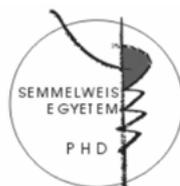


Abdominal myomectomy. Reproductive outcome after
surgery

Ph.D. thesis

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Budapest
2007

INTRODUCTION

One of the characteristic features of benign tumours is that both the patient and the physician can decide on either conservative or radical surgical treatments.

The most frequent benign tumour of the female genital tract are leiomyomas of the uterus originating from mesenchymal cells, the treatment of which has always been a crucial problem for gynaecologists for ages. Many ways of therapy have become familiar and accepted. The most widespread treatments today are hysterectomy, myomectomy (abdominal, laparoscopic, hysteroscopic), medical treatment (GnRH analogues), focused ultrasound therapy and uterine artery embolization.

Though abdominal myomectomy was first performed in the 1840s, operations aiming to conserve uterus started to spread all over the world after with Bonney reported on his surgery in 1930s. Vilmos Tauffer was the first to perform a successful operation of this type in Hungary in 1916.

While making a historical and literary survey on the treatment of leiomyomas in the international practice first the advantages and disadvantages of hysterectomy were compared to those ones of abdominal myomectomy. Since the middle of the 70s international publications have examined the results of alternative, conservative, surgical methods more and more frequently. The criteria for selecting patients for hysteroscopic and laparoscopic operations were set up by several specialists, which pertain to abdominal procedures as well. Non-surgical treatments of fibroids have gained more and more attention recently.

The reason I chose this topic for my dissertation was that only very few papers have been published on abdominal, conservative, surgical treatment of the uterus in Hungary in the last 15 years although there has been an increasing demand for preserving the uterus in our society.

At the I. Department of Obstetrics and Gynecology, Semmelweis University Faculty of Medicine, Budapest, 504 abdominal myomectomies were performed between 1st July 1990 and 31st December 2004.

The experience gained on the indications and perioperative morbidities of operations and observations on post-operative reproductive history are summarized in my thesis. My aim was to contribute to defining the place of abdominal myomectomy in the surgical treatment of fibroids by presenting our experience gained through systematic observations in the past one and a half decade.

AIMS

My aim was to analyse the case studies of patients undergoing abdominal myomectomy at the I. Department of Obstetrics and Gynecology, Semmelweis University Faculty of Medicine, Budapest in the last 15 years, taking into consideration my surgical experience in the area of leiomyomas with a special focus on the new inventions of this period. In my thesis I made research into the following problems:

1. How has the demand for conservative surgery in treating leiomyomas changed in the last 15 years?
2. Has the age of the patient have an impact on the specialist' deciding on a treatment preserving uterus?
3. Performing abdominal myomectomy in the peri- and postmenopausal period.
4. Does management change of asymptomatic tumour?
5. Does the age of the patient have an impact on the localisation, size and number of leiomyoma and the frequency of opening the endometrial cavity?
6. What are the criteria for selecting patients for abdominal myomectomy?
7. Do morbidity and hospitalization change if the uterine cavity is opened?
8. Does opening of the uterine cavity under myomectomy alter reproduction outcome?
9. Can leiomyomas in the period of pregnancy cause fetal malformations?

MATERIALS

Hospital charts were reviewed for all women who underwent abdominal myomectomy at the I. Department of Obstetrics and Gynecology, Semmelweis University Faculty of Medicine, Budapest, from 1990 through 2004. Patients' age, indication for surgery, type, size and number of removed fibroids, entry into the uterine cavity during the procedure, perioperative complications, duration of hospital stay were recorded and analysed. The most frequent indications for myomectomy were determined. These were hemorrhagia, pelvic pain, infertility, recurrent spontaneous abortion, size larger than 5 cm and/or growth of the fibroid and asymptomatic fibroids diagnosed by routine bimanual or ultrasound examination in which cases surgery was performed just for the desire of the patient. The type (submucosal, intramural, subserosal or intraligamental) of each fibroids were determined. If multiple fibroids were present and located in different layers, the position of each fibroid was recorded. Perioperative complications developed before and within 7-10 days after surgery were identified including the necessity of preoperative transfusion, intraoperative bleeding and necessity of postoperative transfusion, postoperative febrile morbidity, unintended major surgical procedures, life-threatening events and need for relaparotomy. We selected those patients whose age was above 48 years and compared to a matched selected patient group treated by hysterectomy. The characteristics of abdominal myomectomy and matched hysterectomy cases were similar regarding the age of the patients, number, type and size of removed fibroids, indication of surgery and date of the surgery (maximum of 3 months difference between the abdominal myomectomy and hysterectomy cases). We studied whether abdominal myomectomy could be a choice for patients with symptomatic fibroids above the age of 48 years, who wish to get hormonal replacement therapy and desire to preserve their uterus.

In 423 cases fibroids were removed by via laparotomy, because the patients had either large subserosal or intramural fibroids (>5-7 cm) or submucosal fibroids >3 cm or multiple fibroids (>3) were to be removed. In these cases we analysed whether there is any difference in perioperative morbidity and the consequently required

management between cases where the uterine cavity was opened or remained closed during abdominal myomectomy.

From the 423 abdominal myomectomies the indication for myomectomy was infertility and/or recurrent pregnancy loss in 229 cases (54.1%). We analyse the reproductive outcomes in these cases following abdominal myomectomy and try to determine the role of myomectomy in the treatment of infertility.

During the surgical procedure a vertical incision was performed on the uterus in order to avoid damaging the fallopian tubes and uterine arteries. In those cases where the fibroid was located in a lateral position we preferred transverse incisions parallel to the arcuate vessels. In order to prevent postoperative adhesions we minimized the number of serosal incisions and, if possible, enucleated more fibroids from a single incision. However, we tried to avoid tunnelling within the myometrium, which is known to affect haemostasis. We performed the incision through the pseudo capsule of the fibroid with the aim not to lose valuable muscle tissue and to prevent bleeding.

When the uterine cavity was opened during the procedure a special rain drop or tennis racket shaped drain with a cervical output was placed into the uterine cavity. The wound of removed fibroids was closed in two layers. The outer layer was closed by using continuous suture with the purpose to avoid postoperative adhesions.

Statistical analyses were performed by Statistica Software (StatSoft Inc., Tulsa, OK). Student's t test was used to compare mean values and the χ^2 test for comparison of proportions. Statistical significance was set at $P < 0.05$.

RESULTS

504 abdominal myomectomies were performed at the I. Department of Obstetrics and Gynecology, Semmelweis University Faculty of Medicine, Budapest between January 1990 and December 2004 over the study period, the annual number of operations increased significantly; compared to the 4 annual myomectomies in the initial years, in 2004 there were 104 myomectomies, indicating a 26-fold increase.

In cases of women of childbearing the aim of myomectomy was the immediate (26.7) or delayed (73.3%) restoration of the capacity of reproduction (73.3). In the age group of 41-45 years the rate of patients desiring pregnancy was only 27.4%. They wanted to preserve their uterus. The rate of women without a demand for reproduction in this age group was 72.6%.

Above the age of 48, there were 9 (1.8%; 9/504) patients, and 6 (1.19%; 6/504) of them requested HRT after abdominal myomectomy. The characteristics of the matched control group of hysterectomy cases were similar to those of abdominal myomectomy cases. Analyzing the complications we found that in the group of abdominal myomectomy only one patient needed postoperative blood transfusion. There was no difference in febrile morbidity between the compared groups. There were no unintended surgical procedures in either group. No relaparotomies were required and no life-threatening events were observed in either group. The length of hospital stay and the overall morbidity were higher in those cases where the uterine cavity was entered. We did not observe the recurrence of fibroids after abdominal myomectomy followed by one year of hormonal replacement therapy.

Analysing indications of surgery I found similar rates in symptomatic cases, 46-48% (haemorrhagia, pelvic pain, size larger than 5cm and /or growth of the fibroid) in each of the three five-year periods. The rate of patients who wished reproduction in the future increased in the first period and notably decreased in the third period from 27.08% to 23.27%. The rate of the asymptomatic cases decreased rate from 25.00% to 21.89% first, and increased to 28.64% in the 2000-2004 period. Examining fibroids according to the age of women the rate of the intramural type was above 50% in all age groups. The highest rate was observed in the group of 20-25 years at 71.42%. Examining the localization of fibroids I found a higher rate (8/19; 42.1%) of the submucosal type in the >40-years age group. In cases of submucosal fibroids the uterine cavity was opened in a significantly higher percentage of the procedures ($P<0,0001$). According to the size of the largest removed fibroid I found a >5 cm fibroid in more than 50% in the >26.years age group (72/172; 41.48%). In the age group of 31-35 the fibroids with size of >70 mm were the most frequent (72/172; 41.48%). A moderate increase can be seen in the number of removed fibroids with the alteration of age.

In the 20-25-years age group the mean number 1.65, in 26-30 age group 1.66, in the 31-35-years age group, 1.99, 36-40 age group 2.27 and in the >40-years age 2.34 is the mean number.

In 423 (83.92%) cases the removal of fibroids via laparotomy was the route of choice, because the patients had either large fibroids (>5 cm, 273 cases, 273/504; 54.16%) or submucosal fibroids > 3 cm (9 cases, 9/504; 1.78%) or multiple fibroids (>3, 66 cases, 66/504; 13.09%) or intramural (338 cases, 338/504; 64.06%) were to be removed.

From the 423 abdominal myomectomies the uterine cavity was entered during the surgical procedure in 92 (21.7%) cases and in 331 (78.3%) cases the uterine cavity remained closed. The patients who underwent myomectomy were between 20 and 55 years of age. There was no significant difference in the mean age between the opened and non-opened uterine cavity groups (34.8 vs. 34.3 years, respectively). Analyzing the indications for surgery and the likelihood of entering the uterine cavity during surgery we found that in case of menorrhagia significantly more surgical procedures were associated with opening the uterine cavity (44.6% vs. 19.6 %, P <0.0001), whereas in other types of indications no significant difference was found. In cases of submucosal fibroids the uterine cavity was opened in a significantly higher percentage of the procedures (63.2% vs. 36.8% %, P <0.0001). We formed 4 groups according to the size of the largest removed fibroid and compared the percentage of those cases where the uterine cavity was opened during the procedure or remained closed. None of the groups showed any significant difference in this regard. There was no significant difference in the number of removed fibroids between the opened and non-opened uterine cavity groups (1.9 vs. 2.2). Analyzing the complications we found that in the opened uterine cavity group significantly more bleeding occurred during the surgical procedure (220 ml vs. 180 ml mean intraoperative blood loss) and significantly more patients needed postoperative blood transfusion (23.9% vs. 6.7% P <0.0001). There was no significant difference in febrile morbidity between the compared groups. There were no unintended surgical procedures in either group. The percentage of relaparotomies did not differ significantly between the compared groups. In all cases the indication for relaparotomy was postoperative bleeding. Surgery included steps to reach haemostasis

and none of the cases required hysterectomy. No life-threatening events were observed in either group. Life-threatening event were defined as cardiopulmonary arrest, resuscitation, unplanned admission to intensive care unit or death. The length of hospital stay (9.3 vs. 6.9 days) and the overall morbidity rate (23.9% vs. 11.2%) were significantly higher in those cases where the uterine cavity was entered during the surgical procedure.

With the indication of infertility and/or recurrent pregnancy loss 229 abdominal myomectomies were analysed retrospectively. From the 229 cases the uterine cavity was entered during the procedure in 47 (20.5%) cases and in 182 (79.5%) cases the uterine cavity remained closed. The pregnancy rate was 54.4%. In cases of conception spontaneous abortion rate was 19% (23/118), the birth rate was 81% (95/118). 12% (14/118) of pregnant women had vaginal deliveries and Caesarean section was performed in 69% (81/118) according to our results.

We found no significant differences in postoperative pregnancy, delivery and miscarriage rates after myomectomy according to the type, size or number of fibroids removed. However, results suggest a trend towards lower postoperative pregnancy rates in cases of removal submucosal fibroids. In those cases where the size of the removed fibroid was <30 mm a trend towards higher pregnancy rates were observed, and the pregnancy rate seems to decrease if the number of removed fibroids is 7 or more.

Our results also confirm that the pregnancy rate is not influenced by entering the uterine cavity.

CONCLUSIONS

1. We performed 504 laparotomies with myomectomy between 1990 and 2004 in our university department. The number of patients operated on in 2004 was 26 times as many as the number of patients undergoing the same operations in 1990. In Hungary there is an increasing demand for uterus sparing surgery, so it is very important for gynaecologists to be well trained in this type of operations.

2. In case of women in childbearing ages the aim of myomectomy is immediate (26.7%) or delayed (73.3%) demand for reproduction. In the age group of 41-45 the rate of women desiring pregnancy is

27.4%, and the rate of those wanting to preserve their uterus is 72.6%. Abdominal myomectomy is a very good treatment for uterine smooth muscle fibroids diagnosed earlier but showing growth in case of patients insisting on uterus-sparing surgery, partly because they would like to have child or because they regard the uterus as a symbol of their femininity. Age should not prevent conservative surgery.

3. Myomectomy can be an alternative treatment for hysterectomy in the peri- and postmenopausal period either for keeping female identity or for hormonal treatment.

4. The number of patients with a well established diagnosis of fibroids without complaints, with closed family plans and deciding on conservative surgical treatment has increased. It is reasonable that asymptomatic fibroids are added to the list of indications even at other departments.

5. Submucosal fibroids occur at the highest rate in the age group over 40 (8/19, 42.1%). More than 50% of leiomyomas diagnosed in the age group over 26 are bigger than 5 cm. In the age group between 31 and 35, fibroids of ≥ 70 mm diameter are the most frequent (72/172; 41,48%). The increase in the number of myomas is in parallel with the aging of patients. In cases of patients over 40, opening of uterus cavity can be expected more frequently.

6. Abdominal myomectomy is advisable in the following cases: if the fibroid is >5 cm diameter, or it is >3 cm with submucosal location, or the number of myomas is more than 3 or its position is intramural. The abdominal way is also advisable if the opening of the uterine cavity can be expected or enucleation was not successful hysteroscopically or laparoscopically.

7. Opening the uterine cavity and suturing the endometrial layer has no impact on perioperative morbidity. Drainage of the uterine cavity through the cervical canal is required to prevent endocavitary

adhesions. In cases with opening of the uterine cavity intraoperative blood loss is more significant ($P < 0,0001$).

8. According to my results, post-operative pregnancy, birth and spontaneous abortion rate is not significantly influenced by the fact whether the endometrium was opened or not during abdominal myomectomy. In the group of the cases where the endometrium was opened 40.42% cases resulted in conception. In cases of abdominal myomectomy, as a consequence of infertility or habitual abortion, the rate of successful pregnancies was 41.48% (95/229) after enucleation.

9. Growing of the myoma during of pregnancy can cause fetal ischemic disease and brain injury.

LIST OF PUBLICATIONS

Journal articles pertaining to the thesis

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