

## Laparoscopic versus laparotomic myomectomy in infertility management and its pregnancy outcome in Nigeria

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### Abstract

Uterine leiomyoma is common among black women of reproductive age in Africa and is associated with infertility. Its definitive means of treatment is myomectomy which can be approached by laparoscopy or laparotomy. There is a need to know if any of these two modes of treatment affects the chances of achieving pregnancy or its outcome in women with background infertility.

**Objective:** To assess the proportion of women who achieved pregnancy after laparoscopic and laparotomic myomectomy with background infertility, their pregnancy outcome and a comparison of the two groups.

**Materials and Method:** The study retrospectively reviewed 36 out of 188 women that had either laparoscopic (n=86) or laparotomic myomectomy (n=102) and achieved pregnancy over a period of 30 months.

**Result:** There was pregnancy in 21 out of 86 women that had laparoscopy and 15 among the 102 women that had laparotomic myomectomy. This gave the pregnancy rates of 24.4% and 14.7% respectively. The pregnancy outcome was favourable and similar between the two groups with the laparoscopic group having a lower caesarean delivery rate of 76.2% compared to 100% in the laparotomy group. The duration of hospital stay was significantly lower in the laparoscopy group.

**Conclusion:** Laparoscopic or laparotomic myomectomy improves the chances of pregnancy in women with background infertility below 35 years. The laparoscopic group had a significantly lower caesarean section rate and a shorter duration of hospital stay than the laparotomic group, however, both groups had a similar and favourable pregnancy outcome.

**Keywords:** Myomectomy; Laparoscopic; Laparotomic; Pregnancy; Nigeria

### 1. Introduction

Uterine leiomyoma is common among black women of reproductive age in Africa and it is associated with infertility [1]. Uterine leiomyoma is a benign tumour of the smooth muscle and connective tissues of the uterus [2,3].

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Surgery is a definitive mode of treating the condition especially in those who want to preserve their uterus for fertility purposes [4,5,6]. This surgical treatment could be approached via abdominal laparotomic or laparoscopic myomectomy [6].

While laparoscopic myomectomy involves minimal access surgery with enucleation of myomas, morcellation and suturing of the uterus, the laparotomic mode involves incision of the abdominal wall, peritoneum, the uterus, consequent enucleation of the myomas and suturing of the uterus and abdominal wall [7,8]. In both methods there could be significant blood loss and possible transfusion. Both methods are prone to postoperative complications like bleeding, sepsis, intrauterine synechae and peritubal adhesion [9].

A previous study showed that laparoscopic myomectomy conferred some advantages over laparotomic myomectomy like reduced postoperative pain, reduced necessity of analgesia, recovery time, shorter hospital stay, reduced febrile morbidity and lower blood loss. In some other studies, operating time was comparable between the two methods while postoperative abdominal adhesions including peritubal adhesions were lower in the laparoscopic method [4,5,6].

Following conception in post myomectomy patients, they may have some complications like miscarriage, placenta praevia, preterm labour, uterine rupture, malpresentation, increased likelihood of operative delivery and postpartum haemorrhage. Uterine rupture has been reported in previous studies to be more in patients with laparoscopic myomectomy compared to those with laparotomic myomectomy [6,8]. In other studies the fertility and labour outcomes after laparoscopic myomectomy was comparable to those of laparotomic myomectomy [6].

In this study, the women with infertility who achieved pregnancy following laparoscopic or laparotomic myomectomy without tubal or male factor in our area of study were reviewed to ascertain and compare their pregnancy outcome.

### *Objective*

This study assessed the proportion of women who achieved pregnancy after laparoscopic or laparotomic myomectomy with background infertility excluding tubal or male factor. It also assessed their pregnancy outcome and compared the two groups.

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## **2. Material and methods**

This is a retrospective study of 36 patients out of 188 women who had laparoscopic or laparotomic myomectomy, achieved pregnancy and delivered at Savealife Mission Hospital PortHarcourt, Nigeria between January 2017 and June 2019.

Laparoscopic myomectomy was offered to those with myomas whose uterine size was below 24 weeks and laparotomic myomectomy to those with uterine size of 24 weeks and above. All had ultrasound diagnosis of uterine myoma prior to surgery.

Their case files and birth register were retrieved from the records department and labour ward respectively for the data. The information obtained were age, parity, educational level, antenatal, intra partum and post partum complications, gestational age at delivery and mode of delivery. Others were birth weight, APGAR scores and post natal complications.

The data was analysed with SPSS version 23.0 for windows and presented with descriptive tables, student t-test and relative risk calculated with 95% confidence interval. P value less than 0.05 was statistically significant.

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## **3. Results**

Out of 86 women that had laparoscopic myomectomy, 21 of them achieved pregnancy while 15 among the 102 women that had laparotomic myomectomy achieved pregnancy. This gave the pregnancy rates of 24.4% and 14.7% respectively as shown in table 1.

**Table 1** Association between type of myomectomy and pregnancy

Pregnancy	Myomectomy		P value	OR	95% C.I for OR
	Laparoscopic n (%)	Laparotomic n (%)			
Yes	21 (24.4)	15 (14.7)	0.095	1.874	0.897 – 3.913
No	65 (75.6)	87 (85.3)			

Table 1 shows that 24.4% of the women achieved pregnancy after laparoscopic myomectomy while 14.7% of those that had laparotomic myomectomy achieved pregnancy. This was not significantly different, hence there was no significant association between type of myomectomy and pregnancy ( $p = 0.095$ ,  $OR = 1.874$ ,  $95\% C.I = 0.897 - 3.913$ ).

**Table 2** Demographic characteristics of the women who achieved pregnancy in both groups

	Myomectomy		$\chi^2$	P value
	Laparoscopic n (%)	Laparotomic n (%)		
<b>Age group</b>				
25 – 29	2 (9.5)	3 (20.0)	5.312	0.150
30 – 34	13 (61.9)	4 (26.7)		
35 – 39	3 (14.3)	6 (40.0)		
$\geq 40$	3 (14.3)	2 (13.3)		
<b>Level of Education</b>				
Secondary	4 (19.0)	3 (20.0)	0.005	0.943
Tertiary	17 (81.0)	12 (80.0)		
<b>Mode of delivery</b>				
C/S	16 (76.2)	15 (100.0)	4.147	0.042
SVD	5 (23.8)	0 (0.0)		
<b>Sex of the baby</b>				
Male	10 (47.6)	6 (40.0)	0.206	0.650
Female	11 (52.4)	9 (60.0)		

Table 2 shows that majority of the women who had laparoscopic myomectomy were within the age bracket of 30 to 34 years while 40% were within the age bracket of 35 to 39 among those that had laparotomic myomectomy. The distribution of the age brackets was not significantly different between the groups ( $\chi^2 = 5.312$ ,  $p = 0.150$ ). The mean age for the laparoscopic group is  $34.43 \pm 7.51$  and  $34.07 \pm 5.20$  for laparotomic group. This was not significantly different ( $t = 0.161$ ,  $p = 0.873$ ). Most of the women in both groups (81% and 80%) have tertiary level of education ( $\chi^2 = 0.005$ ,  $p = 0.943$ ). All the women (100%) that had laparotomic myomectomy delivered via caesarean section while 76.2% of the laparoscopic group delivered via caesarean section. This was significantly different ( $\chi^2 = 4.147$ ,  $p = 0.042$ ). Female babies delivered by women in the laparoscopic group is 52.4% while that of the laparotomic group is 60%. This was not significantly different ( $\chi^2 = 0.206$ ,  $p = 0.650$ ).

Table 3 shows that the mean duration of admission was significantly higher among mothers who had laparotomic myomectomy ( $t = 2.828$ ,  $p = 0.008$ ). However no significant difference was found in the Gestational Age, Birth weight and APGAR scores between women in both groups ( $p > 0.05$ ).

Table 4 shows no significant association between type of Myomectomy and pregnancy outcome ( $p > 0.05$ ).

As shown in table 4, both myomectomy groups showed similar favourable pregnancy outcome. Their gestational age of delivery (81% & 80%), birth weight of 2.5 kg and above (81% & 93.3%), APGAR score of 6 and above (90.5% & 86.7%)

as well as no newborn admission of 71.4% and 60.0% respectively between the post laparoscopy and post laparotomy groups.

**Table 3** Comparison of mean gestational age (GA), birth weight, APGAR score and mother’s duration of admission between the groups

	Myomectomy		T	P value
	Laparoscopic Mean ± SD	Laparotomic Mean ± SD		
Gestational age	37.76 ± 1.97	37.53 ± 2.45	0.310	0.758
Birth weight	3.09 ± 0.54	3.19 ± 0.65	0.460	0.649
mother’s duration of admission	4.62 ± 1.43	6.00 ± 1.46	2.828	0.008
APGAR score	7.47 ± 2.09	7.67 ± 1.49	0.302	0.765

**Table 4** Association between type of myomectomy and pregnancy outcome

	Myomectomy		P value	OR	95% C.I for OR
	Laparoscopic n (%)	Laparotomic n (%)			
<b>Age group</b>					
≤35	15 (71.4)	8 (53.3)	0.269	2.187	0.546 – 8.761
>35	6 (28.6)	7 (46.7)			
<b>Parity</b>					
1	14 (66.7)	12 (80.0)	0.383	0.500	0.105 – 2.372
≥2	7 (33.3)	3 (20.0)			
<b>Gestational Age</b>					
<37 weeks	4 (19.0)	3 (20.0)	0.943	0.941	0.177 – 4.997
≥37 weeks	17 (81.0)	12 (80.0)			
<b>Morbidity</b>					
Yes	6 (28.6)	5 (33.3)	0.760	0.800	0.191 – 3.347
No	15 (71.4)	10 (66.7)			
<b>APGAR</b>					
<6	2 (9.5)	2 (13.3)	0.721	0.684	0.085 – 5.494
≥6	19 (90.5)	13 (86.7)			
<b>Birth weight</b>					
<2.5kg	4 (19.0)	1 (6.7)	0.310	3.294	0.329 – 32.943
≥2.5kg	17 (81.0)	14 (93.3)			
<b>Newborn Admission</b>					
Yes	6 (28.6)	6 (40.0)	0.475	0.600	0.148 – 2.436
No	15 (71.4)	9 (60.0)			
<b>Duration of Mother’s admission</b>					
≤7 days	21 (100.0)	14 (93.3)	NA	NA	NA
>7 days	0 (0.0)	1 (6.7)			

\*NA = Not applicable

#### 4. Discussion

Myomectomy is a feasible surgical means of treating uterine fibroids especially in women who want to preserve their fertility potential. It also improves the propensity to achieve pregnancy in women with infertility and fibroid [11,12,13,14].

The study showed a pregnancy rate of 24.4% and 14.7% for the post laparoscopic and post laparotomic myomectomy groups respectively. This is similar to the pregnancy rate of 16% for the laparotomy group by Kim et al and 27% for the laparoscopic arm by Ajayi et al [4,6.] It was higher than 15.9% (Kim et al) but lower than 37.7% by Lourena et al for the laparoscopic group [6,15].

The pregnancy rates of the two groups in the study were not statistically significant ( $p > 0.05$ ) as was also reported in a previous comparative study of post laparoscopic and laparotomic myomectomy patients [6]. This shows that myomectomy improves the chances of achieving pregnancy in infertile women with fibroid whether it was done laparoscopically or by laparotomy. From systematic review, high rates of successful pregnancy were seen after myomectomy [16].

The mean age of the women in our study was  $34.43 \pm 7.51$  /  $34.07 \pm 5.20$  years respectively for the laparoscopic and laparotomic groups. This was not statistically significant. It is similar to the mean age of  $35.8 \pm 3.4$  /  $35.2 \pm 3.6$  years and  $35.88 \pm 3.57$  /  $32.36 \pm 4.06$  years obtained from previous comparative studies of these two groups [6,12]. The mean age of the women in our study was interestingly below 35 years which is known to be favourable to achieving pregnancy in post myomectomy patients with infertility [2,17,18].

The obstetric outcome was good in both groups we studied as they had low maternal morbidities (71.4% versus 66.7%) between the two groups. The gestational age at delivery of 37 weeks and above was 81% & 80%, the birth weight of babies 2.5kg and above was 81% and 93.3% respectively for the two groups while the APGAR scores of babies in both groups were 90.5% and 86.7% respectively. Only a case of intrauterine fetal death in a baby with features of Down's syndrome and anhydriamnios in the laparoscopic myomectomy group was the adverse fetal outcome recorded in this study.

While previous studies in post myomectomy patients showed good obstetric outcome like Kumakiri et al and Savachioll et al, other ones showed adverse obstetric outcome like uterine rupture in pregnancy following laparotomic or laparoscopic myomectomy [19,20,21,22,23]. There was no uterine rupture recorded in our study.

On the mode of delivery; while all women in the laparoscopic group had caesarean section, five of them in the laparoscopic group had vaginal delivery (23.8%). This gave a caesarean delivery rate of 76.2% and 100% respectively for both groups. This was statistically significant and comparable to the caesarean section rate of 77.8% for the laparoscopic group and higher than 66.7% for the laparotomic group from a similar comparative study [6].

The laparotomic group from our study all had caesarean section and were not allowed vaginal delivery. This is possibly because they had more fibroid masses with uterine size beyond 24 weeks prior to myomectomy. This exposed them to more extensive dissection and repair of the myometrium during myomectomy and making them susceptible to uterine rupture in pregnancy. Conversely, the laparoscopic group had smaller sized fibroids prior to myomectomy and had less extensive myometrial involvement, dissection and repair during the myomectomy. They were therefore less prone to uterine rupture before the onset of labour and thereby making vaginal delivery permissible.

The post laparoscopic myomectomy group's vaginal delivery rate from our study of 23.8% was lower than 36.6% obtained from a related study in which vaginal delivery was not contraindicated in post laparoscopic myomectomy patients [5]. This was a different scenario from the study by Ajayi et al where their post laparoscopic myomectomy patients were at the risk of uterine rupture and were not allowed vaginal delivery [4]. Currently however, no clear evidence exists regarding the choice of mode of delivery after myomectomy [13].

Shorter mean duration of admission was noticed among the laparoscopic group in our study compared to the laparotomic group ( $4.62 \pm 1.43$  and  $6.00 \pm 1.46$  days) respectively and this was statistically significant. This may be due to the skin incision used as the laparoscopic group had Pfannenstiel incision and some of them had vaginal delivery. The laparotomic group had midline subumbilical incision as repeat skin incision during caesarean section following the laparotomic approach to prior myomectomy. Previous studies corroborated that laparoscopic patients had shorter duration of hospital stay compared to the laparotomic group [4,5,6,12].

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## 5. Conclusion

Laparoscopic or laparotomic myomectomy improves the chances of pregnancy in women with background infertility below 35 years. They both have favourable pregnancy outcome however there is more likelihood of caesarean delivery in the laparotomy group and a significantly shorter duration of hospital stay among the laparoscopy group. Proper patient selection and good surgical skills are also beneficial to the patients in both groups.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The authors declare no conflict of interest.

### *Statement of ethical approval*

This was obtained from the hospital's ethics committee.

### *Statement of informed consent*

Informed consent was obtained from all the participants included in the study.

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