



# Myomectomy During Cesarean Section: Why Do We Abstain From?

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## Abstract

**Objectives** To assess the intra- and postoperative results of cesarean myomectomy.

**Methods** A retrospective study was conducted to collect the results of cesarean myomectomy procedures performed in our tertiary center between June 2013 and December 2018. The subjects were 2219 pregnant women undergoing cesarean section at these units.

**Results** A total of 2219 scheduled patients undergoing CS were included in the present study. Sixty-five patients have undergone intramural myomectomy during CS; 82 patients have had subserosal myomectomy during CS. No statistically significant differences were found between the three groups in changes of preoperative Hb, postoperative Hb, mean Hb and length of hospital stay. Operation times were significantly longer in both intramural and subserosal myomectomy groups ( $45.23 \pm 8.498$  vs.  $39.02 \pm 6.824$  vs.  $32.14 \pm 5.423$  min,  $p$  0.01). Only in the intramural myomectomy group, two patients were subjected to blood transfusion (3%). Assessment of intramural myomectomy patients was carried out by taking 5 cm as the cutoff value. No statistical differences were found between the two groups in terms of mean Hb change, operation time, length of hospital stay. In the group with intramural myomectomy larger than 5 cm, two (15.38%) patients needed a blood transfusion.

**Conclusions** Cesarean myomectomy operation performed by experienced surgeons has no adverse effects other than lengthening the duration of operation and can be safely implemented.

**Keywords** Myoma uteri · Cesarean section · Myomectomy

## Introduction

Leiomyoma is the benign tumor of the genital system most commonly seen in women [1]. The incidence varies between 1.6 and 10.7% during pregnancy [2]. Myomas sizes are

observed to be enlarged, particularly due to the hormonal changes in the first trimester (increased estrogen) [3]. In recent years, pregnancies are delayed until advanced ages as a result of frequent use of assisted reproductive techniques and adopting of urban life which has led to obstetricians identifying myomas more frequently during pregnancy.

The number of cesarean sections (CS) has recently increased rapidly, making cesarean the most common cause of laparotomy applications across the world. This ratio is around 50% in our country in 2013 [4]. Therefore, the risk of encountering myoma during CS has increased. There are drawbacks based on potential bleeding, hysterectomy or postoperative morbidity during the myomectomy phase of CS, for which different views have been suggested in the literature [5]. However, leading from the recent work on this subject, the possibility of complications connected to myomectomy in the same cesarean section is less than feared and the need for myomectomy in the second cesarean section is reduced [6].

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In this study, we aimed to evaluate the outcome of myomectomy during CS and to compare it with a control group.

## Materials and Methods

Data for 2366 patients with scheduled CS performed at Koru Ankara Hospital, Obstetrics and Gynecology Clinic, between June 2013 and December 2018. Ethical approval for the study was obtained from the Ethics Committee, Koru Ankara Hospital (Ethics Committee protocol code 13/03/2019-40). The study was conducted in accordance with the Helsinki Declaration. Sixty-five patients (2.7%) undergoing intramural myomectomy during CS, 82 patients (19.4%) having subserosal myomectomy during CS and 2219 patients (control group) scheduled for CS without myoma. CSs were performed under spinal anesthesia by several obstetricians in a single center. All CS myomectomies were performed according to experienced surgeons. Exclusion criteria for the study were the presence of multiple myomas, surgical procedures in addition to CS myomectomy, the presence of coagulation disorders and the presence of abnormal attachment of the placenta. The largest diameter measured in the pathology results was considered as the myoma diameter.

All patients were subjected to oxytocin infusion application in order to avoid massive hemorrhage. A linear cut was made on the myoma nodule using electrocautery; the myoma was removed from its capsule; and the remaining uterine tissue was closed with dissolvable sutures (0 and 2/0 caliber vicryl). After the uterus was repaired and after checking for hemorrhage, all patients were fitted with a drain in the Douglas cavity; the surgical site was then closed in compliance with the abdominal anatomy. All patients were continued on 1000 cc saline with 20 units of oxytocin at a rate of 150 cc per hour intravenously in the 24 h after an operation to aid the uterine contraction. Age, gravidity, parity, pre- and

postoperative hemoglobin (Hb) values, number of excised myomata, size, total myoma volume, location, duration of operation and duration of hospital stay of all patients were retrospective. The duration of operation was accepted as the time from initial skin incision to incision closure.

All analyses were conducted using SPSS 22.0 (SPSS for Windows 22.0, Chicago, IL). Normality of distribution was tested with the one-sample Kruskal–Wallis test. The results are presented as mean  $\pm$  standard deviation (SD) values. In intramural myomectomy group, the analysis based on 5 cm cutoff values was carried out using the Mann–Whitney U test. *p* Values below 0.05 were considered significant.

## Results

A total of 2219 scheduled patients undergoing CS were included in the present study. Sixty-five patients have undergone intramural myomectomy during CS; 82 patients have had subserosal myomectomy during CS. No statistical differences were found between the three groups in terms of maternal age, gravidity, parity and birth weight (Table 1).

No statistically significant differences were found between the three groups in changes of preoperative Hb, postoperative Hb, mean Hb and length of hospital stay (Table 2). Operation times were significantly longer in both intramural and subserosal myomectomy groups ( $45.23 \pm 8.498$  vs.  $39.02 \pm 6.824$  vs.  $32.14 \pm 5.423$  min, *p* 0.01; Table 2). Only in the intramural myomectomy group, two patients were subjected to blood transfusion (3%). There was no statistical significance (*p* 0.261) (Table 2).

Assessment of intramural myomectomy patients was carried out by taking 5 cm as the cutoff value. No statistical differences were found between the two groups in terms of mean hemoglobin change, operation time, length of hospital stay. In the group with intramural myomectomy larger than 5 cm, two (15.38%) patients needed a blood transfusion (Table 3).

**Table 1** Demographic characteristics for all patients

	Cesarean myomectomy group <i>n</i> = 147		Cesarean group <i>n</i> = 2219	<i>p</i> value
	Cesarean intramural myomectomy group <i>n</i> = 65	Cesarean subserosal myomectomy group <i>n</i> = 82		
Maternal age (years)	27.52 $\pm$ 5.495	27.11 $\pm$ 5.077	27.45 $\pm$ 5.243	0.688
Gravidity (n)	2.15 $\pm$ 0.922	2.33 $\pm$ 0.957	2.26 $\pm$ 0.911	0.276
Parity (n)	0.74 $\pm$ 0.713	0.74 $\pm$ 0.734	0.74 $\pm$ 0.711	0.997
Birth weight (g)	3168.38 $\pm$ 285.544	3156.22 $\pm$ 233.22	3160.21 $\pm$ 254.121	0.812

**Table 2** Postoperative characteristics for all patients

	Cesarean myomectomy group <i>n</i> = 147		Cesarean group <i>n</i> = 2219	<i>p</i> value
	Cesarean intramural myomectomy group <i>n</i> = 65	Cesarean subserosal myomectomy group <i>n</i> = 82		
Preoperative Hb (g/dL)	11.36 ± 0.97	11.44 ± 0.988	11.40 ± 1.239	0.912
Postoperative Hb (g/dL)	10.16 ± 0.712	10.29 ± 0.688	10.25 ± 1.197	0.923
Mean change in Hb (g/dL)	1.2 ± 0.862	1.15 ± 0.3	1.15 ± 0.042	0.939
Operation time (min)	45.23 ± 8.498	39.02 ± 6.824	32.14 ± 5.423	0.01
Length of hospital stay (days)	1.18 ± 0.464	1.22 ± 0.445	1.14 ± 0.542	0.449
Frequency of blood transfusion ( <i>n</i> -%)	0.03 ± 0.248	0	0	0.261

**Table 3** Postoperative characteristics for intramural myomectomy patients

	Cesarean intramural myomectomy group <i>n</i> = 65		<i>p</i> value
	Cesarean intramural myomectomy group, ≤ 5 cm <i>n</i> = 52	Cesarean intramural myomectomy group, > 5 cm <i>n</i> = 13	
Preoperative Hb (g/dL)	11.31 ± 0.951	11.56 ± 1.057	0.425
Postoperative Hb (g/dL)	10.15 ± 0.695	10.20 ± 0.805	0.628
Mean change in Hb (g/dL)	1.16 ± 0.748	1.36 ± 1.02	0.551
Operation time (min)	45.48 ± 8.532	44.23 ± 8.623	0.46
Length of hospital stay (hours)	1.19 ± 0.487	1.15 ± 0.376	0.958
Frequency of blood transfusion ( <i>n</i> -%)	0	2 (15.38%)	NS

## Discussion

Since CSs have recently increased in number and pregnancy at advanced ages has become more common, myomectomy during CS has gained importance for obstetricians. Many obstetricians avoid myomectomy during cesarean section, except for cases of pedicled myomas [7]. Among the reasons are a great number of morbidities ranging from bleeding to hysterectomy. But the researches made in recent years have shown that, as opposed to popular belief, myomectomy during CS does not lead to complications [8–10].

Leiomyomas may be submucosal, intramural, subserosal, cervical, pedicled or located in broad ligament. However, resection of intramural myoma during CS is inadvisable and contraindicated by most of the leading textbooks of obstetrics, primarily because it may stimulate perfuse uncontrolled bleeding that could lead to hysterectomy [11, 12]. In this study, we applied myomectomy to subserosal and intramural myomas.

One of the most feared complications during cesarean myomectomy is a hemorrhage. Several methods may be used to reduce hemorrhage before a myomectomy is performed. Vasopressin injection, the use of uterotonics

such as ergometrine, oxytocin, misoprostol, uterine tourniquets, bilateral uterine arterial ligation, the use of electrocautery–laser coagulation may be listed among such techniques [13]. In order to decrease the risk of bleeding, in all our cases, electrocautery and oxytocin infusion were applied. In a study by Özcan et al. [14], where similar methods were used, the average change in hemoglobin was found to be  $1.48 \pm 0.7$  g/dL. In our study, on the other hand, it was  $1.2 \pm 0.862$  g/dL for intramural myomectomy group and  $1.15 \pm 0.3$  g/dL for the subserosal group. In the control group, it was  $1.15 \pm 0.042$  g/dL (*p* 0.939). Hemorrhage was observed to be less than it was in the study by Özcan et al. [14], but there is not a significant difference from our control group. Only two patients required transfusion (1.35%). The need for blood transfusion was identified as 20% only in the study by Ehigiegba et al. [15] where oxytocin infusion was applied. Compared to the literature, the average amount of hemorrhage and the need for transfusion were observed to be lower in our study.

Another controversial parameter in the literature is the size of excised myomas and the operation results. In the study by Özcan et al. [14], only the operation durations were found to be statistically significant between cesarean myomectomy patients grouped as 0–3 cm, 3–6 cm and

over > 6 cm ( $p < 0.001$ ). Kaymak et al. have, in their study, addressed only the volume of hemorrhage in patient groups having similar sizes and have not found any statistically significant difference [15]. In our study, we analyzed the intramural myomectomy patients based on the myoma dimension and considered myomas of 5 cm as the cutoff value. There were no significant differences in terms of average change in hemoglobin, operation duration and length of hospital stay. In the group of intramural myomectomy larger than 5 cm, two (15.38%) patients were given a blood transfusion (Table 3). The percent of patients undergoing blood transfusion is high because there are fewer patients in this group. This is a restriction of our study.

Another significant issue during cesarean myomectomy is the length of operation. In their study, Kaymak et al. [16] have discovered that the operation is 8.9 min longer in cesarean cases with myomectomy, and Kwawukume et al. [9] have calculated this prolongation to be 11.25 min. The duration of operation has been statistically significantly extended in both studies ( $p < 0.05$ ). In our study, the duration was 13.09 min longer in the intramural myomectomy group and 6.88 min longer in the subserosal myomectomy group compared to the control group ( $p < 0.01$ ). Also, there was no statistically significant difference in the intramural myomectomy group where 5 cm was considered as the cutoff ( $p < 0.46$ ). The results of our study are supportive of the literature.

Today, with increased levels of health care expenses, cost-effectiveness has become more important. The length of hospital stay and the need for re-operation are important aspects of cost-effectiveness. In their study, Özcan et al. [14] have identified that the length of hospital stay increases about 7.36 h in the group of patients who have had a cesarean myomectomy ( $p < 0.006$ ). Kaymak et al. [16] have calculated this increase to be 0.6 days on average ( $p < 0.05$ ). In our study, there were no statistically significant differences among the three patient groups with regard to the length of hospital stay (0.449). Also, there was no statistically significant difference in the intramural myomectomy group where 5 cm was considered as the cutoff ( $p < 0.958$ ). We suppose that performing myomectomy during CS will help reduce the need for performing myomectomy or hysterectomy in the future. Based on the above-mentioned reasons, the results of our study support cesarean myomectomy with regard to cost-effectiveness.

## Conclusion

Being carried out in a single hospital and involving a homogeneous patient population are the restrictions of our study. There is a need for performing multiple studies on much bigger patient populations where in particular the myoma dimensions are addressed. An important advantage of our

study is that it has been conducted on a much bigger patient population than the other studies in the literature. In conclusion, cesarean myomectomy operation performed by experienced surgeons has no adverse effects other than lengthening the duration of operation and can be safely implemented. Experience hand only should do it at tertiary level center or in private with all facilities. In addition, fibroids have a wide spectrum in terms of location, size and patient characteristics. Therefore, treatment should be individualized.

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## Compliance with Ethical Standards

**Conflict of interest** There is no conflict of interest between the authors and/or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

## References

1. Lippman SA, Warner M, Samuels S, et al. Uterine fibroids and gynecologic pain symptoms in a population-based study. *Fertil Steril*. 2003;80(6):1488–94.
2. Rosati P, Exacoustòs C, Mancuso S. Longitudinal evaluation of uterine myoma growth during pregnancy. A sonographic study. *J Ultrasound Med*. 1992;11(10):511–5.
3. Vitale SG, Tropea A, Rossetti D, et al. Management of uterine leiomyomas in pregnancy: review of literature. *Updates Surg*. 2013;65(3):179–82.
4. Ulubay M, Öztürk M, Fidan U, et al. Skin incision lengths in caesarean section. *Cukurova Med J*. 2016;41(1):82–6. <https://doi.org/10.17826/cutf.147190>.
5. Hassiakos D, Christopoulos P, Vitoratos N, et al. Myomectomy during cesarean section: a safe procedure? *Ann N Y Acad Sci*. 2006;1092:408–13.
6. Song D, Zhang W, Chames MC, et al. Myomectomy during cesarean delivery. *Int J Gynecol Obstet*. 2013;121(3):208–13.
7. Tinelli A. Myoma in pregnancy and cesarean myomectomy: a matter of debate for a long time. *Int J Gynecol Clin Pract*. 2014;1(104):2.
8. Ortac F, Gqngfr M, Sfnmezer M. Myomectomy during cesarean section. *Int J Gynecol Obstet*. 1999;67:189–90.

9. Kwawukume EY. Myomectomy during cesarean section. *Int J Gynecol Obstet.* 2002;76:183–4.
10. Roman AS, Tabsh KMA. Myomectomy at time of cesarean delivery: a retrospective cohort study. *BMC Pregnancy Childbirth.* 2004;4:14–7.
11. Cunningham FG, Leveno KJ, Bloom SL, et al. Abnormalities of the reproductive tract. *Williams obstet.* 2005;949:962.
12. Ludmir J, Stubblefield PG. Surgical procedures in pregnancy. *Obstetrics: normal and problem pregnancies.* 2002, p. 607.
13. Incebiyik A, Hilali NG, Camuzcuoglu A, et al. Myomectomy during caesarean: a retrospective evaluation of 16 cases. *Arch Gynecol Obstet.* 2014;289(3):569–73.
14. Ozcan A, Kopuz A, Turan V, et al. Cesarean myomectomy for solitary uterine fibroids: is it a safe procedure. *Ginekol Polska.* 2016;87:54–8. <https://doi.org/10.17772/gp/57833>.
15. Ehigiegba AE, Ande AB, Ojobo SI. Myomectomy during cesarean section. *Int J Gynecol Obstet.* 2001;75(1):21–5.
16. Kaymak O, Ustunyurt E, Okyay RE, et al. Myomectomy during cesarean section. *Int J Gynecol Obstet.* 2005;89:90–3.

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