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Effect Of Leiomyoma On Maternal And Fetal Outcomes During Pregnancy

Leiomyomun Maternal ve Fetal Sonuçlar Üzerine Etkisi

Deniz OLUKLU [1] Orcid ID:0000-0002-9050-2041
Serra AKAR [1] Orcid ID:0000-0002-0466-140X
Ali Turhan ÇAĞLAR [2] Orcid ID:0000-0002-7022-3029

[1] Department of Obstetrics and Gynecology, Turkish Ministry of Health Ankara City Hospital, Ankara, Turkey

[2] Department of Obstetrics and Gynecology, Etlik Zübeyde Hanım Women's Health Care, Training and Research Hospital, Ankara, Turkey

ÖZ

Amaç: Çalışmamızda myom boyutu, sayısı, lokalizasyonu ve tipinin obstetrik ve fetal sonuçlar üzerindeki etkilerinin retrospektif olarak elde edilmesi amaçlanmıştır.

Gereç ve Yöntemler: Ocak 2007-Aralık 2014 tarihleri arasında Ankara Dr Zekai Tahir Burak Eğitim ve Araştırma Hastanesi perinataloji kliniğinde rutin antenatal takibi yapılan ve 24 hafta ve üzeri doğum yapmış 292 tekil gebe çalışmaya dahil edildi. Çalışma grubu 4 santimetre ve üzeri leiomyomu olan hastalardan oluşturuldu. Sezaryen esnasında myomektomi yapılan, ek hastalığı, uterin anomalisi ve fetal malformasyonu olan hastalar çalışma dışı bırakıldı. Obstetrik ve fetal sonuçlar kaydedildi.

Bulgular: Çalışmamızda myom sayısı 1 olanlarda vajinal doğum şekli görülme oranı myom sayısı 2 ve daha fazla olanlardan anlamlı düzeyde yüksek bulunmuştur (χ^2= 6.922; p=0.009). Myom boyutu 10 cm'den fazla olanlarda preterm eylem tanısı alanların oranı 4-7 cm ve 7 -10 cm olanlardan anlamlı düzeyde yüksek bulunmuştur (sırasıyla, p= 0.005 ve p= 0.002). Myom boyutu 10 cm'den fazla olanlarda prezentasyon anomalisi olanların oranı 4-7 cm (p= 0.008) ve 7-10 cm olanlardan daha yüksektir (p=0.045). 4-7 cm grubunda tranfüzyon ihtiyacı olanların oranı 7-10 cm grubundan ve 10 cm grubundan düşüktür (sırasıyla, p= 0.010 ve p= 0.011).Myom yerleşimi serviks ile korpus lokalizasyonlu myomu olanlarda korpus lokalizasyonlu olanlara göre sezeryan ile doğumun daha yüksek sıklıkta olduğunu tespit ettik (p= 0.008).İntramural grubunda vajinal doğum oranı % 40.9, subserozal (p= 0.002) ve kombine (p= 0.004) olup myom tipi gruplarında elde edilen oranlardan daha yüksek bulunmuştur.

Sonuç: Kadınların daha ileri yaşlarda gebelik planması, ileri yaşlarda myoma uteri insidansının artması ve son yıllarda sezaryen ile doğum oranlarının artmasıyla gebelik sırasında myoma uteriye sık rastlanmaktadır. Myomların sayısı, boyutu, yerleşimi ve tipine göre gebeliğe etkisi ve obstetrik sonuçları ile ilişkili litaratürde az çalışma olup, çelişkili kanıtlar mevcuttur. Myomu olan olgular gebelik, doğum ve doğum sonrası olası komplikasyonlar yönünden dikkatlice takip edilmelidir.

Anahtar Kelimeler: Leiomyoma, maternal sonuçlar, fetal sonuçlar

ABSTRACT

Aim: The study aimed to determine the effects of leiomyoma size, number, location, and type on obstetric and fetal outcomes, retrospectively.

Materials and Methods: A total of 292 singleton pregnancies, who were attended to perinatology unit of Zekai Tahir Burak Women's Health Training and Research Hospital in Ankara as part of routine antenatal follow-up between January 2007 and 2014 and delivered at or beyond 24 weeks were included. The study group consisted of patients with leiomyoma of 4 cm or more. Patients who underwent myomectomy during cesarean delivery, who had co-morbidities, uterine anomalies, or fetal malformations were excluded from the study. Obstetric and fetal outcomes were recorded.

Results: Vaginal delivery rate was significantly higher in patients with a single leiomyoma when compared to patients with 2 or more leiomyoma (p=0.009). Diagnosis of preterm labor was significantly higher in patients with leiomyoma size larger than 10 cm when compared to patients with leiomyoma sizes 4-7 cm and 7-10 cm (p =0.005 and p=0.002, respectively). The presentation anomaly rate was significantly higher in patients with leiomyoma sizes bigger than 10 cm when compared to patients with leiomyoma sizes 4-7 cm (p=0.008) and 7-10 cm (p =0.045). The need for transfusion was lower in the group with leiomyoma measuring 4-7 cm when compared to leiomyoma measuring 7-10 cm and those larger than 10 cm (p=0.010 and p = 0.011, respectively). Cesarean delivery rate was higher in patients with leiomyoma localized to the cervix and corpus in comparison to those localized to the corpus only (p =0.008). Vaginal delivery rate (40.9%) was higher in patients with intramural leiomyoma when compared to subserous (p=0.002) and combined (p=0.004) leiomyoma.

Conclusion: The prevalence of leiomyoma during pregnancy is increasing due to women planning pregnancy later in life, the increasing incidence of fibroids with age, and the rise of cesarean delivery rates which enables us to diagnose more cases in recent years. Patients with leiomyoma should be placed on close surveillance for possible complications during pregnancy, delivery and postpartum.

Keywords Leiomyoma, maternal outcomes, fetal outcomes

Sorumlu Yazar/ Corresponding Author:
Deniz Oluklu
Adres: Ministry of Health, Ankara City Hospital, 1604th Street, No: 9, Cankaya/Ankara, 06800 Turkey,
E-mail: denizoluklu9@gmail.com

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INTRODUCTION

Uterine leiomyoma is the most prevalent benign gynecologic tumors, and roughly 20–40% of women develop uterine leiomyoma during their reproductive years (1). In epidemiologic studies, the prevalence of leiomyoma among pregnant women ranged from 0.1– 3.9 % (2-6). The presence of leiomyoma in pregnancy can be problematic, partly because of the difficulty of ultrasonography in differentiating leiomyoma from the physiological thickening of the myometrium. (2,7)

Published data on obstetric outcomes in women with leiomyoma are conflicting. Some have described an increased risk of cesarean delivery (8,4,10,11), preterm labor or birth (2,10,12), placental abruption (2,3), malpresentation (3,8,10), and decreased birth weight (12,13) in women with leiomyoma, whereas others have reported no increased risk of these adverse outcomes (2,3,8,10,14). These discrepant findings may in part be attributable to lack of control groups, residual confounding, and biases inherent in study designs. More recent studies(3,8,10-12) have attempted to improve on this knowledge but still report conflicting results and are somewhat limited by small sample sizes.

We aimed to retrospectively determine the effects of fibroid size, number, location, and type on obstetric and fetal outcomes in this study.

MATERIALS AND METHODS

Patients with fibroid/s equal or greater than 4 cm were seen at the Perinatology Unit between January 2007 and December 2014 for routine antenatal follow-up and delivered at 24 weeks or beyond and who did not undergo a myomectomy during cesarean section were included in the study. Patients with co-morbidities and uterine or fetal malformations were excluded from the study. Approval from the Ethics committee of Dr. Zekai Tahir Burak Training and Research Hospital, Ankara was obtained (Decision No: 32; 29/04/2015).

Leiomyoma was divided into 4-7 cm, 7-10 cm, >10 cm groups according to size. The leiomyoma was classified as corporal, cervical, or corporal-cervical according to location and intramural, subserous, submucosal, and combination according to type.

Maternal age, gravidity, parity, body mass index, gestational age at birth, presence of preterm labor, preterm premature rupture of membranes (PPROM), and intrauterine growth restriction (IUGR) were recorded. Also, presentation of the fetus, placental localization, placenta previa, presence of placental invasion anomaly, route of delivery, the occurrence of postpartum atony, need for blood product transfusion and if so amount required and length of hospital stay was noted from the medical records. Additionally, fetal outcomes such as average birth weight and Apgar scores at 1 and 5 minutes were gathered.

Statistical Analysis

IBM SPSS Statistics 21.0 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) and MS-Excel 2007 were used for statistical analyses and calculations. The distribution of the variables were analyzed with the Shapiro-Wilks test. Variables not showing normal distribution were defined with a median (minimum; maximum). The distribution of categoric variables were illustrated with the number (n) and percentage.

The difference in the categoric variables grouped as the number of leiomyoma (1, ≥2) were assessed by Pearson Chi-square, Chi-square, and Fisher exact test as appropriate. Comparison of variables of the length of hospital stay and birth weight were made by Mann Whitney U test.

RESULTS

Differences in length of hospital stay and birth weight according to the size of leiomyoma (4-7 cm, 7-10 cm ve 10 cm), localization of leiomyoma (corpus, cervix, and cervix-corpus), and type of leiomyoma (intramural, subserosal and mixed) were analyzed by the Kruskal-Wallis non-parametric variance analysis. Bonferroni correction was used to determine the factor responsible for differences between variables. Pearson Chi-square test was used to examine the distribution of categoric variables. Exact test results were given in cases of insufficient sample size. When a statistically significant difference was obtained, the group responsible for the difference was analyzed by the independent two ratios. The level of statistical significance was assumed to be $p<0.05$.

For variables to be compared between groups, two groups were made for the placental site other than fundal. Since there was only one case of placental invasion anomaly, no cases of postpartum atony, and all newborns had a 5 minute Apgar score of seven and above, these variables were not used in the analyses. Variables regarding amniotic index and route of delivery were combined for analysis.

A total of 462 pregnancies were included in the study. Eigh-

ty-two patients were excluded because they underwent myomectomy during the cesarean section. Eighty-eight patients' hospital records could not be reached. The records of 292 pregnant patients were retrieved. The prevalence of leiomyoma during pregnancy was 0,41%. Demographic characteristics of the patients, gestational age, and birth weights were presented in Table 1.

Table 1. Characteristics of the variabes studied (n=292)

Variables	Median (min; max)	Mean±SD
Maternal age	33.0 (22.0; 47.0)	33.3±4.5
Gravidity	2.0 (1.0; 7.0)	2.5±1.3
Parity	1.0 (0.0; 4.0)	1.0±1.0
BMI	27.5 (22.6; 39.2)	27.8±2.8
Gestational weeks	38.0 (27.0; 41.0)	38.1±1.9
Length of hospital stay (hours)	38.0 (6.0; 144.0)	37.5±19.5
Birth weight (grams)	3140.0 (1460.0; 4380.0)	3135.8±527.5

Mean±SD: mean± Standard Deviation

Fifty (17%) pregnancies were diagnosed with preterm labor, 10 (3.4%) were diagnosed with PPROM and 16 (5.5%) were diagnosed with IUGR. 34 (11.6%) pregnancies were diagnosed with presentation anomalies, 3 (1%) were diagnosed with placenta previa, 1 (0.3%) was diagnosed with placental invasion anomaly and 1 (0.3%) was diagnosed with placental abruption. 210 (71.9%) patients had anterior lying placentas, the placenta was localized posteriorly in 81 (%13) patients, fundally in 1 (0.3%) patient. The amniotic index was normal in 273 (93.5%) patients, a diagnosis of oligohydramnios was made in 13 (4.5%) pregnancies and polyhydramnios was detected in 6 (1.5%) patients. Regarding the route of delivery, 56 (19.2%) patients required urgent cesarean section, 139 (47.6%) patients had cesarean sections and 97 (33.2%) patients gave vaginal birth. No cases of postpartum atony were seen. Eleven (3.8%) patients required blood and blood product transfusion. The median transfusion requirement was 2.0 (min= 2.0; max= 8.0) units. The newborns of 286 (97.9%) patients had 1 minute Apgar scores of 7 or above while the newborns of all patients had a 5 minute Apgar score of 7 or above (Table 2).

Table 2. Frequency distribution of categoric variables

	n (%)		n (%)
Preterm labour		Amniotic Index	
Absent	242(82.9)	Normal	273 (93.5)
Present	50 (17.1)	Oligohydramnios	13 (4.5)
PPROM		Polihydramnios	6 (2.1)
Absent	282 (96.6)	Route of Delivery	
Present	10 (3.4)	Urgent cesarean section	56 (19.2)
IUGR		Cesarean section	139 (47.6)
Absent	276 (94.5)	Vaginal delivery	97 (33.2)
Present	16 (5.5)		
Presentation anomaly		Postpartum atony	
Absent	258(88.4)	Absent	292 (100.0)
Present	34 (11.6)	Present	-
Site of placenta		Blood and blood product transfusion requirement	
Anterior	210(71.9)		
Posterior	81 (27.7)	Absent	281 (96.2)
Fundus	1 (0.4)	Present	11 (3.8)
Placenta previa		Quantity of volume (n= 11)	
Absent	289 (99.0)	Median (min; mak)	2.0 (2.0; 8.0)
Present	3 (1.0)	Mean±SD	3.3±2.4
Placenta invasion anomaly		1 minute Apgar	
None	291 (99.7)	<7	6 (2.1)
Acreata	1 (0.3)	≥7	286 (97.9)
Placental Abruption		5 minute Apgar	
None	289 (99.0)	<7	-
Present	3 (1.0)	≥7	292 (100.0)

Sixty-four (21.9%) patients had 2 or more leiomyoma. There were 172 (58.9%) patients with leiomyoma measuring between 4 and 7 cm, 84 (28.8%) patients with leiomyoma sizes between 7 and 10 cm, 36 (12.3%) patients had leiomyoma measuring 10 cm or more. Localization of leiomyoma was corpus in 251 (86%) patients. Leiomyoma type was intramural in 198 (67.8%) patients (Table 3).

Table 3. Distribution of leiomyoma.

	n (%)		n (%)
Number of Leiomyoma		Leiomyoma size	
1	228 (78.1)	4 - 7 cm	172 (58.9)
≥2	64 (21.9)	7 – 10 cm	84 (28.8)
Localization of Leiomyoma		>10 cm	36 (12.3)
Corpus	251 (86.0)	Leiomyoma type	
Cervix	22 (7.5)	Submucosal	1 (0.3)
Not Documented	1 (0.3)	Intramural	198 (67.8)
Cervix and Corpus	18 (6.2)	Subserous	52 (17.8)
		Combined	41 (14.1)

There is no statistically significant relationship between preterm labor and the number of leiomyoma (p=0.340). 3.1% of patients (n=2) with 2 or more leiomyoma uteri and 3.5% of patients (n=8) with a single fibroid were diagnosed with PPROM (p= 1.000) (Table 4).

Table 4. Comparison of variables according to number of leiomyoma (n=292)

	Number of Myoma		
	1 (n=228) Median(min; max)	≥ 2 (n= 64) Median(min; max)	
Variables	n (%)	n (%)	P
Preterm labor	36 (15.8)	14 (21.9)	0.340[b]
PPROM	8 (3.5)	2 (3.1)	1.000[c]
IUGR	12 (5.3)	4 (6.3)	0.758[c]
Presentation anomaly	26 (11.4)	8 (12.5)	0.983[b]
Placental location			
Anterior	168 (73.7)	42 (66.7)	0.347[b]
Posterior	60 (26.3)	21 (33.3)	
Placenta previa	3 (1.3)	0 (0.0)	1.000[c]
Placental abruption	2 (0.9)	1 (1.6)	1.000[b]
Amniotic index			
Normal	215 (94.3)	58 (90.6)	0.387[c]
Anormal	13 (5.7)	6 (9.4)	
Route of Delivery			
Cesarean	143 (62.7)	52 (81.2)	**0.009**[b]
Vaginal	85 (37.3)	12 (18.8)	
Blood and blood product transfusion requirement	8 (3.5)	3 (4.7)	0.711[c]
Units (n=11: 8/3)	2.0 (2.0; 8.0)	2.0 (2.0; 2.0)	0.376[d]
Length of Hospital Stay (hour)	38.0 (6.0; 144.0)	40.0 (12.0; 96.0)	**0.004**[d]
Birth Weight (gram)	3150.0 (1610.0; 4330.0)	3120.0 (1460.0; 4380.0)	0.778[d]
1. min Apgar			
<7	3 (1.3)	3 (4.7)	0.122[c]
≥7	225 (98.7)	61 (95.3)	

a. Pearson chi square, b. Chi square, c. Fisher exact, d:Mann Whitney U

There was no statistically significant difference between placental location according to fibroid number(p=0.347). The rate of vaginal birth was significantly higher in patients with a single leiomyoma when compared to those with 2 or more leiomyoma (p=0.009). There was a statistically significant difference in the length of hospital stay according to the number of leiomyoma (p=0.004). Patients with 2 or more leiomyoma had a median length of hospital stay of 40.0 hours (min= 12.0; max= 96.0) while patients with a single myoma uterus had a median length of hospital stay of 38.0 (min= 6.0; max= 144.0) hours (Table 4).

There was a statistically significant difference in the distribution of patients diagnosed with preterm labor in patients with varying sizes of leiomyoma (p=0.004) (Tablo 5).

Table 5. Comparison of variables according to the size of myoma uteri (n=292).

	Fibroid size			
	4 – 7 cm (n= 172) Median(min; max)	7 – 10 cm (n=84) Median(min; max)	> 10 cm (n= 36) Median(min; max)	
Variables	n (%)	n (%)	n (%)	P
Preterm labour	27 (15.7)	10 (11.9)	13 (36.1)	**0.004**
PPROM	6 (3.5)	1 (1.2)	3 (8.3)	0.145
IUGR	6 (3.5)	7 (8.3)	3 (8.3)	0.200
Presenation anomaly	16 (9.3)	9 (10.7)	9 (25.0)	**0.027**
Location of placenta				
Anterior	120 (70.2)	63 (75.0)	27 (75.0)	0.665
Posterior	51 (29.8)	21 (25.0)	9 (25.0)	
Plasenta previa	3 (1.7)	0 (0.0)	0 (0.0)	-
Placental abruption	1 (0.6)	1 (1.2)	1 (2.8)	0.699
Amniotic index				
Normal	162 (94.2)	79 (94.0)	32 (88.9)	0.489
Abnormal	10 (5.8)	5 (6.0)	4 (11.1)	
Route of Delivery				
Cesarean	111 (64.5)	56 (66.7)	28 (77.8)	0.308
Vaginal	61 (35.5)	28 (33.3)	8 (22.2)	
Blood and Blood Product transfusion need	2 (1.2)	6 (7.1)	3 (8.3)	**0.017**
Unite (n=11: 2/6/3)	3.0 (2.0; 4.0)	2.0 (2.0; 8.0)		-
Length of hospital stay (hours)	36.0 (6.0; 132.0)	38.0 (10.0; 144.0)	44.0 (12.0; 140.0)	**0.003**
Birth weight (gram)	3155.0 (1530.0; 4380.0)	3070.0 (1460.0; 4330.0)	3070.0 (1700.0; 4210.0)	0.492
1.minute Apgar				
<7	3 (1.7)	2 (2.4)	1 (2.8)	1.000
≥7	169 (98.3)	82 (97.6)	35 (97.2)	

There was no statistically significant difference in the rate of preterm labor between patients with leiomyoma measuring 4-7 cm and those measuring 7-10 cm (p=0.418). The rate of preterm labor was significantly higher in patients with leiomyoma measuring more than 10 cm when compared to the groups with fibroid size 4-7cm and 7-10 cm (respectively, p= 0.005 ve p= 0.002). The rate of presentation anomalies in patients with leiomyoma measuring 4-7 cm, 7-10 cm and > 10cm were 9.3% (n= 16), 10.7% (n=9) and 25% (n= 9) respectively (p=0.027). The rates are similar between leiomyoma sized 4-7 cm and 7-10 cm (p= 0.721). For leiomyoma larger than 10 cm, the rate of presentation anomalies is higher than for leiomyoma 4-7 cm (p= 0.008) and 7-10 cm (p=0.045) in size. There was a statistically significant difference in blood product transfusion requirement among different sizes of leiomyoma(p= 0.017). The transfusion requirements for leiomyoma sized 4-7 cm was lower than for leiomyoma sized 7-10 cm and >10cm (p= 0.010 and p= 0.011, respectively). The transfusion requirements are similar between the other 2 groups (p=0.821). The length of hospital stay is

statistically significantly different in at least one of the groups of different sizes of leiomyoma (p=0.003). With paired comparisons, a difference was detected between leiomyoma 4-7 cm and >10 cm (p=0.004). No statistically significant difference was found in the length of hospital stay between groups of 4-7 cm and 7-10 cm (p=0.152) and between groups of 7-10 cm and >10 cm (p=0.311). Median birth weights are similar among groups with different sizes of leiomyoma (p=0.492). The median birth weight with leiomyoma sized 4-7 cm, 7-10 cm and >10 cmwas3155.0 (min= 1530.0; max= 4380.0),3070.0 (min= 1460.0; max= 4330.0) and 3070.0 (min= 1700.0; max= 4210.0) grams, respectively. The other variables were found to be similarly distributed among different sizes of myoma uteri (p>0.05) (Table 5).

The length of hospital stays varied with different localizations of myoma uteri (p=0.009) (Table 6).

Table 6. Comparison of variables according to localization of leiomyoma (n=291)

	Fibroid localization			
	Corpus (n= 251)	Cervix (n= 22)	Corporal-cervix (n= 18)	
	Median(min; max)	Median(min; max)	Median(min; max)	
Variables	n (%)	n (%)	n (%)	P
Preterm labour	40 (15.9)	6 (27.3)	3 (16.7)	0.405
PPROM	9 (3.6)	1 (4.5)	0 (0.0)	0.865
IUGR	13 (5.2)	2 (9.1)	1 (5.6)	0.851
Presentation anomaly	29 (11.6)	2 (9.1)	3 (16.7)	0.849
Location of placenta				
Anterior	183 (72.9)	16 (72.7)	11 (61.1)	0.558
Posterior	68 (27.1)	6 (27.3)	7 (38.9)	
Placenta previa	3 (1.2)	0 (0.0)	0 (0.0)	-
Placental abruption	2 (0.8)	0 (0.0)	1 (5.6)	0.190
Amniotic index				
Normal	236 (94.0)	21 (95.5)	15 (83.3)	0.145
Abnormal	15 (6.0)	1 (4.5)	3 (16.7)	
Route of delivery				
Cesarean	159 (63.3)	18 (81.8)	17 (94.4)	**0.008**
Vaginal	92 (36.7)	4 (18.2)	1 (5.6)	
Blood and blood product transfusion need	9 (3.6)	2 (9.1)	0 (0.0)	0.264
Units (n=11: 9/2/-)	2.0 (2.0; 8.0)			-
Length of hospital stay (hours)	38.0 (6.0; 144.0)	39.0 (14.0; 140.0)	42.0 (21.0; 96.0)	**0.009**
Birth weight (gram)	3150.0 (1530.0; 4380.0)	3025.0 (2090.0; 4270.0)	3120.0 (1460.0; 3910.0)	0.941
1.minute Apgar				
<7	5 (2.0)	0 (0.0)	1 (5.6)	0.372
≥7	246 (98.0)	22 (100.0)	17 (94.4)	

There was no difference in length of hospital stay between groups with cervical and corporal-cervical locations (respectively, p=0.637 ve p=0.537). However, the length of hospital stay was significantly lower in leiomyoma located in the corpus when compared to those located in corpus-cervical (p=0.012).

There was a statistically significant difference in the distribution of myoma locations among different routes of delivery (p=0.008). There was no difference in the route of delivery between leiomyoma located in the corpus and those located in the cervix (p=0.082). There was a statistically significant difference in route of delivery between leiomyoma located in the corpus-cervix and corpus (p=0.007), no difference was found between locations of the corpus-cervix and cervix (p= 0.230).

Among different myoma types, the only route of delivery and 1 minute Apgar scores showed statistically significant differences in distribution (p<0.001 and p=0.040, respectively) (Table 7).

Tablo 7. Comparison of variables according to myoma type (n=291).

	Myoma type			
	intramural (n= 198)	Subserous (n= 52)	Combined (n= 41)	
	Median(min; max)	Median(min; max)	Median(min; max)	
Variables	n (%)	n (%)	n (%)	P
Preterm labour	33 (16.7)	7 (13.5)	10 (24.4)	0.361
PPROM	8 (4.0)	0 (0.0)	2 (4.9)	0.347
IUGR	13 (6.6)	1 (1.9)	2 (4.9)	0.454
Presentation anomaly	25 (12.6)	6 (11.5)	3 (7.3)	0.628
Placental location				
Anterior	147 (74.2)	34 (66.7)	28 (68.3)	0.474
Posterior	51 (25.8)	17 (33.3)	13 (31.7)	
Placenta previa	3 (1.5)	0 (0.0)	0 (0.0)	-
Placental abruption	1 (0.5)	0 (0.0)	2 (4.9)	0.058
Amniotic index				
Normal	186 (93.9)	50 (96.2)	36 (87.8)	0.236
Abnormal	12 (6.1)	2 (3.8)	5 (12.2)	
Route of delivery				
Cesarean	117 (59.1)	43 (82.7)	34 (82.9)	**<0.001**
Vaginal	81 (40.9)	9 (17.3)	7 (17.1)	
Blood and blood product transfuison need	6 (3.0)	1 (1.9)	4 (9.8)	0.103
Units (n=11: 6/1/4)	3.0 (2.0; 8.0)			-
Length of hospital stay (hours)	36.0 (6.0; 144.0)	41.0 (12.0; 122.0)	42.0 (18.0; 140.0)	0.160
Birth weight (gram)	3140.0 (1530.0; 4330.0)	3340.0 (2450.0; 4300.0)	3030.0 (1460.0; 4380.0)	0.838
1.minute Apgar				
<7	3 (1.5)	0 (0.0)	3 (50.0)	**0.040**
≥7	195 (98.5)	52 (100.0)	38 (92.7)	

No difference was found between intramural and subserous leiomyoma (p=0.372). A difference was observed in combined leiomyoma (p=0.031). Rates of ≥7 Apgar scores are different among subserous and combined leiomyoma (p= 0.047).

The vaginal delivery rate, 40.9%, in the intramural group was higher than those for subserous (p= 0.002) and combined (p= 0.004) groups. The vaginal delivery rate in the subserous and combined groups were17.3% and 17.1%, respectively (p= 0.976). The distribution of other variables according to the type of leiomyoma were similar (p>0.05).

DISCUSSION

Our results indicate that the incidence of vaginal birth was higher in patients with single leiomyoma when compared to those with multiple leiomyoma. Also, the rate of preterm labor and presentation anomalies were higher in women with leiomyoma bigger than 10 cm when compared to those with leiomyoma measuring 4-7 cm and 7-10 cm. The need for transfusion was lower in women with leiomyoma measuring 4-7 cm when compared to other groups. The rate of cesarean delivery was higher in women with leiomyoma localized to the corporal-cervical region as opposed to those with leiomyoma located in the corpus. The rate of vaginal delivery was higher in women with intramural leiomyoma compared to those with combined or subserous leiomyoma.

Complications can arise in about 10-30% of patients diagnosed with leiomyoma during pregnancy (4) The biological basis for the association between pregnancy, labor, or delivery complications and uterine leiomyoma is unclear. Some research suggested that leiomyoma that are behind the placenta or in the lower uterine segment increase the likelihood of delivery complications (2,11,14). Uterine leiomyoma also might decrease uterine distensibility, or present mechanical obstructions that restrict space, limit fetal movement or lessen the force of contractions (2,11).

Ciavattini et al reviewed 219 singleton pregnancies with routine ultrasonography in the second trimester revealing leiomyoma. All patients delivered beyond 24 gestational weeks and had no additional comorbidities. They were compared to an age-matched group of pregnancies without leiomyoma. Patients with leiomyoma during pregnancy were grouped according to number (single or multiple) and size (small; 5 cm and large; ≥5 cm). PPROM was more frequent in patients with large leiomyoma. Those with multiple leiomyoma had higher rates of preterm labor and cesarean section. In pregnancies with multiple leiomyomas, the decrease in uterine distensibility and modification in the contraction model may have contributed to the increase in the rate of preterm labor. Additionally, since malpresentation and dynamic or mechanic dystocia were more frequent in pregnancies with multiple leiomyomas, cesarean rates were higher (15). In the current study, there was no difference in the distribution of preterm labor or PPROM among groups of different sizes of leiomyoma. Patients with 2 or more leiomyoma had significantly higher rates of cesarean delivery when compared to those with single leiomyoma. The distribution of PPROM rates was similar among patients with different sizes of leiomyoma.

Shavell et al. gathered studied 95 singleton pregnancies in which leiomyoma were detected in pregnancy with ultrasonography. The Control group included 95 age-matched pregnancies without leiomyoma. Pregnancies with a diagnosis of leiomyoma were classified as small (<5 cm) and large (5 cm). They showed that patients with large leiomyoma delivered at an earlier gestational week when compared to those with small or no leiomyoma (36.5 vs. 38.6 vs 38.4 respectively). There was a significant increase in the rates of PPROM (rupture of membrane before 37th gestational week), preterm labor, and shorter cervix(cervical length <25 mm measured with transvaginal ultrasound at or before 32 gestational weeks) in patients with large leiomyoma. Blood loss and subsequent need for blood transfusion were significantly higher in patients with large leiomyoma. The total volume of myoma was significantly related to preterm birth, short cervix, and PPROM. Decreased uterine distensibility due to leiomyoma can give rise to such obstetric outcomes. There was no difference in the route of delivery among patients with large, small, or no leiomyoma (16). Similarly, our results showed a difference in the distribution of preterm labor among groups of different sized leiomyoma. The rate of preterm labor was significantly higher in patients with leiomyoma larger than 10 cm when compared to those with leiomyoma 4-7 cm and 7 -10 cm. There was a statistically significant difference in the distribution of the need for transfusion of blood and blood products among groups of leiomyoma of different sizes. The need for transfusion was lower in cases of leiomyoma sized 4-7 cm when compared to those sized 7 - 10 cms and those 10 cms. The distribution of transfusion needs was similar in the two groups. The distribution of PPROM rate among different groups of fibroid size was similar. There was no difference in the postpartum blood transfusion rate. There was no incidence of postpartum atony in 292 patients included in the

study. There were 11 patients (3.8%) who required transfusion of blood or blood products. The median transfusion amount was2.0 (min= 2.0; max= 8.0) units. Due to the rapid initiation of medical treatment with agents such as oxytocin, misoprostol, and methylergonamine, no incidence of uterine atony was noted and only a few patients required transfusion.

Lam et al. included 197 patients with leiomyoma of 4 cm or more on ultrasound. 136 patients gave live birth and the leiomyoma were classified according to size (4-7 cm, 7-10 cm, 10 cm), localization (cervix, corpus), type (submucosal, intramural, subserosal or combined), and number (single, multiple). Preterm labor was significantly higher in patients with multiple leiomyomas when compared to those with single leiomyoma. A higher rate of cesarean section was seen when leiomyoma was located in the cervix as opposed to those located in the corpus. Postpartum hemorrhage was more frequent in patients with leiomyoma measuring 10 cm when compared to those with leiomyoma sizing 4-7 cm and 7-10 cm (17). Our study failed to show a significant difference in the distribution of preterm labor among fibroid groups of different sizes. Regarding the route of delivery, there was a significant difference among groups of leiomyoma according to location. There was no difference in route of delivery between leiomyoma located in the cervix and those located in the corpus. There was a difference in route of delivery between leiomyoma located in the cervix and corpus and those located in the corpus. There was a lower need for transfusion in patients with leiomyoma sized 4-7 cm when compared to those measuring7-10 cm and 10 cm.

In a retrospective cohort, Qidwai et al. identified at least one fibroid in 401 pregnancies during routine second trimester ultrasound performed on 15104 pregnant women. Rates of cesarean birth, breech presentation, presentation anomaly, preterm labor, placenta previa, and postpartum hemorrhage were higher in patients with leiomyoma. There was no difference in cesarean rates between patients with leiomyoma less than 10 cm and those larger than 10 cm(10). We reported an urgent cesarean section rate of 19.2%, cesarean section rate of 47.6%, and vaginal delivery rate of 33.2%. In the current study, a type of presentation anomaly was detected in 11.6% of our patients. 17.1% of patients were diagnosed with preterm labor. We failed to show a statistically significant difference in cesarean rates among leiomyoma measuring 4-7 cm, 7-10 cm, and 10 cm.

Sheiner et al. studied 105909 singleton births and detected leiomyoma in 690 (%0.65) patients. Multivariate analyses were used and nulliparity, chronic hypertension, diabetes mellitus, increasing maternal age was shown to be significantly related to leiomyoma. Perinatal mortality was higher in patients with leiomyoma when compared to those without. Maternal age, parity, gestational age, and presentation anomalies (13). In our study, the median maternal age was 33.0 (min= 22.0; max= 47.0). Median gravidity was2.0 (min= 1.0; max= 7.0) and median parity was 1.0 (min= 0.0; mak= 4.0). We reported an urgent cesarean section rate of 19.2%, cesarean section rate of 47.6%, and vaginal delivery rate of 33.2%. In the current study, a type of presentation anomaly was detected in 11.6% of patients. 17.1% of patients were diagnosed with preterm labor. 1% of pregnancies received a diagnosis of placental abruption.

Exacoustos et al. examined 12708 pregnant patients with ultrasonography and found leiomyoma in 492 pregnancies. While 88% had a single leiomyoma, 12% had multiple leiomyomas. They assessed fibroid size, position, localization, relationship with the placenta and its echogenic features and compared results with those of the control group. There was a significant increase in the rates of imminent abortion, preterm labor, placental abruption, and pelvic pain in patients with leiomyoma. Placental abruption was particularly increased in pregnancies with submucosal leiomyoma with volumes greater than 200 cm3and those that were superposed on the placenta. Leiomyoma with heterogenic echo patterns on sonography, cystic spaces, and volumes greater than 200 cm3 were found to be related to pelvic pain. The presence of leiomyoma did not affect the route of delivery, the occurrence of imminent abortion, preterm labor, PPROM, and fetal growth (3). According to our results, 1% of patients had placental abruption.

In the retrospective cohort reported by Vergani et al., leiomyoma was detected during routine second trimester ultrasonography in 183 pregnancies and 7523 pregnant women who attended antenatal follow-up at the same center were included in the control group. Mean maternal age in those with and without leiomyoma was 33.1 and 29.5, respectively. The rate of nulliparity was 46% and 61% in patients with leiomyoma and without leiomyoma, respectively. Preterm labor (37 gestational weeks), PPROM, IUGR, placental abruption, placenta previa, postpartum hemorrhage, placental rest were significantly higher when compared to the incidence in the general population. The rate of cesarean section was higher in patients with leiomyoma (%23 vs %12). Uni- and multivariate analyses revealed higher cesarean rates for leiomyoma located in the lower uterine segment and for leiomyoma larger than 5 cm (18). Our results indicate that the route of delivery varies by fibroid location.

While there is no difference in the route of delivery between leiomyoma located in the corpus and those located in the cervix, there is a significant increase in the rate of cesarean section for leiomyoma located in the corporal-cervical location. The size of the leiomyoma did not affect the route of delivery.

A retrospective cohort by Stout et al. included antenatal follow-up of 64047 women with singleton pregnancies among 72373 who received routine second trimester ultrasonography. 2058 (%3.2) patients were seen to have leiomyoma. Gestational age at birth and birth weight were significantly lower in patients with leiomyoma when compared to those without leiomyoma. Risk for breech presentation, placenta previa, birth by cesarean, placental abruption, PPROM, preterm labor, and intrauterine growth retardation was higher for women with leiomyoma. There was a significant relationship between increased fibroid volume and breech presentation, cesarean delivery. Risk for placenta previa, PPROM, and IUGR was significantly higher for women whose leiomyoma was larger than 5 cm when compared to those with leiomyoma 5 cm or less (19). Our study indicated that women with a diagnosis of preterm labor showed a difference in the distribution in groups of fibroid size. There is no difference in the rate of preterm labor between women with leiomyoma 4-7 cm and those with 7-10 cm. Women with leiomyoma larger than 10 cm had a higher risk of preterm labor than those with leiomyoma 4-7 cm and 7-10 cm. There is no difference in the risk of placenta previa and PPROM according to different leiomyoma sizes.

In a retrospective population-based study, Coronado et al. included 2065 pregnancies with leiomyoma resulting in singleton live births and 4243 pregnant controls without. The prevalence of leiomyoma was 0.37%. There was a significant relationship between first trimester bleeding, placental abruption, PPROM, and leiomyoma. Dystocia, prolonged labor, breech presentation, and cesarean section were strongly correlated with the existence of leiomyoma. In patients with leiomyoma, the rate of 5 minute Apgar scores <7 and low birth weight (<2500 gr) was significantly higher (8). We report the rate of placental abruption to be 1%, PPROM to be10%, and cesarean birth to be66.8%. The median birth weight was 3140.0 gram (min= 1460.0; max= 4380.0). No 5 minute Apgar score less than7 was noted.

In a multicenter retrospective study, Conti et al. included 450 primiparous pregnant women aged > 30 and detected leiomyoma in 236 pregnancies. Weight gain in pregnancy, imminent abortion, preterm labor, urgent cesarean section rate, and risk of postpartum hemorrhage was higher in women with leiomyoma when compared to controls. Length of hospital stay(3.6 vs 3.2 days) and newborn birth weights (3198 vs 3266 gram) was similar in both groups(20). According to our findings, the mean length of hospital stay was 38 hours and the mean newborn birth weight was 3135 grams.

CONCLUSION

The prevalence of leiomyoma during pregnancy is increasing due to women planning pregnancy later in life, the increasing incidence of fibroids with age, and the rise of cesarean delivery rates which enables us to diagnose more cases in recent years.

There are few studies and conflicting reports on the impact of the number, size, location, and type of leiomyoma on obstetric outcomes. Patients with leiomyoma should be placed on close surveillance for possible complications during pregnancy, delivery, and postpartum.

The limitations of our study are no control group, a retrospective design, and limited by a small sample.

Our results indicate that the incidence of vaginal birth was higher in patients with single leiomyoma when compared to those with multiple leiomyomas. Also, the rate of preterm labor and presentation anomalies were higher in women with leiomyoma bigger than 10 cm when compared to those with leiomyoma measuring 4-7 cm and 7-10 cm. The need for transfusion was lower in women with leiomyoma measuring 4-7 cm when compared to other groups. The rate of cesarean delivery was higher in women with leiomyoma localized to the corporal-cervical region as opposed to those with leiomyoma located in the corpus. The rate of vaginal delivery was higher in women with intramural leiomyoma compared to those with combined or subserous leiomyoma.

The mechanism as to how leiomyoma triggers obstetric complications are not yet clear. However, several views regarding uterine distensibility, obstruction, effect on the contraction pattern, changes in endometrial structure, inflammation, molecular signaling have been presented.

Women with leiomyoma warrant special attention during pregnancy, delivery, and postpartum for possible complications.

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