



How Do Uterine Leiomyomas affect the course of Pregnancy and Labor– A Prospective Study

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Abstract

Prevalence of uterine leiomyoma among pregnant women is approximately 2% and more common in primipara. Leiomyoma with pregnancies are always at high risk as it may be associated with a number of complications like abortion, preterm labor, premature rupture of membranes (PROM), malpresentation, low lying placenta, intrauterine growth restriction (IUGR) and many others. During labor, dystocia, operative interferences like LUCS and post partum hemorrhage (PPH) are often encountered.

Objective: To evaluate the effects of leiomyoma on the course of pregnancy, labor and mode of delivery.

Materials and Method: The study was a prospective and observational study and carried out in a tertiary care hospital of city Kolkata, West Bengal with ethical approval. The study population included the antenatal mothers who attended antenatal OPD from the first trimester of pregnancy. A total of 102 mothers were taken in the study group as case-control study. Group L (n=51), consist of the pregnant mothers having USG confirmed leiomyoma with pregnancy, considered as case. Leiomyoma size of at least 3cm in diameter was included in the study. Group C (n=51) was the pregnant mothers relatively matched with age, parity and gestational weeks with group L, but without having uterine leiomyoma, served as control.

Results: Major portion of pregnant mothers with leiomyoma belonged to nulliparous group. There was higher percentage of termination of pregnancy before 28 weeks ($p<0.05$), preterm labor ($p<0.05$), LUCS ($p<0.05$), PPH ($p<0.05$), low birth weight baby ($p<0.05$) and lower percentage of vaginal delivery ($p<0.05$) among pregnancy with leiomyoma group (Group- L) compared to pregnancy without leiomyoma group (Group-C).

Conclusion: Uterine leiomyoma may adversely affect the course of pregnancy, labor and mode of delivery.

Keywords: Leiomyoma, Preterm labor, PROM, Malpresentation, IUGR, LUCS, PPH.

Introduction

Uterine leiomyoma, also known as myoma or fibroid, is a common benign smooth muscle tumors of the uterus; occurs in the reproductive age group and its incidence during pregnancy is approximately 2%^{1,2}. It has the potential to enlarge during pregnancy as well as to regress

after menopause. Leiomyomas vary in their location; may develop as submucous, subserosal or intramural growths and likely caused by estrogen stimulation. The stimulatory effects of pregnancy on myoma growth are unpredictable and may responds differently in individual woman, thus may grow, regress or remain

unchanged in size during pregnancy^{3,4}. Pregnancies with uterine myoma are always at high risk as they are frequently associated with abortion, preterm labor, PROM (premature rupture of membrane), placental abruption, fetal malpresentation, obstructed labor, caesarian delivery and post partum hemorrhage^{1,5,6}. The two most important factors which determines morbidity in pregnancy are leiomyoma size and its location⁷. The proximity of myomas to the placental site is also a factor, especially abortion, preterm labor, placental abruption and post partum hemorrhage; all are increased if the placenta is adjacent to or implanted over a leiomyoma. On the other hand, tumor in the cervix or lower uterine segment may obstruct labor. Malpresentations, especially breech presentations are reported to be high and the size and location of leiomyoma might predict the magnitude of the risk⁸. Women with uterine leiomyomas were at higher risk for poor birth outcomes like low birth weight and congenital malformations than women having without leiomyoma⁹.

Materials and Methods

The aim of the study was to evaluate the effects of leiomyoma on the course of pregnancy, complications during pregnancy and labor and mode of delivery. The study was prospective and observational in nature. It was carried out in a tertiary care hospital of city Kolkata, West Bengal in the department of Obstetrics and Gynecology for one year with ethical approval. The study population included the antenatal mothers who attended antenatal OPD from the first trimester of pregnancy. A total of 102 mothers were taken in the study group as case-control study. Group L (n=51), was the pregnant mothers having USG confirmed leiomyoma with pregnancy, considered as case. Leiomyoma size of at least 3cm in diameter was included in the study. Group C (n=51) was the pregnant mothers relatively matched with age, parity and gestational weeks with group L, but without having uterine leiomyoma, served as control. All mothers under

selection were counseled about abnormal signs and symptoms and advised to attend clinic or emergency even earlier if there were such symptoms. The purpose interrogation and investigations were explained to every mother and written informed consent was obtained from each woman in her own language.

Proper history taking, physical and obstetrical examination done in each case. Obstetrical examination included measurement of fundal height, different obstetrical grips to detect presentation and position of fetus, fetal heart auscultation and pelvic examination where necessary. During active phase of labor, meticulous obstetrical and internal examination was done in each case to rule out cephalo pelvic disproportion and planning for mode of delivery.

Inclusion criteria included pregnant women who attended the antenatal OPD or emergency with sonographically identified uterine leiomyoma was considered as case. Pregnancy without leiomyoma matched with age, parity and gestational weeks served as control. Exclusion criteria included pregnant women with less than 3cm sized leiomyoma, pregnancy with uncertain gestational age, multiple gestations with or without leiomyoma and pregnancy with fibroid with previous caesarean section.

All the essential hematological and biochemical investigations were done in the Hematology and Biochemistry department of the institution and ultrasonography at the department of Radiology. For each case and control subject, ultrasonography was done routinely in different trimesters of pregnancy to observe fetoplacental profile along with number, size and location of leiomyomas where present. All other data collected from Labor Room Record Book, Antenatal Record Book, OT Registrar and Bed Head Ticket.

After completion of the study, primary data were collected and a master chart prepared. Data entered and analyzed with the help of Microsoft Excel and Epi info (5) software. Probability outcomes of two different groups were expressed in terms of odds ratio (OR) and relative ratio

(RR). Qualitative data were expressed in terms of number, percentage and chi-square test. In all proportions, p value <0.05 will be considered as statistically significant.

Results and Analysis

After satisfying all inclusion and exclusion criteria, a total of 102 pregnant mothers were

selected under study. 51 pregnant mothers with uterine leiomyoma were included as Case (Group-L) and 51 pregnant mothers without leiomyoma were included as Control (Group-C). Both groups were relatively matched with age, parity and gestational weeks.

Table-1 Distribution of study group according to age

Age in years	Group L (n=51)		Group C (n=51)	
	Number	Percentage	Number	Percentage
Up to 19	1	1.97	1	1.97
20-25	8	15.68	8	15.68
26-30	32	62.74	33	64.70
31-35	7	13.73	7	13.73
>35	3	5.88	2	3.92
Total	51	100.00	51	100.00

The table shows that major portion of pregnant mothers with leiomyoma belonged to 26-30 years age group i.e. 62.74%.

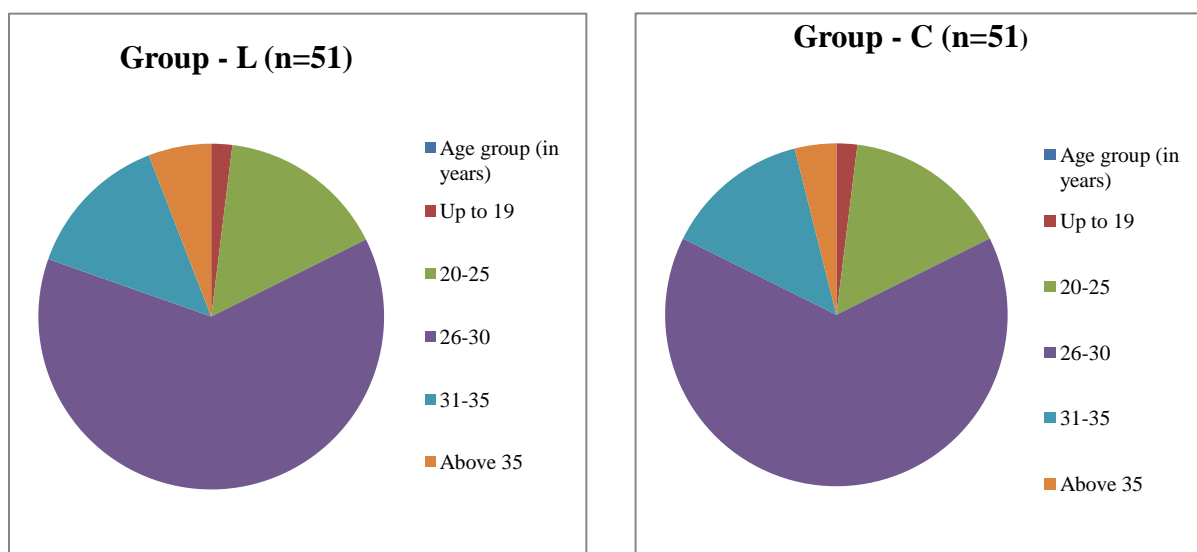


Figure-1 Showing the age wise distribution of study group

Table-2 showing distribution of study group according to parity

Parity	Group L (n=51)		Group C (n=51)	
	Number	Percentage	Number	Percentage
Nullipara	35	68.62	36	70.58
Multipara	16	31.38	15	29.42
Total	51	100.00	51	100.00

$X^2 = 0.05$; $P = 0.8296$; $OR = 0.91$; $RR = 0.96$; Non significant.

The table shows that majority of pregnant mothers with leiomyoma belonged to nullipara group, 35 cases (68.62%) out of 51 and it was found only 16

cases (31.38%) of multipara. As control group was relatively matched with parity, it was statistically insignificant.

Figure 2

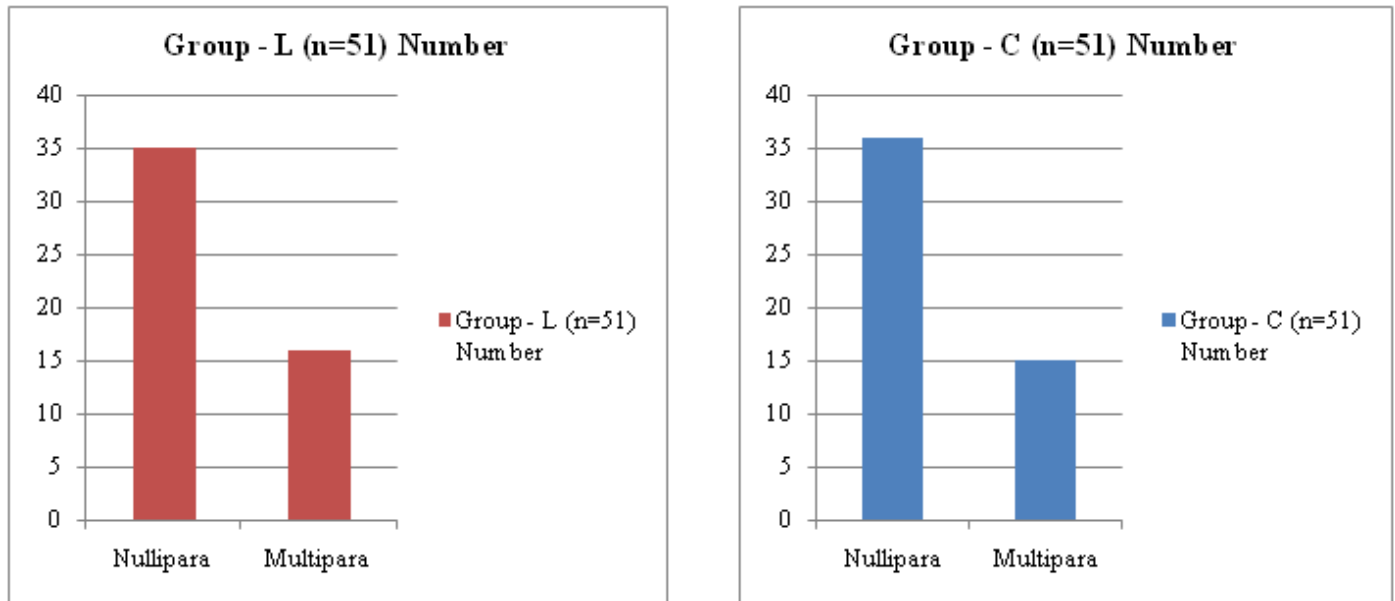


Figure2 showing parity wise distribution of study group

Table -3 Distribution of study group according to gestational age.

Gestational age (week)	Group L (n=51)		Group C (n=51)	
	Number	Percentage	Number	Percentage
Up to 28	8	15.69	4	7.84
29 - <37	15	29.41	5	9.80
37 +	28	54.90	42	82.36
Total	51	100.00	51	100.00

$X^2 = 9.13$; $P = 0.01$; $df = 2$; Significant

The above table shows that 15.69 % of pregnancy with leiomyoma had terminated before 28 weeks of gestation compared to only 7.84% in pregnancy without leiomyoma. So, pregnancy termination before 28 weeks of gestation is pretty high in L-group than the C- group. Again, termination of pregnancy in between 29- <37 completed weeks of gestation in pregnancy with leiomyoma is 29.41 % compared to 9.80% in control. Moreover,

termination after 37 completed weeks in pregnancy with leiomyoma group was 54.90% compared to 82.36% in pregnancy without leiomyoma group. So there was more percentage of preterm pregnancy and less percentage of term pregnancy in pregnancy with leiomyoma group than the control group and it is statistically significant ($P < 0.05$).

Table 4: Comparison of different parameters between two groups

Parameters	Group - L (n=51)		Group - C (n=51)		P value	Inference
	Number	Percentage	Number	Percentage		
Abortion	8	15.68	4	7.84	0.218	Insignificant
Preterm labor	15	29.41	5	9.80	0.013	Significant
PROM	12	23.52	8	15.68	0.318	Insignificant
Malpresentation	11	21.56	5	9.80	0.10	Insignificant
LSCS	31	60.78	13	25.49	0.000	Significant
Vaginal delivery	12	23.52	34	66.66	0.000	Significant
PPH	8	15.68	2	3.92	0.046	Significant

($X^2 = 1.51$; $P = 0.218$; $OR = 2.19$; $RR = 1.40$)

The table shows that, though there was 15.68% abortion rate in the L group compared to 7.84% in

the C group, it was statistically not significant. The table also shows that the percentage of preterm labor (<37 completed weeks) in pregnant

women with leiomyoma (Group L) was 29.41%, whereas it was only 9.80% in pregnancy without leiomyoma (Group C). P value is significant ($P < 0.05$), so preterm labor was higher in Group L ($X^2 = 6.22$; $P = 0.013$; $df = 1$; $OR = 3.83$; $RR = 1.71$). Though the above table shows that the percentage of PROM was in Group L (23.52%) was higher compared to Group C (15.68%), it was statistically not significant ($X^2 = 1.00$; $P = 0.318$; $df = 1$; $OR = 1.65$; $RR = 1.26$). Similarly, the incidence of malpresentations was more common in Group L than Group C, more than double, but it was statistically not significant ($X^2 = 2.67$; $P = 0.10$; $OR = 2.53$; $RR = 1.48$). From the above table, it has seen that the rate of LSCS was much higher, more than double in Group L (60.78%) compared to Group C (25.49%). So LSCS rate was much higher in pregnant mother with leiomyoma and statistically highly significant ($P < 0.05$) ($X^2 = 12.95$; $P = 0.0003$; $df = 1$; $OR = 4.53$; $RR = 2.04$). Above table also shows that vaginal delivery rate was much lower in pregnancy with leiomyoma group (23.52%, Group -L) than pregnancy without leiomyoma group (66.66%, Group-C) and again it was statistically highly significant ($P < 0.05$) ($X^2 = 19.16$; $P = 0.0001$; $df = 1$; $OR = 0.15$; $RR = 0.37$). The table clearly shows that the incidence of PPH was more in pregnancy with leiomyoma (15.68%, Group-L) than pregnancy without leiomyoma (3.92%, Group-C) and statistically significant ($P < 0.05$) ($X^2 = 3.99$; $P = 0.046$; $OR = 4.56$; $RR = 1.71$).

Table 5 Birth weight of the Babies among two groups.

Birth weight(gm)	Group L		Group C	
	Number	Percentage	Number	Percentage
< 2500	15	29.41%	8	15.68%
≥/2500	28	54.90%	39	76.47%

$X^2 = 3.77$; $P = 0.052$; $df = 1$; $OR = 2.61$; $RR = 1.56$; Significant.

From the above table, it has seen that the incidence of low birth weight (LBW, <2500gm) baby was more in Group L (29.41%) than Group

C (15.68%). Similarly, birth weight more than 2500gm was 54.90% in Group L, which was much lower than Group C (76.47%). So there is increased chance of having LBW baby in pregnancy with leiomyoma as the result is statistically significant ($P < 0.05$).

Discussion

Leiomyoma is the most common benign uterine neoplasm in the reproductive age group. The prevalence of leiomyoma during pregnancy is likely to be increase as more women delay child bearing until later in life. It is more common in primipara than of multipara¹⁰. Complications including pregnancy loss can occur with leiomyoma although most patients have uncomplicated pregnancy and delivery. One study¹¹ mentioned 10% rate of pregnancy complications in leiomyoma uterus and the risk of complication is influenced by both myoma size and its location¹².

Table 1 shows that 62.74% (32/51) of pregnant women with leiomyoma belonged to 26-30 years age group. More broadly, 76.47% (39/51) belonged to 26-35 years age group and only 1.96% was under 20 years. So major portions of pregnancy with leiomyoma were of 26-35 years in this study, whereas the study by Gloria et al⁹ showed about 59% of cases belonged to 25-34 years age group and below 25 years age group was only 4.1%.

Table 2 shows that 68.62% (35/51) of pregnancy with leiomyoma belonged to nulliparous group and 31.38% (16/51) belonged to multiparous group. By the way, study by G Iram Qidwai et al¹³ found 57.4% of nulliparous and 42.6% of multiparous women in pregnancy with leiomyoma in their study. Another study by Gloria et al⁹ showed nullipara with leiomyoma in 57.7% and multipara in 15.6% of cases. So these inferences indicate that the incidence of pregnancy with leiomyoma is high in nullipara.

Table 3 shows that termination of pregnancy less than or equal to 28 weeks in Group L was 15.68% (8/51) compared to 7.84% (4/51) in Group C.

Premature termination, i.e. between 29 - <37th completed weeks of gestation in Group L was 29.41%(15/51) whereas in Group C, it was only 9.80% (5/51). Pregnancy termination after 37th completed weeks was 54.90% (28/51) in Group L compared to 82.36% (42/51) in Group C. All these results in our study suggested that premature termination was more frequent in pregnancy with leiomyoma than without leiomyoma group and was statistically significant ($p < 0.05$).

Table 4 shows comparison of different parameters between Group L (pregnancy with leiomyoma) and Group C (pregnancy without leiomyoma). The rate of abortion in Group L was 15.68% (8/51) compared to 7.84% (4/51) in Group C. Though the rate of pregnancy loss in Group L increased twice the rate of Group C, it was statistically not significant, probably due to small sample size. A study by Benson CB et al¹⁴ showed the rate of spontaneous pregnancy loss in women with fibroid almost twice the rate in women with normal uterus. Vollenheven et al¹⁵ also observed high rate of miscarriage in pregnancy with submucous fibroid in their study.

Again, the Table 4 shows 29.41% (15/51) preterm labor in Group L compared to 9.80% (5/51) in Group C and it was statistically significant ($p < 0.05$). So preterm labor was high in pregnancy with leiomyoma group in our study. Similar results of increased preterm labor in pregnancy with leiomyoma had observed by Shailesh Kore et al¹⁶ and G Iram Qidwai et al¹³ in their studies.

Leiomyoma, particularly of submucous variety may be associated with increased incidence PROM. The probable causes include increased friability of membranes, high rate of infection and increased association of preterm birth. Though the incidence of PROM was high in Group L (23.52%) compared to Group C (16.68%), there was insignificant association ($p > 0.05$) between the two groups. However, the study done by G Iram Qidwai¹³ found increased incidence of PROM and Gloria et al⁹ found insignificant association of PROM in their studies.

In our study, caesarean section in Group L was 60.78 % (31/51) in compared to 25.49% (13/51) in Group C (Table 4). The common indications for LUCS were fibroid in lower segment, cervical fibroid, malpresentation, PROM, mechanical obstruction, placenta praevia and inco-ordinated uterine contractions. The higher rate of LUCS was also statistically significant ($p < 0.05$). Similar higher rate of caesarean section in pregnancy with leiomyoma also observed in their studies done by Katz et al¹⁷ and Gloria D et al⁹.

In our study, vaginal birth in Group L was 23.52% (12/51) whereas in Group C, it was 66.66% (34/51). So the incidence of vaginal birth was less among pregnancy with leiomyoma group compared to pregnancy without leiomyoma group. P value was highly significant ($p < 0.05$) (Table 4).

The rate of PPH in pregnancy with leiomyoma group was high in our study than that of pregnancy without leiomyoma group. Table 4 showed 15.68% (8/51) PPH in Group L compared to only 3.92% (2/51) in Group C with significant p value ($p < 0.05$). The main causes of PPH were uterine atony, genital tract injury due to increased operative procedure, retained placental tissue and few cases of placenta praevia. G Iram Qidwai et al¹³ also found increased incidences of PPH (8.3%) in leiomyoma group compared to without leiomyoma group (2.9%) with significant p value. Regarding birth weight of babies, Table 5 showed LBW (<2500gm) was 29.41% (15/51) in Group L compared to 15.68% (8/51) in Group C. On the other hand, birth weight \geq 2500gm in Group L was 54.90% (28/51), whereas in Group C it was 76.47% (39/51). So in our study, there was significant association between LBW baby and pregnancy with leiomyoma as p value was significant ($p < 0.05$). Gloria et al⁹ also found higher incidences of LBW babies in pregnancy with leiomyoma in their study. Probable causes include higher incidence of preterm labor, IUGR, poor utero- placental blood supply and mechanical obstruction of fibroid to the growing fetus.

Conclusion

Although most of the women have smooth course of pregnancy in spite of presence of leiomyoma, around 10-30% of them may develop pregnancy related complications and there is considerable increase in morbidity and mortality both to the mother and the baby. It is really surprising that most of the leiomyoma are accidentally diagnosed on routine ultrasonography in early pregnancy or during some non gynecological indications. 3D ultrasonography should be preferred to detect leiomyoma more precisely in pregnancy and also to avoid false positive results. While a major percentage of women do not face any adverse symptoms, there are cases where the size and location of fibroids can cause pregnancy related complications and should be rated as high risk pregnancy. Obstetricians should be prepared to manage severe PPH after vaginal births and caesarean deliveries in pregnancy with leiomyoma. Despite widespread occurrence, there is much research get to be done to fully understand the causes, prevention and treatment of leiomyoma. Moreover, a long term repeated ongoing studies are required to clarify the association between leiomyoma and adverse obstetric outcome to minimize complications among pregnant women with uterine leiomyoma.

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