Gynecology & Obstetrics
ISSN: 2161-0932

Machupalli et al., Gynecol Obstet 2013, 3:2
DOI: 10.4172/2161-0932.1000144

Research Article Open Access

# Abdominal Myomectomy Increases Fertility Outcome

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## Abstract

**Objective:** The aim of this study was to assess fertility outcome after abdominal myomectomy and to examine the influence of the number, size, and location of uterine fibroids pertaining to fertility outcome after the surgery.

**Study design:** Retrospective clinical study.

**Patients and methods:** Fertility outcome from 178 women who had abdominal myomectomy during 2000-2004 were analyzed. Data from women with unexplained infertility were collected from medical records and from survey interviews of all women participants.

**Main outcome measures:** Conception rate, pregnancy loss, and live birth rate after myomectomy were measured. The relationship of size and location of fibroids to fertility outcome was also evaluated.

**Results:** Conception rate was determined after myomectomy. The percentage of total pregnancies after myomectomy was 58% and spontaneous abortion rate was 45%. Age, number of fibroids removed, and indication for surgery predicted post-myomectomy fertility.

**Conclusions:** Our study suggests that abdominal myomectomy might improve reproductive outcome in patients with myomas. The reproductive performance was particularly good when the patients were younger and had previous pregnancies prior to the surgery. Myomectomy is associated with less miscarriage rate after pregnancy, compared to those prior to the surgery.

**Keywords:** Leiomyomas; Abdominal myomectomy; Reproductive outcome; Infertility

## Introduction

Uterine fibroids are the most common tumors of the female genital tract. These benign neoplasms are estimated to occur in 20% to 50% of women, with increased frequency during the later reproductive years [1]. They are three to nine times more common in Black women than in Caucasians [2]. The relationship of uterine fibroids to fertility is controversial [3-6]. Indirect evidence suggests a negative effect, including lengthy infertility before surgery (unexplained by other factors), and rapid return of fertility after fibroid removal [7]. The location of fibroids like large intramural, submucosal and subserosal fibroids can affect the ability to conceive naturally and reduce the effectiveness of assisted reproduction cycles [8]. Pedunculated subserosal fibroids are not associated with negative effects on fertility [9]. The size of the fibroid may be other important factor [3,6]. 27% of infertile women found to have uterine fibroids. 50% of women with unexplained infertility become pregnant after removal of uterine fibroids [7]. Infertility also may be due to submucous myomas or to a markedly distorted, enlarged endometrial cavity interfering with normal implantation or sperm transportation. For *in vitro* fertilization patients, endometrial cavity distortion by myomas may lead to decreased pregnancy rates and increased spontaneous abortion rates in up to 40% of cases [7]. Our study assessed fertility outcome following abdominal myomectomy in infertile women. The aim of this study was to assess fertility outcome after abdominal myomectomy and to examine the influence of the number, size, and location of uterine fibroids pertaining to fertility outcome after the surgery.

## Material and Methods

The data were collected retrospectively from hospital records of 178 patients who underwent abdominal myomectomy at Our Lady of Mercy Medical Center from 2000-2004 and from a survey questionnaire mailed to each patient after obtaining institutional IRB approval. Subject age, parity, duration, and causes of infertility were recorded. Questions were asked about subsequent fertility and outcome, any further fertility treatments, and any long-term effects of therapy. The information retrieved from hospital records included the location, number and size of the fibroids, and the indications for surgery.

Preoperatively as part of their extensive infertility work up, all 178 patients who desired pregnancy (even though their presenting complaint may vary, all of them desired pregnancy) were assessed by hysterosalpingogram and ovulation studies. Their partners also underwent semen analysis. Patients who underwent abdominal myomectomy and who has other causes for infertility due to tubal factors (37), peritubal adhesions (16), endometriosis (24), PCOS (16), or male factors (14) were excluded from this study. Total of 107 patients were excluded from the study. Data of 178 patients with unexplained infertility and who desired pregnancy were analyzed in the study. All operations were carried out under general anesthesia using a pfannenstiel or infraumbilical midline incision. All operations were carried out by an attending physician and assisted by resident physician. The operative approach was consistent among all the surgeons. Fibroid size was estimated preoperatively by pelvic ultrasound and clinical examination. A 24F Foley catheter with dye was placed in the uterine cavity in order to note whether the uterine cavity was opened during the surgery. Surgery was carried out using classical techniques [10].

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**Received** February 13, 2013; **Accepted** March 25, 2013; **Published** March 28, 2013

**Citation:** Machupalli S, Norkus EP, Mukherjee TK, Reilly KD (2013) Abdominal Myomectomy Increases Fertility Outcome. Gynecol Obstet 3: 144. doi:10.4172/2161-0932.1000144

Diluted Vasopressin (20 units in 50 ml of NS) was injected at the base of the myomas to secure hemostasis. The fibroid capsule was identified and then enucleation was carried out within the cleavage plane. Depending on the depth and the size of fibroids, the uterus was sutured in one or two layers. The myometrium was closed with vicryl 1/0 as interrupted sutures and the uterine serosa was closed with vicryl 2/0, 3/0 as continuous or interrupted sutures. At the end of the operation copious abdomino pelvic lavage was performed using warm sterile normal saline solution. Histological examination including measurement of size and weight was performed on all fibroids at the pathology lab of our institute.

## Statistical Analysis

Student's *t*-tests and one-way ANOVA were used to detect significant differences between the mean values of two or more independent, continuous variables, respectively. Chi-square analyses were used to compare categorical variables. To identify the significance of potential relationships between variables, simple regression and logistic regression analyses were performed. The *p*-values <0.05, in two-tailed testing, were considered statistically significant.

## Results

The mean age of the women was 37 ± 5 (sd) years (26-45 years). Even though most of the patients have a combination of indications, the chief complaint of the patient is used to indicate the single indication. All of them wanted to conceive after the surgery. As shown in table 1, unexplained infertility (primary and secondary combined) was the most common reason for surgery, 43.5% (81/178), while menorrhagia accounted for another 36.5% (65/178) of surgeries.

As shown in table 2, pregnancies occurred more often after myomectomy in younger women. We observed that age was inversely associated with pregnancy (RR=0.84, 95% CI 0.75-0.94, p=0.002). Logistic regression analysis of women in this study determined that there was a 16% decreased likelihood of pregnancy for every one-year increase in age beginning at age 26 years (p=0.002). Following myomectomy surgery, women over 40 experienced a significantly longer duration before their first pregnancy (mean 16 months vs. 10 months) than women from 26-40 years of age (P<0.0005). Among women 26-30, 31-35, 36-40, and 41-45 years, pregnancy occurred 10 ± 3 months, 11 ± 3 months, 13 ± 3 months and 17 ± 3 months after surgery (p<0.00005) respectively. Pregnancy rate also was more successful in younger women (women 26-30 years [94%]>31-35 yrs [88%]>36-40 yrs [46%]>41-45 yrs [29%]. Table 3 describes fibroid characteristics in the study. The majority of patients in the study had multiple fibroids removed. Most of the women in the study had more than one fibroid removed from multiple locations. The location of fibroids is indicated by the presence of the majority number of fibroids in that location. It is difficult to determine the role of fibroid location in infertility, as the clinical presentation is a mixture of different locations. Table 4 describes fertility outcome after myomectomy. Of the 104 pregnancies, 57 live newborns were delivered and 47 pregnancies ended in miscarriage. Of the 57 deliveries, 24 were vaginal deliveries. The majority of the women in this study (95%) conceived spontaneously.

| | n | % |
|---|---|---|
| Age group | | |
| 26-30 | 18 | 10.1 |
| 31-35 | 51 | 28.7 |
| 36-40 | 61 | 34.3 |
| 41-45 | 48 | 27.0 |
| | | |
| Main indication | 65 | 36.5 |
| Menorrhagia | 42 | 22.5 |
| Secondary (unexplained) infertility | | |
| Primary (unexplained) infertility | 39 | 20.8 |
| Miscarriage | 32 | 18.0 |
| Parity | | |
| 0 | 96 | 53.9 |
| 1 | 61 | 32.6 |
| 2 | 27 | 13.5 |

**Table 1:** Characteristics of 178 women who underwent Myomectomy and wished to Conceive.

| Age of patients | pregnancies/women in group | pregnancy rate |
|---|---|---|
| 26 to 30 yrs | 17/18 | 94% |
| 31 to 35 yrs | 45/51 | 88% |
| 36 to 40 yrs | 28/61 | 46% |
| 41 to 45 yrs | 14/48 | 29% |

**Table 2:** Pregnancies after myomectomy by age.

Table 5 compares reproductive performance before and after myomectomy. The pregnancy rate increased from 30% to 58% after myomectomy with significant p value of 0.001. The number of live births increased from 27% to 55% after myomectomy with significant p value of <0.0005. The number of miscarriages decreased and morbidity of pregnancy decreased with no second or third trimester losses after myomectomy.

Table 6 describes impact of age, infertility, and nature of fibroids on fertility. Patients who are less than 35 years have better fertility outcome with significant p value of <0.0005. Patients with prior history of unexplained infertility have better fertility outcome after myomectomy with significant p value of 0.003. The average duration of infertility before surgery was 2-4 years. The size, number, or location of fibroids did not affect the pregnancy rate following myomectomy with insignificant p values.

## Discussion

Physicians who have patients with uterine fibroids who want to become pregnant face a clinical dilemma regarding the best management options. The argument against surgical treatment of fibroids is the lack of definite evidence of a causal association between uterine fibroids and infertility [1,3-5]. Concerns remain about potential adverse consequences, such as morbidity, complications, adhesion formation, and increased risk for uterine scar dehiscence, as well as postoperative need for cesarean delivery. Indirect evidence suggests that more than 50% of patients with unexplained infertility become pregnant after fibroid removal [4,5,11-13].

Our study supports these findings. Pregnancies were achieved after a relatively short period of time (11.9 ± 3.6 months), and most of the patients (95%) conceived spontaneously. We found that the main factors determining fertility after myomectomy were patient characteristics. Patient age and duration of infertility before the surgery are the most important factors. All pregnancies were achieved in women <45 years of age. The significant number of miscarriages in our study can be explained by the greater number of fibroids removed, more incisions on the uterus, and possible recurrence of fibroids.
Concerning the possible influence of factors associated with fibroids, the number, size, or location of fibroids did not affect the obstetric outcome in the current study. A majority of the patients in our study had a greater number of fibroids (>5) and larger fibroids (>5 cm) removed. Fertility outcome in our study is still comparable to other studies. This is in contradiction with the findings of Acien and Quereda [13], who reported that age >30 years, infertility >3 years, and multiple fibroids negatively influenced pregnancy rate after abdominal myomectomy.

| Number of fibroids | n | % | Pregnancy rate after myomectomy (%) |
|---|---|---|---|
| 1-3 | 13 | 7.3 | 61% (8/13) |
| 4-5 | 47 | 26.4 | 51% (23/45) |
| >5 | 118 | 66.3 | 61% (73/120) |
| Size of largest fibroids | | | |
| <5 cm | 1 | 0.6 | 100% (1/1) |
| >5 cm | 177 | 99.4 | 58% (103/177) |
| Location of largest fibroid with respect to Uterine wall | | | |
| Submucosal | 84 | 47.2 | 55 |
| Intramural | 115 | 64.6 | 62 |
| Subserosal | 71 | 39.9 | 43 |

**Table 3:** Characteristics of Fibroids in 178 women.

| Mean delay in conception | 11.9 ± 3.6 months (5-24 months) n | % |
|---|---|---|
| 1.Total pregnancies | 104/178 | 55 |
| 2. Number of spontaneous pregnancies | 99/104 | 95.2 |
| 3. Number of induction of Ovulation & Intra uterine insemination | 2/104 | 1.9 |
| 4. Number of in vitro fertilization pregnancies | 3/104 | 2.9 |
| 5. Total live births | 57 /104 | 55 |
| a. C-sections | 33/57 | 57.9 |
| b. Vaginal deliveries | 24/57 | 42.1 |
| 6. Miscarriages | 47/104 | 45 |

**Table 4:** Fertility outcomes after myomectomy.

| Pregnancy outcome n (%) | Before myomectomy n (%) | After myomectomy n (%) | p values |
|---|---|---|---|
| **Subjects in the study** | 178 (100%) | 178 (100%) | - |
| **Subjects who became pregnant** | 53 (30%) | 104 (58%) | p=0.001 |
| **Total number of pregnancies** | 88 (49%) | 104 (58%) | P=0.371 |
| **Live birth** | 20 (27%) | 57 (55%) | p<0.0005 |
| **Pregnancy loss,** | 68 (77%) | 47 (45%) | p=0.107 |
| **total First trimester** | 45 (51%) | 47 (45%) | p=0.907 |
| **Second trimester** | 21 (24%) | 0 (0%) | p<0.0005 |
| **Third trimester** | 2 (2%) | 0 (0%) | p=0.499 |
| **Ectopic pregnancy** | 0 (0%) | 0 (0%) | - |

**Table 5:** Reproductive performance before and after myomectomy in 178 patients who wished to conceive.

| | | Live birth | Miscarriage | p-value | Total pregnant | Not pregnant | p-value |
|---|---|---|---|---|---|---|---|
| Age (yrs) | <35 | 36 | 11 | - | 47 | 7 | - |
| | >35 | 21 | 36 | <0.0005 | 57 | 67 | <0.0005 |
| Infertility | yes | 45 | 24 | - | 69 | 8 | - |
| | no | 12 | 23 | 0.003 | 35 | 66 | <0.0005 |
| Size of fibroids | <5 cm | 0 | 0 | - | 0 | 0 | - |
| | >5 cm | 57 | 47 | (no p-value; only 2 groups) | 104 | 74 | (no p-value; only 2 groups) |
| Number of fibroids | 1-3 | 3 | 5 | - | 8 | 5 | - |
| | >3 | 54 | 42 | 0.306 | 96 | 67 | 0.852 |
| submucosal | | 7 | 15 | - | 11 | 8 | - |
| Intramural | | 32 | 59 | - | 48 | 35 | - |
| subserosal | | 18 | 69 | 0.095 | 45 | 31 | 0.983 |

**Table 6:** The impact of age, infertility and the nature of fibroids on reproductive outcome following myomectomy.

Similarly, Sudik et al. [14] reported that women with more than five fibroids removed had a lower pregnancy rate than those with one to five fibroids.

With appropriate surgical care, the number and size of fibroids removed, the preoperative distortion of the uterine cavity, the number of incisions made, or entry into the uterine cavity should not influence the subsequent ability to conceive [1]. However, it is likely that in clinical practice the increasing number of myometrial incisions needed to excise multiple fibroids might ultimately result in reduced fertility due to increased risk of surgical complications, such as adhesion formation and intrauterine synechiae, as indirectly suggested by our miscarriage rate, and those of other investigators [13,14]. In our study, myomectomy was performed exclusively by abdominal approach, a well-established method. Some of the main concerns after abdominal myomectomy are obstetric complications, including uterine rupture during pregnancy and the need for elective cesarean delivery. We observed no scar dehiscence or uterine rupture, and 42.1% of the patients delivered vaginally. Our study analyzed the fertility outcome in a large number of patients (n-178) and in literature so far the data for a large number of patients has not been observed.

Among the 57 pregnancies that resulted in a live birth, no case of second or third trimester loss was observed, and there were no cases of premature rupture of membranes or scar rupture. It is not surprising that a relatively high proportion of infants were delivered by cesarean section (57.9%). An elevated rate of cesarean section after abdominal myomectomy also was reported by Li et al. [15] and by Vercellini et al. [16], with 41% and 59% of the deliveries, respectively, being by the abdominal route. Few studies [8,17,18] have evaluated

the effect of fibroids on the pregnancy rate after Assisted Reproductive Techniques (ART). ART provides a unique setting because such factors as mechanical issues, greater distance for the gametes to travel, position of the cervix, postoperative adhesions, or menometrorrhagia can be excluded as possible causes of infertility. In our study most of the patients (95%) conceived spontaneously. Only three (2.9%) patients conceived after *in vitro* fertilization and two (1.9%) patients after induction of ovulation and intrauterine insemination. Since our data suggests women with unexplained infertility have a better chance of conception after myomectomy and the main factors in treatment success are patient age and duration of infertility, this conservative operation should not be postponed for too long.

However, our study has limitations. First, it was observational and did not include a control group. Furthermore, data on postoperative fertility were collected retrospectively. Second, some of the factors studied were closely associated, such as the presence of additional infertility factors, and duration of infertility. Third, the outcomes may have been influenced by the fact that the procedures were performed by different operators and the infertility treatment protocol after myomectomy was not standardized. Nevertheless, no randomized controlled studies have evaluated the role of myomectomy in the management of infertile women. Randomized controlled studies are needed to identify more conclusively in whom and when to perform myomectomy.

## Conclusion

Until unbiased information is available from a prospective, randomized study comparing myomectomy with expectant management, our study adds further evidence that abdominal myomectomy might be useful to increase pregnancy rates and to decrease pregnancy losses in women with uterine fibroids who want to conceive. Our study indicates that younger women and women with unexplained infertility may benefit most from this form of surgery.

### Acknowledgements

We would like to extend our sincere thanks to Rajeswar Rao Tekmal, Ph.D. Department of Obstetrics and Gynecology, University of Texas Health Science Center at San Antonio, TX for all his help in publishing this article. We would like to thank all the patients who were enrolled in the study.

### Source of Research Funding

This study was internally funded and was part of resident research program (SM) of the Department of Obstetrics & Gynecology.

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