Clinical Outcome after Myomectomy versus Uterine Artery Embolization for Uterine Fibroids

Vergleich der klinischen Behandlungsergebnisse nach Myomenukleation und der Embolisation der Arteria uterina

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Schlüsselwörter
- Myomektomie
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- Gebärmutterleiomyome

Key words
- myomectomy
- uterine artery embolization
- uterine fibroids

Abstract

Background: Although total hysterectomy has been considered as gold standard in treatment of symptomatic uterine fibroids in women with completed childbearing, an increasing number of patients are asking for alternatives. Myomectomy and uterine artery embolization, as reported recently, may yield high success rates as well. To date, only few studies have directly compared treatment outcomes of fibroid enucleation vs. embolization of symptomatic uterine fibroids.

Methods: During the last 5 years, symptomatic uterine fibroids were removed by organ-preserving surgery (surgical population, n = 120) or by embolization of the uterine artery (embolization population, n = 140) in our unit. Follow-up was conducted using standardized questionnaires mailed to each patient and was completed by 60 patients from the surgical population and 80 patients from the embolization population. In this retrospective single-center study, we looked at pregnancy outcomes as well as improvements in clinical symptoms after the treatment.

Results: Both myomectomy and embolization lead to a significant improvement of clinical symptoms. The patients in the surgical and in the interventional population groups displayed reduction of hypermenorrhoea in 68 vs. 77% of cases, reduction of metrorrhagia in 78 vs. 77% and reduction of dysmenorrhoea in 39 vs. 56% of cases, respectively. A tendency for increased improvement of hypermenorrhoea and dysmenorrhoea was noted after embolization compared to surgery.

Conclusion: The success rates with myomectomy and uterine artery embolization elucidate the various methods of treating uterine fibroids to every patient. In addition, in patients with completed family planning we now tend to perform a uterus-preserving therapy for symptomatic uterine fibroids.

Zusammenfassung

Fragestellung: Obwohl die operative vollständige Entfernung der Gebärmutter lange als Goldstandard für die Behandlung symptomatischer Gebärmutterleiomyome bei Frauen mit abgeschlossener Familienplanung galt, erkundigen sich immer mehr Patientinnen nach alternativen Therapien. Wie kürzlich berichtet, sind die Ergebnisse sowohl nach Myomektomien als auch nach der Embolisierung der Gebärmutterarterie gut. Bisher gab es nur wenige Studien, die bei der Therapie symptomatischer Gebärmutterleiomyome die Ergebnisse der Enukleation von Gebärmutterleiomyomen mit denen nach der Embolisierung der Gebärmutterarterie verglichen.

Material und Methodik: In den vergangenen 5 Jahren wurden an unserem Institut symptomatische Gebärmutterleiomyome entweder mittels eines organerhaltenden chirurgischen Eingriffs (chirurgische Gruppe, n = 120) entfernt oder durch Embolisierung der Gebärmutterarterie (Embolisierungsgruppe, n = 140). Der Follow-up wurde bei diesem Kollektiv mithilfe eines Standardfragebogens durchgeführt, der an jede Patientin geschickt wurde und der von 60 Patientinnen aus der chirurgischen und 80 Patientinnen aus der Embolisierungsgruppe ausgefüllt wurde. Bei dieser retrospektiv an einer einzigen Institution ausgeführten Studie wurden sowohl die Schwangerschaftsausgänge als auch die Verbesserungen der klinischen Symptome beurteilt.

Ergebnisse: Sowohl Myomektomien als auch Embolisierungen führten zu einer signifikanten Verbesserung der klinischen Symptome. In der chirurgischen und in der Embolisierungsgruppe ging die Hypermenorrhö jeweils in 68 bzw. 77% der Fälle zurück, die Metrorrhagie in 78 bzw. 77% der Fälle und die Dysmenorrhö in 39 bzw. 56% der Fälle. In der Embolisierungsgruppe war die Verbesserung der Hypermenorrhö und der

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Dysmenorrhö tendenziell noch etwas stärker verglichen mit der chirurgischen Gruppe.
Schlussfolgerung: Die Erfolgsraten nach Myomektomien oder Embolisierung der Gebärmutterarterie zeigen deutlich, dass es inzwischen verschiedene Methoden zur Therapierung von Gebärmutterleiomyomen gibt. Inzwischen führen wir auch bei Patientinnen ohne Kinderwunsch gebärmuttererhaltende Therapien zur Behandlung symptomatischer Gebärmutterleiomyome durch.

Abbreviations

SP	surgical population
EP	embolization population
REST	The Randomized trial of Embolization vs. Surgical Treatment of fibroids

Introduction

Uterine fibroids are among the most frequent gynecological diseases, affecting 20 – 25 % of women over the age of 30. The treatment is usually indicated with development of symptoms. In addition to symptomatic treatment of pain, or hormonal therapy for bleeding disturbances, established treatment methods include surgical removal of fibroids, with hysteroscopic resection of submucosal fibroids, transabdominal fibroid enucleation by laparotomy or laparoscopy, and finally hysterectomy. For patients wishing to conceive, organ-preserving removal of uterine fibroids has traditionally been accepted as standard of care. Increasingly, however, patients with completed childbearing are also requesting alternatives to hysterectomy. What is the purpose of organ-preserving treatment in this situation?
In the last decade, embolization of the uterine artery has been introduced and further developed as an additional method for treating uterine fibroids with numerous studies reporting of high success rates [1 – 8]. However, only few studies have been published to date on the long-term results and on the direct comparison between the treatment results with fibroid enucleation or embolization [9 – 11]. Such data are decisively important in advising patients with uterine fibroids, however. Furthermore, a recently published prospective trial indicated that embolization may not offer complete treatment and may even require further treatment in a minority of patients [12].
The present study investigates the treatment results in patients with symptomatic uterine fibroids who underwent fibroid enucleation with hysteroscopy, laparoscopy, or laparotomy, or alternatively uterine artery embolization.

Materials and Methods

In the period from January 2001 to June 2005, 120 uterus-preserving operations were carried out to treat symptomatic fibroids in our department. The surgical population (SP) was treated with surgical hysteroscopy (group 1), laparoscopy (group 2), or laparotomy (group 3). Patients who received combined procedures (surgical hysteroscopy and abdominal fibroid enucleation) were excluded due to the small number of cases. During the same period, 140 women with the same disorder underwent uterine artery embolization (embolization population [EP], group 4). The subjective success of the treatment was assessed retrospectively using a questionnaire. An analog scale from 1 to 10 was used for pain assessment. A total of 60 cases were evaluable in the surgically treated groups (groups 1 – 3) and 80 cases from the group of patients who received uterine artery embolization. Uterine artery embolization was carried out when hysterectomy was declined and organ-preserving surgery was not possible or practicable, when there were contraindications for surgery, or at the patient's request. Patients with several intramural fibroids were advised to undergo fibroid enucleation via a laparotomy, particularly when they wished to have children.
Data were presented as mean values ± standard deviation (SD), unless indicated otherwise. Statistical analyses were carried out using non parametric McNemar test for matched pairs and Wilcoxon signed rank. Differences of variables between both groups were calculated with the Mann-Whitney U test. A p value of less than 0.001 defined statistical significance.

Results

The patients in the groups 1 to 3 were respectively younger as those in group 4 (**Table 1**). In consequence, a higher proportion of patients in groups 1 – 3 wished to conceive. Overall, 84 % of the patients ($p < 0.001$) who had symptoms preoperatively were free of symptoms or had marked improvement after operative treatment. Ninety-three percent of the women reported that they would be willing to undergo the same surgical treatment again.

Table 1 Patient characteristics

	Group 1 (histeroscopy)	Group 2 (laparoscopy)	Group 3 (laparotomy)	Group 4 (embolization)
Number of patients	16	20	24	80
Mean age (range)	39 (32 – 53)	39 (31 – 53)	37 (32 – 46)	45 (32 – 55)
Mean follow-up (months)	29,1	26,2	27,2	40,1
Diameter of largest fibroid in mm	26 ± 11,4	46 ± 21.6	58,2 ± 17,5	63,7 ± 28,5
Number of removed fibroids	1,4 ± 0,7	3,1 ± 2,3	5,2 ± 3,7	n. d.
Patients without residual fibroids	7	18	16	n. d.

Table 2 Pregnancy rate after myomectomy

	Group 1 Hysteroscopy	Group 2 Laparoscopy	Group 3 Laparotomy	Group 1 – 3 All operations
Total number of patients	16	20	24	60
Family planning	6	9	18	32
Pregnancies after procedure	2	4	10	16
Babies taken home	1	4	10	15

Half of the patients who wished to have children (16 of 32) became pregnant following surgical fibroid removal; 14 women had live births (**Table 2**). The pregnancy rate was minimally higher in the laparotomy group (41.6%) than in the laparoscopy group (20%). The pregnancy rate was markedly lower following resectoscopic removal. However, due to the small number of cases, these results must be regarded with caution. This is in accordance with the fact that only incomplete resection of submucosal fibroids was possible in three of 16 cases (including two of six patients wishing to have children).

In group 3 (laparotomy), the patients had a higher rate of severe or altered bleeding at the time of the questionnaire (**Table 3**). This is in accordance with the fact that this group had on average the largest numbers of fibroids removed, the highest rate of residual fibroids, and consequently the highest recurrence rate. However, in the patients with continuing bleeding disturbances, the severity of the bleeding also declined; the severity of bleeding was assessed semiquantitatively (using the consumption of sanitary napkins or tampons), and was halved in these patients following the procedure.

The rate of postoperative complications was low in groups 1 – 3, with two cases of raised postoperative temperature, one urinary-tract infection, and four cases requiring blood transfusion, three of which occurred in patients whose preoperative hemoglobin value had been 9 g/dL or lower. Two patients (one each in groups 1 and 2) received an abdominal hysterectomy, and one patient in group 3 underwent a repeated fibroid enucleation. Growth of residual fibroids (n = 7) or the development of new fibroids (n = 7) occurred in 14 of the 60 patients. No differences were observed between the various operation groups.

Similarly to the organ-preserving surgery, uterine artery embolization led to a significant reduction in clinical symptoms. A trend to increased improvement of hypermenorrhoea and dysmenorrhoea was noticed after embolization compared to operative treatment groups (**Table 4**). After uterine artery embolization, new fibroids or renewed fibroid growth occurred in 10% of the patients following initially successful treatment. After embolization, myomectomy was performed in two cases and hysterectomy in one case.

Discussion

The decisive criteria for assessing the various treatment options in patients with uterine fibroids include the control of the clinical symptoms, the complication rate, and the need for further procedures due to recurrences. In the group of patients studied here, bleeding disturbances were controlled in approximately 70% of cases with fibroid enucleation, independently of the operating technique used. The success rate is thus slightly lower than the rates reported in the literature, at 70 – 80% [13 – 16]. In the laparotomy group, complete resection of the fibroids could be performed only in two thirds of the patients, due to the large proportion of patients with multiple fibroids in this group. The resulting higher proportion of patients with residual fibroids had a negative influence on the rate of improvement of clinical symptoms. The dysmenorrhoea experienced by the patients

Table 3 Improvement of clinical symptoms by myomectomy and embolization

		Preoperative	At time of questionnaire	Percentage of patients free of symptoms by procedure	
Hypermenorrhoea	hysteroscopy n = 16	14	3		
	laparoscopy n = 20	10	2		
	laparotomy n = 24	10	6		
	all operations n = 60	34	11	68%	p < 0.001
	embolization n = 80	52	12	77%	p < 0.001
Metrorrhagia	hysteroscopy n = 16	11	2		
	laparoscopy n = 20	8	0		
	laparotomy n = 24	8	4		
	all operations n = 60	27	6	78%	p < 0.001
	embolization n = 80	43	10	77%	p < 0.001
Dysmenorrhoea	hysteroscopy n = 16	9	3		
	laparoscopy n = 20	10	7		
	laparotomy n = 24	12	9		
	all operations n = 60	31	19	39%	p < 0.001
	embolization n = 80	46	16	56%	p < 0.001
Pain score (only patients with preoperative pain)	all operations n = 34	6,1 ± 2,0	2,8 ± 2,6		p < 0.001
	embolization n = 62	6,1 ± 2,2	1,5 ± 2,3		p < 0.001

Table 4 Significance of reduction of clinical symptoms between the operative treatment and embolization

	Myectomy	Embolization	p
Hypermenorrhoea	68%	77%	0.46
Metrorrhagia	78%	77%	n.s.
Dysmenorrhoea	39%	56%	0.035
Pain score (only patients with preoperative pain)	2.8 ± 2.6	1.5 ± 2.3	n.s.

was only successfully relieved in 39% of the women treated. However, the pain score was significantly reduced, even among patients who were still experiencing pain at the time of the questionnaire. Since dysmenorrhoea can be caused by other factors in addition to fibroids, such as endometriosis, this symptom is clearly more difficult to master with fibroid enucleation than the other symptoms.

In contrast to the data in the literature, in which the recurrence rates are slightly higher following laparoscopic surgery [17–19], the recurrence rate in the present study was higher in the group undergoing laparotomy. Since open surgery was recommended for patients with several fibroids, the number of preoperatively identified fibroids, the number of fibroids removed, and also the proportion of patients with residual fibroids (8 of 24 vs. 2 of 20), were markedly larger in the laparotomy group. On the other hand, the risk of recurrence after fibroid enucleation increases if more than one fibroid is present [17,19]. This also explains the differences in comparison with the data in the literature. The recurrence and repeat surgery rates in the literature are given as 10–30 and 4%, respectively [17,18,20]. This is in accordance with the data in the present study.

In agreement with the literature, no differences were observed with regard to the pregnancy rates between laparoscopic surgery and open fibroid enucleation; however, these data need to be interpreted with caution as the load of cases is modest. The pregnancy rate after fibroid enucleation depends on other associated sterility factors involved, the number of fibroids, and the position of the fibroids, and is 30% in the presence of these or up to 70% in couples with no other sterility factors [21–24]. The pregnancy rate of 50% in the present investigation must be regarded as a good result in view of the patients' average age of 39, mostly in patients with several fibroids and with no information regarding other sterility factors, and the rate is in accordance with the known pregnancy rates following myomectomy.

Organ-preserving surgery for uterine fibroids, as well as uterine artery embolization, provides good control of the patients' clinical symptoms in the majority of cases. This is reflected in the high levels of satisfaction expressed by the patients. In our study more than 90% express a willingness to undergo the same procedure again. In line with the study of Siskin et al. [11] improvement of pain and bleeding disorders were greater after uterine-artery embolization compared to myomectomy. The great majority of patients who underwent uterine artery embolization declined the traditional treatment methods and often decided in favor of uterine artery embolization after independently finding out about the available alternatives. The resulting selection in the group undergoing uterine artery embolization may decisively influence the results, particularly with regard to the subjective success rate, symptomatic improvements, and degree of satisfaction.

Although a tendency to increased symptom improvement was noticed after embolization compared to surgery, we did have renewed fibroid growth in 10% of the patients following initially successful treatment. In addition, three patients required surgical procedure for consecutive treatment. This may implicate a need for further treatment in a minority of patients. In a recently published study, the REST Investigators also found that the faster recovery after embolization should be weighed against the need for consecutive treatment in a small portion of these patients [12].

However, the success rates with myomecotmy and uterine artery embolization justify providing every patient – even when family planning has been completed – with information regarding the various methods of treating uterine fibroids.

Authorship

Both Prof. Dr. Gaetje and Dr. Mavrova-Risteska contributed equally to this work.

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