent myomectomy during a Cesarean section, and 224 patients with leiomyoma underwent Cesarean sections without myomectomy. Mean age was greater in the group who underwent myomectomy (32.6 ± 5.8 vs. 29.9 ± 5.2 years; $p < 0.001$). No statistically significant differences were found between the two groups in terms of parity, age of gestation in weeks at the time of delivery, and mean myoma diameter (Table I).

Size and location in the uterus of the leiomyomas in the group undergoing myomectomy were presented in Table 2. The most common leiomyoma category was subserosal (61%), and the anterior wall of the fundus was the most common myoma location (91.5%). Two of our patients had intraligamentary myoma, and were the least common type of patient undergoing myomectomy during a Cesarean operation (Table II).

No statistically significant difference was found between the two groups in postoperative hemoglobin decrease (1.48 ± 0.7 vs. 1.31 ± 0.68 g/dL; $p = 0.063$) or need for blood transfusion ($p = 0.502$). The pre- and post-operative hemoglobin values of the myomectomy and control groups, postoperative hemoglobin decreases, and need for blood transfusion in both groups are shown in Table 3. Both the hospital stay and operation durations were significantly longer in the myomectomy group (57.9 ± 19.7 vs. 50.5 ± 20.7 h, $p = 0.006$; 39.9 ± 12.5 vs. 35.2 ± 9.1 min, $p = 0.001$, respectively; Table III) but they are not clinically significant.

The myomectomy group was divided into three subgroups based on myoma size: ≤ 3 cm, $>3 - <6$ cm, and ≥ 6 cm. The amount of intraoperative hemorrhage and duration of hospital stay increased, and the birth-weight of the infants decreased, with increasing myoma size, albeit not significantly so. The operation duration was significantly shorter only in the group with myomas ≤ 3 cm (35.4 ± 9.3 vs. 45.5 ± 16.5 vs. 47.0 ± 10.6 min, $p < 0.05$; Table IV).

Discussion

The rate of pregnancies at advanced ages has been increasing because of the status and position of women in society and their career plans. Additionally, women with uterine myomas who have not had children usually prefer not to undergo surgical treatment because of the associated risks. Thus, the likelihood of encountering myomas during pregnancy is increasing steadily. This increase is of concern to obstetricians and patients during pregnancy care and at the time of delivery. From the perspective of obstetricians, elective myomectomy during cesarean operations is controversial because of the risk of hemorrhage and consequent hysterectomy. In the present study, we compared patients undergoing and not undergoing myomectomy during cesarean section in terms of intraoperative and postoperative risks and evaluated the feasibility of the procedure.

Leiomyomas may be submucosal, intramural, subserosal, cervical, pedicled, or located in the broad ligament. Those for which myomectomy is performed during Cesarean operation are located subserosally (6-7). Among our patients, subserosal myomas were the most common type, likely due to their ease of diagnosis. Interestingly, intraligamentary leiomyomas were identified in the present study, and these patients underwent myomectomy because the obstetrician considered the myomas to narrow the area of the Cesarean incision, making control of hemorrhage difficult. Additionally, a pedicled myoma had a blood supply from the omentum in the form of a parasitic myoma and was excised during the cesarean procedure.

Traditionally, the principle of not performing myomectomy prevails among obstetricians when myomas are detected during Cesarean procedures unless they preclude delivery, to avoid several complications, especially hemorrhage. A review of studies supporting this opinion revealed that hysterectomy was required due to excessive hemorrhage in 3 (30%) of 10 cases of Cesarean myomectomy in the work of Hasan et al. and in 9 (47%) of 19 cases in that of Exacoutos et al. (8-9). Both studies emphasized that the removed myomas were ≥ 6 cm in size, located intramurally, and had high rates of complications. In contrast, Roman et al. reported that the incidence of hemorrhage doubled when 27 subjects undergoing myomectomy during Cesarean operation for

Aykut Özcan et al. *Cesarean myomectomy for solitary uterine fibroids: Is it a safe procedure?***Table III.** Comparison of operation outcomes between two groups.

	Myomectomy group (n=82) (Mean ± SD)	Control group (n=224) (Mean ± SD)	p-value
Preoperative Hb (g/dL)	12±0.88	11.53±1.3	0.002
Postoperative Hb (g/dL)	10.2±0.85	9.97±1.1	0.025
Mean change in Hb (g/dL)	1.48±0.7	1.31±0.68	NS
Duration of operation (minutes)	39.94±12.5	35.27±9.1	0.001
Length of hospital stay (hours)	57.9±19.7	50.54±20.77	0.006
Birth weight (gram)	3073±754	3115.54±522	NS
Frequency of blood transfusion (n-%)	2 (2.4)	3 (1.4)	NS

Values for continuous variables are mean ± standard deviation. Values for categorical variables are number/total number of cases (%).
Abbreviations: Hemoglobin – Hb; NS – not significant.

Table IV. Comparison of outcomes among myomectomy subgroups.

	≤ 3 cm (n=48) (Mean ± SD)	>3 ve <6 cm (n=17) (Mean ± SD)	≥ 6 cm (n=17) (Mean ± SD)	p value
Mean change in Hb (g/dL)	1.47±0.68	1.40±0.74	1.60±0.78	NS
Preoperative Hb (g/dL)	12.09±0.77	11.75±0.92	12.1±1.09	NS
Mean postoperative Hb (g/dL)	10.35±0.77	10.07±1.02	10.27±0.89	NS
Duration of operation (minutes)	35.41±9.33	45.58±16.57	47.05±10.61	<0.001
Length of hospital stay (hours)	56.47±18.52	64.82±24.13	55±18.04	NS
Birth weight (gram)	3101.46±690.22	3092.35±879.33	2973.53±754.13	NS

NS – not significant.

intramural myomas ≥ 6 cm were compared to controls, but neither additional surgical intervention nor hysterectomy was performed. In the present study, no hysterectomy or additional surgical intervention was required for cases undergoing myomectomy for intramural myomas ≥ 6 cm. Because of these contradictions in the literature, myomectomy for leiomyomas ≥ 6 cm should be evaluated taking the risk of complications into consideration.

Currently, experienced obstetricians report myomectomy during Cesarean section to be an efficient and safe procedure in selected patients (6-7). Several studies suggest that myomas of 3–20 cm in size can be removed safely during Cesarean procedures (10-11). Dianrong et al. concluded in their compilation that myomectomy could be performed by experienced obstetricians during Cesarean operation in selected patients and that postoperative hemorrhage and maternal morbidity and mortality did not increase, but that data were insufficient to develop a protocol (5). In the present study, the amount of intrapartum hemorrhage during myomectomies increased for myomas ≥ 6 cm, although the difference in postoperative hemoglobin decreases between the groups undergoing and not undergoing myomectomy was not significant because few myomas of this size were evaluated.

Because there is no established protocol, the preferred method for reducing hemorrhage is unclear. Ehigiegba et al. reported that infusion of Synpitan decreased the amount of hemorrhage (12). Furthermore, some studies have shown that applying a tourniquet to the uterus to decrease intraoperative blood loss, ligating the bilateral uterine arteries, and removing the myomas by means of electric cautery decreased the amount of hemorrhage (13-15). The myomectomy procedure in the present study was performed using electric cautery, and 10 units of Synpitan were administered immediately after the operation, followed by 40 units of Synpitan via infusion over 24 h. The fact that no hysterectomy or other surgical interventions were required due to hemorrhage may be attributable to the small number of subjects with cervical, wide intramural leiomyomas.

The studies conducted to date have indicated no significant difference in rates of intraoperative hemorrhage for myomectomy during Cesarean procedures (6-7). However, in a study that evaluated only subjects undergoing intramural myomectomy, the incidence of hemorrhage doubled and both the operation and hospital stay durations increased significantly (7). In the present study, the rate of blood transfusion and amount of intraoperative hemorrhage were similar in the groups undergoing and not

undergoing myomectomy. Both the operation and hospital stay durations have been reported to be longer in patients undergoing myomectomy compared to those not undergoing myomectomy. Additionally, when the myomectomy group was divided into three sub-groups according to myoma size, and these sub-groups were compared in terms of intraoperative hemorrhage, and operation and hospital stay durations, the amount of intraoperative hemorrhage and hospital stay duration increased and the birth-weight of the infants decreased with increasing myoma sizes. However, these differences were not significant, with the exception of operation duration. We thought that the hospital stay was significantly longer in the myomectomy group due to concerns of surgeons about hemorrhage but no complications were observed.

Limitations of the present study included the fact that the operations were performed by different surgeons and the small number of high-risk subjects who might be at risk of needing hysterectomy. Prospective randomized trials with bigger number of patients should be performed, then the level of evidence would be stronger and probably could merit a change in practice.

Conclusions

Performing myomectomy during Cesarean procedures in selected patients does not increase the intrapartum and early postpartum morbidity. Thus, we suggest that myomectomy may be performed during cesarean section in selected patients to avoid repeat operations and additional cost.

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Authors' contribution:

1. Aykut Özcan – concept, study design, article draft, corresponding author.
2. Ayca Kopuz – acquisition of data, analysis and interpretation of data.
3. Volkan Turan – assumptions, study design.
4. Cagdas Sahin – revised article critically, article draft.
5. Emrah Töz – revised article critically.
6. Selin Aksoy – acquisition of data.
7. Mehmet Ozeren – analysis and interpretation of data.

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- the manuscript has not been published in or submitted to any other journal.
- Source of financing: None.