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The dilemma of cesarean myomectomy: Is it safe or not?

Ali GÜRSOY*, Kemal ATASAYAN, Ezgi DOĞAN TEKBAŞ, Erdin İLTER

Department of Obstetrics and Gynecology, Faculty of Medicine, Maltepe University, İstanbul, Turkey

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Abstract

To evaluate the safety and effectiveness of myomectomy during cesarean section. The data of fifty-four pregnant who underwent cesarean myomectomy and twenty-six pregnant with uterine leiomyoma who had cesarean section without myomectomy between the years of 2017 and 2020 in our tertiary clinic were examined retrospectively. There was no significant difference in terms of maternal age, weeks of gestation, gravida, parity, use of additional uterotonics, type of leiomyoma, size of leiomyoma, cesarean indications, blood transfusion requirement, postoperative fever, preoperative hemoglobin (g/dl), change in hemoglobin (g/dl), preoperative hematocrit (%), change in hematocrit (%), length of hospital stay between the two groups ($p>0.05$). While no significant difference was observed according to the location of the leiomyomas between the anterior, fundal and posterior location between the two groups, cervical leiomyomas were significantly higher in the CS group ($p<0.05$). This study shows that cesarean myomectomy is a safe procedure in selected cases. It also offers the advantage of avoiding a second operation in patients.

Keywords: cesarean, leiomyoma, pregnancy, uterine myomectomy

1. Introduction

Leiomyomas or uterine fibroids are benign monoclonal tumors of smooth muscle taking origin in the myometrium. They are the most common benign tumors in women of reproductive age and especially in the 30's. Although the etiology is largely unknown, they are known to be estrogen and progesterone dependent tumors (1). The reported prevalence of uterine leiomyomas in pregnancy is between 1.6 and 10.7% (2). In the future, it is expected that the incidence of leiomyomas during pregnancy will increase in association with delay in childbearing (3).

The first trimester is the ideal time to measure and identify the leiomyomas in pregnancy. Enlarging uterus size and growing of the fetus may prevent visualization of them in later gestational weeks (4). Considering that the risk for obstetric complications increases with the growth of leiomyomas, they should be followed up regularly with ultrasonographic imaging determining the number, size and location of them. The leiomyomas are usually asymptomatic during pregnancy. On the contrary, they may present with some symptoms in 10–30% of patients. The most common symptoms are pain due to red degeneration, miscarriage, bleeding, preterm labor, preterm premature rupture of membranes, placental abruption, increased leiomyoma size, abnormal presentation, congested labor, and postpartum hemorrhage (5). About 5–21% of pregnant women with leiomyoma are hospitalized during pregnancy for pain control, which is often associated with large leiomyoma (>5 cm), posterior leiomyoma or red degeneration (4, 6). Red degeneration is a pregnancy-specific condition and occurs more frequently in the first trimester and onset of pregnancy when leiomyoma grow faster. The pain is thought to be due to necrotic infarction (due to rapid growth and tissue anoxia), the change in the blood flow of the growing uterus, and the release of prostaglandins from cellular damage (7). Uterine leiomyoma may negatively affect the implantation, placentation, and ongoing pregnancy through mechanical disruption of the endometrial cavity, impaired endometrial vascularization, and endometrial inflammation. Therefore, leiomyomas are associated with miscarriage, intrauterine growth restriction, intrauterine fetal death, preterm labor, placental abruption, and postpartum hemorrhage (8).

Due to the marked increase in uterine blood flow during pregnancy, obstetricians usually hesitate to perform cesarean myomectomy (CM). Even if some authors recommend only cesarean section (CS), most authors recommend that CM can be performed in selected cases by experienced surgeons. Indications and contraindications for CM are still not clearly defined and still it is a controversial issue. Since the size of the uterus increases during pregnancy (the uterus/tumor ratio is higher than the non-pregnant) leiomyomas can be removed with a relatively small incision and can be sutured more easily by dint of increased elasticity and reduced fragility of the uterus (9). Considering the incidence of uterine leiomyomas in pregnancy continues to increase worldwide like CS birth rates, we aimed to share the outcome of our CM experiences to contribute to the literature in this regard.

* Correspondence: aligursoy44@hotmail.com

2. Materials and methods

This is a retrospective study of patients with leiomyoma who had a cesarean delivery in our Obstetrics and Gynecology Department between the years of 2017 - 2020. Patients with leiomyomas detected during pregnancy follow-up were included in the study. We excluded patients with multiple pregnancy, placental adhesion anomalies, preeclampsia, uterine hypotonia, uterine atony, multiple leiomyomas, leiomyomas located close to the great vessels, and known congenital or acquired coagulopathies which are contraindications for CM (10-12). Pregnant women with leiomyoma who had only CS but not myomectomy was chosen as the control group. This study was approved by the ethics committee and the study was conducted in accordance with the Helsinki Declaration.

Data were collected from inpatient file records, operation, and discharge notes. Patients' age, gravida, parity, cesarean indications, gestational weeks, leiomyoma location, leiomyoma size and leiomyoma types detected during cesarean were recorded. In addition, pre-operative, and post-operative 24th hour hemoglobin (Hb) values, differences between Hb values, pre-operative, and post-operative 24th hour hematocrit (Htc) values, differences between Htc values, additional uterotonic requirement, blood transfusion requirement, duration of hospital stay, postoperative fever (temperature greater than or equal to 38°C) and histopathological examination results of myomectomy materials were examined. The key point to be considered in the surgical technique is the protection of the leiomyoma pseudo-capsule. This method allows the maintenance of healthy myometrial tissue around the leiomyomas and myometrial healing after myomectomy. Many neurotransmitters and neuropeptides necessary for myometrial physiology have been found in the leiomyoma pseudo-capsule (13). A linear incision was made on the leiomyoma with the help of electrocautery or scalpel and was removed with the sparing of the leiomyoma pseudo-capsule. The remaining myometrial cavity and serosa were closed ensuring adequate tissue tension with the number of 2/0 or 0 vicryl sutures. In cases where the endometrial cavity was opened during myomectomy, the endometrium was sutured. The remaining uterine serosa is sutured in a running baseball fashion. The measurement of leiomyomas was based on the largest diameter measured in histopathological examinations.

Table 1. Demographic and preoperative characteristic for all patients

		Min-Max			Median	Mean ± SD/n-%		
Maternal age (years)		21.0	-	42.0	34.0	33.3	±	4.2
Gestational age (week)		28.0	-	40.5	38.4	38.0	±	2.4
Gravida (n)	Primigravid					49		61.3%
	Multigravid					31		38.8%
Parity (n)	Nulliparity					61		76.3%
	Multiparity					19		23.8%
Use of additional uterotonics	(+)					14		17.5%
	(-)					66		82.5%
Location of myoma	Anterior					32		40.0%
	Fundal					25		31.3%
	Posterior					20		25.0%
	Cervical					3		3.8%
Type of myoma	Subserosal					41		51.3%
	Submucosal					7		8.8%
	Intramural					32		40.0%
Size of myoma	≤5 cm					37		46.3%
	>5 cm					43		53.8%
Cesarean indications	Previous uterine surgery					29		36.3%
	Cephalopelvic disproportion					20		25.0%
	Non-progressive labor					8		10.0%
	Abnormal presentation					10		12.5%
	Fetal Distress					13		16.3%
Blood transfusion requirement	(-)					79		98.8%
	(+)					1		1.3%
Postoperative fever	(-)					79		98.8%
	(+)					1		1.3%
Myomectomy	(+)					54		67.5%
	(-)					26		32.5%
Preoperative Hb (g/dL)		8.9	-	13.9	12.0	12.0	±	1.0
Change in Hb (g/dL)		0.10	-	4.30	1.30	1.39	±	0.91
Preoperative Htc (%)		26.8	-	41.5	36.0	35.6	±	2.6
Change in Htc (%)		0.1	-	12.4	3.7	4.2	±	2.7
Length of hospital stay (day)		2.0	-	7.0	2.0	2.1	±	0.6

Average, standard deviation, median lowest, highest, frequency and ratio values were used in the descriptive statistics of the data. The distribution of variables was measured by the Kolmogorov -Smirnov test. Independent sample t-test, Kruskal – Wallis and Mann - Whitney U test was used in the analysis of quantitative independent data. In the analysis of qualitative independent data, the chi-square test, Fischer test was used when chi-square test conditions were not met. SPSS 26.0 program was used in the analysis.

3. Results

Eighty pregnant women between the ages of 21-42 were included in the study. The mean gestational week of the patients was 38.0 ± 2.4 (Table 1). While 54 patients were in the CM group, 26 were in the CS group. Table 2 summarizes comparisons of clinical characteristics in women with cesarean myomectomy and with only cesarean section, revealing no significant differences concerning maternal age, gestational age, gravida, parity, cesarean indication distributions and hospital stay of the two groups (p>0.05). In the CM group, the indications for cesarean delivery were 33.3% previous uterine surgery, 25.9% cephalopelvic disproportion, 16.7% fetal distress, 13% abnormal presentation and 11.1% non-progressive labor. While no significant difference was observed according to the location of the leiomyomas between the anterior, fundal, and posterior location between the two groups, cervical leiomyomas were significantly higher in the CS group (p<0.05). In terms of leiomyoma types, while 53.8% of intramural leiomyoma was observed in the CS group 59.3% of subserous leiomyoma was observed most frequently in the CM group (p>0.05). The additional uterotonic need in the CM group was 20.1%, while the need in the CS group was 11.5% (p>0.05) (Table 2). While 61.1% of leiomyomas in the CM group were >5 cm, in the CS group only 38.5% were observed greater than 5 cm (p: 0.057). In the CM group, transfusion requirement and postoperative fever were observed in 1 patient while no need for transfusion required, and postoperative fever seen in the CS group (p>0.05) (Table 2). Preoperative Hb, Hb change, preoperative Htc and Htc change did not differ significantly between the groups (p>0.05). In the CM group, Hb change, Htc change, additional uterotonic dose need, transfusion requirement, postoperative fever and duration of hospital stay have no relation with the location, size and types of the leiomyomas (p>0.05) (Table 3-5).

Table 2. Comparisons of clinical characteristics and outcomes across women with and without cesarean myomectomy

		Cesarean myomectomy				Cesarean				p	
		Mean ± SD/n-%			Median	Mean ± SD/n-%			Median		
Maternal age (years)		33.3	±	4.3	34.0	33.3	±	4.0	34.0	0.992	m
Gestational age (week)		37.8	±	2.8	38.5	38.3	±	1.2	38.4	0.777	m
Gravida (n)	Primigravid	35		64.8%		14		53.8%		0.346	x^2
	Multigravid	19		35.2%		12		46.2%			
Parity (n)	Nulliparity	42		77.8%		19		73.1%		0.644	x^2
	Multiparity	12		22.2%		7		26.9%			
Use of additional uterotonics	(+)	11		20.4%		3		11.5%		0.330	x^2
	(-)	43		79.6%		23		88.5%			
Location of myoma	Anterior	25		46.3%		7		26.9%		0.157	x^2
	Fundal	18		33.3%		7		26.9%		0.747	x^2
	Posterior	11		20.4%		9		34.6%		0.270	x^2
	Cervical	0		0.0%		3		11.5%		***0.031***	x^2
Type of myoma	Subserosal	32		59.3%		9		34.6%		0.118	x^2
	Submucosal	4		7.4%		3		11.5%			
	Intramural	18		33.3%		14		53.8%			
Size of myoma	≤5 cm	21		38.9%		16		61.5%		0.057	x^2
	>5 cm	33		61.1%		10		38.5%			
Cesarean indications	Previous uterine surgery	18		33.3%		11		42.3%		0.952	x^2
	Cephalopelvic disproportion	14		25.9%		6		23.1%			
	Non-progressive labor	6		11.1%		2		7.7%			
	Abnormal presentation	7		13.0%		3		11.5%			
	Fetal Distress	9		16.7%		4		15.4%			
Frequency of blood transfusion	(-)	53		98.1%		26		100%		1.000	x^2
	(+)	1		1.9%		0		0.0%			
Postoperative fever	(-)	53		98.1%		26		100%		1.000	x^2
	(+)	1		1.9%		0		0.0%			
Preoperative Hb (g/dL)		11.9	±	1.0	11.9	12.1	±	1.1	12.1	0.573	t
Change in Hb (g/dL)		1.40	±	0.94	1.25	1.38	±	0.87	1.35	0.914	m
Preoperative Htc (%)		35.6	±	2.6	35.5	35.8	±	2.7	36.5	0.739	t
Change in Htc (%)		4.3	±	2.8	3.7	3.9	±	2.6	3.6	0.674	m
Length of hospital stay (day)		2.1	±	0.7	2.0	2.0	±	0.2	2.0	0.532	m

t, t test; m , Mann-Whitney U Test; X^2 ,Chi square test (Fischer test)

Table 3. Comparison of outcomes in women with cm concerning localization of leiomyoma

		Anterior				Fundal				Posterior				p	
		Mean ± SD/n-%			Median	Mean ± SD/n-%			Median	Mean ± SD/n-%			Median		
Preoperative Hb (g/dL)		11.9	±	1.2	12.0	12.1	±	0.9	11.9	11.6	±	0.8	11.3	0.313	K
Change in Hb (g/dL)		1.37	±	0.94	1.10	1.45	±	1.02	1.30	1.39	±	0.88	1.40	0.913	K
Preoperative Htc (%)		35.5	±	3.1	36.0	35.9	±	2.3	35.4	35.2	±	2.2	34.5	0.674	K
Change in Htc (%)		4.0	±	2.8	3.5	4.5	±	2.9	4.0	4.6	±	2.7	4.5	0.684	K
Use of additional uterotonics	(+)	4		16.0%		6		33.3%		1		9.1%		p>0.05	X^2
	(-)	21		84.0%		12		66.7%		10		90.9%			
Blood transfusion requirement	(-)	25		100%		17		94.4%		11		100.0%		p>0.05	X^2
	(+)	0		0.0%		1		5.6%		0		0.0%			
Postoperative fever	(-)	25		100%		17		94.4%		11		100.0%		p>0.05	X^2
	(+)	0		0.0%		1		5.6%		0		0.0%			
Length of hospital stay		2.2	±	1.0	2.0	2.1	±	0.3	2.0	2.0	±	0.0	2.0	0.550	K

^{K}, Kruskal-Wallis; X^2, Chi-square test (Fischer test)

Table 4. Comparison of outcomes in women with CM concerning type of leiomyoma

		Subserosal				Submucosal				Intramural				p	
		Mean ± SD/n-%			Median	Mean ± SD/n-%			Median	Mean ± SD/n-%			Median		
Preoperative Hb (g/dL)		11.9	±	1.0	11.8	12.7	±	0.8	12.7	11.8	±	1.1	11.5	0.277	K
Change in Hb (g/dL)		1.54	±	1.04	1.35	1.18	±	0.39	1.30	1.21	±	0.82	0.90	0.534	K
Preoperative Htc (%)		35.5	±	2.6	35.3	36.8	±	2.2	36.9	35.4	±	2.9	35.7	0.537	K
Change in Htc (%)		4.6	±	3.1	3.8	3.5	±	1.1	3.4	3.9	±	2.3	3.4	0.708	K
Use of additional uterotonics	(+)	6		18.8%		2		50.0%		3		16.7%		p>0.05	X^2
	(-)	26		81.3%		2		50.0%		15		83.3%			
Blood transfusion requirement	(-)	31		96.9%		4		100.0%		18		100.0%		p>0.05	X^2
	(+)	1		3.1%		0		0.0%		0		0.0%			
Postoperative fever	(-)	31		96.9%		4		100.0%		18		100.0%		p>0.05	X^2
	(+)	1		3.1%		0		0.0%		0		0.0%			
Length of hospital stay		2.2	±	0.9	2.0	2.0	±	0.0	2.0	2.1	±	0.2	2.0	0.741	K

^{K} Kruskal-wallis / X^2 Chi-square test (Fischer test)

Table 5. Comparison of outcomes in women with CM concerning size of leiomyoma

		Size of myoma ≤5 cm				Size of myoma > 5 cm				p	
		Mean ± SD/n-%			Median	Mean ± SD/n-%			Median		
Preoperative Hb (g/dL)		12.0	±	1.0	11.8	11.9	±	1.1	12.0	0.831	m
Change in Hb (g/dL)		1.31	±	0.80	1.10	1.45	±	1.02	1.30	0.789	m
Preoperative Htc (%)		35.5	±	2.3	35.3	35.6	±	2.9	36.0	0.467	m
Change in Htc (%)		3.9	±	2.6	3.1	4.5	±	2.9	3.9	0.394	m
Use of additional uterotonics	(+)	4		19.0%		7		21.2%		0.847	x^2
	(-)	17		81.0%		26		78.8%			
Frequency of blood transfusion	(-)	21		100.0%		32		97.0%		1.000	x^2
	(+)	0		0.0%		1		3.0%			
Postoperative fever	(-)	21		100.0%		32		97.0%		1.000	x^2
	(+)	0		0.0%		1		3.0%			
Length of hospital stay (day)		2.0	±	0.2	2.0	2.2	±	0.9	2.0	0.545	m

^{m} Mann-whitney u test / X^2 Chi-square test (Fischer test)

4. Discussion

As the primary outcome, we evaluated the difference between preoperative and postoperative Hb levels and the difference between preoperative and postoperative Htc levels. Besides, blood transfusion requirement, prolonged hospitalization, postoperative fever and peripartum hysterectomy requirement were evaluated as the secondary outcomes. Intraoperative hemorrhage has been reported to be the most frequent complication of CM's (14). There are many factors that affect the amount of hemorrhage during operation. Many preventative techniques such as vasopressin, ergometrine, oxytocin, misoprostol, uterine tourniquet and bilateral uterine artery ligation can be used to reduce bleeding before myomectomy operation (15). Apart from these, other factors affecting the amount of bleeding are the surgeon's experience, selection of the correct indication and the lack of standard surgical technique for the operation. Considering all these factors, some studies have shown that performing myomectomy during cesarean did not negatively affect the change in Hb (14, 16-19), while some studies have shown that it increased the change of Hb (20, 21). Although none of the additional methods were used in any of the cases in our study, we found the hemoglobin decrease similarly to the control group. We achieve this situation with the right patient choice and the right dose application of additional uterotonics when it was necessary. Uterine leiomyomas are classified based on location: sub serosal (distorting the external contour of the uterus, >50% of the leiomyoma must project outside the myometrium), intramural (within the myometrium, distorting neither the external contour nor cavity) and submucosal (>50% of the leiomyomas mass projects into the uterine cavity covered by endometrium and distorting the cavity)

(22). While no significant difference was observed according to the location of the leiomyomas between the anterior, fundal, and posterior location between the two groups, cervical leiomyomas were significantly higher in the CS ($p<0.05$). In the literature, most of the surgeons preferred to excise often subserous leiomyomas and corpus located leiomyomas like us (12, 19).

Another factor that is effective in deciding to perform myomectomy during the cesarean section is the size of leiomyomas. Although 61.3% of our CM group consisted of >5 cm leiomyomas, the postoperative Hb reduction compared to <5 cm leiomyomas were similar. It was also showed in several studies that leiomyoma size did not have a negative effect on postoperative hemoglobin decrease (18, 19, 23). After cesarean delivery, the routine dose of oxytocin was applied in all cases but the additional uterotonic drugs were applied only in atonic cases with excessive bleeding. Dedes et al. found that additional uterotonic need was higher but not statistically significant in the CM group than CS group as in our study (p: 0.33) (16). Although cesarean myomectomies have been associated with heavy bleeding, higher need for reoperation, hysterectomy, arterial embolization, arterial ligation, and ileus, none of these risks was encountered in our patients (12). Since it was a retrospective study, we were unable to reach operating times completely and therefore we could not include this parameter in our study. Many studies in the literature showed that performing myomectomy during cesarean increased the duration of surgery significantly (16,19,24,25). Only 1 of our 54 CM patients required blood transfusion ($p > 0.05$). As stated in a meta-analysis, the need for blood transfusion did not increase in CMs (24). Although our study shows that myomectomy during cesarean did not prolong hospital stay there were different results in the literature. In some of these studies, while the duration of hospitalization in CM patients was longer (17, 26, 27), on the contrary some studies suggested that there was no significant difference in the duration of hospitalization (18, 23, 28). Consistent with the literature, we did not find any evidence of CM causing postoperative fever in patients (19, 24). The risk of malignancy for uterine leiomyomas is extremely low and is estimated to be 1/400 (29). In our study, all myomectomy samples were examined histopathologic ally and all of them were confirmed as benign leiomyoma.

There are some limitations in our study. It was a retrospective study with a small sample size. We also didn't have the long-term follow-up data of patients and could not emphasize its impact on future pregnancies. The results of our study show that cesarean myomectomy had no adverse effect on morbidity and mortality in the intrapartum or in the early postpartum period. For this reason, we suggest that cesarean myomectomy can be performed safely in selected cases by obstetricians in order not to do another surgery and burden its additional cost.

Conflict of interest

None to declare.

Acknowledgments

None to declare.

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