ORIGINAL ARTICLE
Korean J Obstet Gynecol 2011;54(9):529-535
http://dx.doi.org/10.5468/KJOG.2011.54.9.529
pISSN 2233-5188 · eISSN 2233-5196

KOREAN JOURNAL OF OBSTETRICS & GYNECOLOGY

STUDY ON THE CHANGES IN SEXUAL FUNCTIONING AND CLINICAL SYMPTOMS BEFORE AND AFTER RADIOFREQUENCY MYOLYSIS IN WOMEN WITH UTERINE MYOMA

Eun Young Choi, MD, Mi Jung Um, MS, Soo Ah Kim, MD, Hyuk Jung, MD, PhD
Department of Obstetrics and Gynecology, Chosun University College of Medicine, Gwangju, Korea

Objective
The purpose of this study was to estimate sexual functioning and clinical symptoms after radiofrequency (RF) myolysis of uterine myomas.

Methods
Fifty-four patients who had undergone RF myolysis in the Department of Obstetrics and Gynecology at Chosun University Hospital were surveyed regarding changes in the number, diameter, volume of myomas, sexual functioning and clinical symptoms before and 6 months after the procedure.

Results
The mean age of the patients was 43 ± 4.048 years. The following clinical symptoms (dysmenorrhea, menorrhagia, abdominal pain, dyspareunia, pelvic pressure, back pain, urinary frequency and leg pain) were improved significantly 6 months after RF myolysis ($P < 0.001$). The results following parameters of sexual function (desire for sex, frequency of sex, frequency of orgasm and strength of orgasm) were no significant differences before and after RF myolysis. The diameter and volume of myomas were significantly reduced 6 months after than before RF myolysis ($P < 0.05$).

Conclusion
RF myolysis is effective in improvement of clinical symptoms without an influence on sexual functioning and reduction of myoma size.

Keywords: Uterine myoma; Radiofrequency myolysis; Sexual function

Uterine myomas are common benign tumors in women of childbearing age. Usually there are no symptoms of myomas, women know they are showing symptoms, they seek for surgical or medical therapies, such as hysterectomy and Gonadotropin-releasing hormone (GnRH) agonists [1].

When symptoms occur, they usually consist of abnormal uterine bleeding, pelvic pain or pressure, reduced capacity of the urinary bladder, constipation, and reproductive dysfunction [2-4]. Usually, symptoms are related with the location and size of the myomas, or concomitant degenerative changes [3,4]. Approximately 600,000 hysterectomies are performed each year in the United States, and greater than one-fourth of US women will undergo this procedure by 60 years of age [5].

However, hysterectomy remains a major surgical operation with inherent risks and potential long-term sequelae. One of the reasons why women want to preserve their uterus is hysterectomy might

Received: 2011. 2.25. Revised: 2011. 7.20. Accepted: 2011. 8.17.
Corresponding author: Hyuk Jung, MD, PhD
Department of Obstetrics and Gynecology, Chosun University College of Medicine, 588 Seoseok-dong, Dong-gu, Gwangju 501-717, Korea
Tel:+ 82-62-220-3091 Fax: +82-62-232-2310
E-mail: bimilo@hanmail.net

Table 1. Demographic characteristics

Age (yr)	43±4.048 (35-49)
Impressions	
Myoma	38 (70.4)
Adenomyosis	9 (16.7)
Myoma with adenomyosis	7 (13)
Total	54 (100)
Indicative symptoms	
Menorrhagia	5 (9.3)
Dysmenorrhea	19 (35.2)
Menorrhagia with dysmenorrhea	16 (29.6)
Vaginal bleeding	3 (5.6)
Pelvic pressure	5 (9.3)
Myoma size increase	4 (7.4)
Asymptomatic	2 (3.7)
Menopause	
Yes	0
No	54 (100)
Hormone replacement	
Yes	0
No	54 (100)
Spouse	
Yes	54 (100)
No	0

Values are presented as mean±standard deviation (min-max) or number (%).

have negative effects on sexual well-being [6], although the literature pertaining to this issue is not conclusive [7,8]. It has been reported that anxiety about postoperative changes in sexual function is present in nearly one-half of patients who had undergone hysterectomy and that few patients discussed these anxieties with their physicians [9].

Over the last decade, however, there have been increasing efforts to develop less-invasive treatment options that address the desire of many women to preserve the uterus. Myomectomy, using either an open abdominal or laparoscopic approach, is one such alternative to hysterectomy [10]. Although shown to be effective, the extended operating times, need for meticulous suture repair, and associated complication rates have limited acceptance of the procedure [11].

In contrast, radiofrequency (RF) myolysis has been received attention as a minimally invasive approach to uterine myomas. But, little is known about sexual functioning after RF myolysis. Furthermore, the effect of RF myolysis on sexual functioning and the relationship to clinical symptoms is unknown.

The purpose of the current study was to estimate the differences in sexual functioning and clinical symptoms before and 6 months after RF myolysis.

Materials and Methods

1. Study population

The study population consisted of women who underwent RF myolysis between July 2008 and July 2009. The questionnaire included the following demographic characteristics; age, impression, indicative symptom for RF myolysis, menopausal status, use of hormone replacement therapy, and marital status. Fifty-four patients who had undergone RF myolysis in the Department of Obstetrics and Gynecology at Chosun University Hospital were prospectively surveyed regarding sexual functioning and clinical symptoms, changes in the number, diameter, and volume of myomas before and 6 months after RF myolysis.

Pre-procedural transvaginal sonographic (NEMIO SSA-550A, Toshiba, Tokyo, Japan) evaluation was performed for measurement of the number and diameter of myomas. Myoma volume was estimated according to the following formula: volume = width × length × height × π/6. The survey was performed as part of the clinical interview. All interviews were performed by the same researcher, with the aim to improve response rates of patient.

We didn't administer GnRH analogs to the patients in the study. And we treated women whom they don't want to have a baby anymore; because of not being proven the relationship between RF myolysis, with pregnancy and side effects. All examinations and procedures were performed by one gynecologist.

2. Sexual function [12]

Questions about sexual function had been validated previously and were adapted from the Maryland Women's Health Study by Rhodes et al. [7] and Helstrom et al. [8]. Our study was used to detect differences in sexual function after RF myolysis compared with before RF myolysis. During their hospital stay for RF myolysis, patients were referred into the study and then interviewed by a study researcher. Approximately 6 months after operation, patients were asked the same questions about sexual function.

Desire and frequency of sex was regarded as present when at least one of the questions concerning the problem was scored with "never", "1 per month", "2-3 per month", "1-2 per week", or "3-4 per week", the frequency of orgasm and dyspareunia with

Table 2. Mean myoma diameter, diameter reduction, volume and volume reduction before and 6 months after radiofrequency (RF) myolysis

	Before RF myolysis (n=54)	6 months after RF myolysis (n=54)	*P*-value
Myoma diameter (cm)	6.2±1.8	4.4±1.6	0.043
Diameter reduction (%)	-	21.7±14.5	-
Myoma volume (cm^3)	85.4±64.5	47.7±34.5	0.025
Volume reduction (%)	-	49.5±29.4	-

Values are presented as mean±standard deviation.

Table 3. Desire for sex before and 6 months after radiofrequency (RF) myolysis

	Before RF myolysis (n=54)	6 months after RF myolysis (n=54)	*P*-value
Never	12 (22.2)	12 (22.2)	
1/month	17 (31.5)	16 (29.6)	
2-3/month	12(22.2)	13 (24.1)	>0.999
1-2/wk	11 (20.4)	12 (22.2)	
3-4/wk	2 (3.7)	1 (1.9)	

Values are presented as number (%).

"none of the time", "little of the time", "some of the time", "most of the time" or "all of the time" with the question concerning the strength of orgasm for which a problem was regarded as present when "very mild", "mild", "somewhat strong" or "very strong" was scored.

3. Clinical symptoms

Women are asked they have suffered from menorrhagia, dysmenorrhea, abdominal pain, pelvic pressure, dyspareunia, constipation, urinary frequency, back pain, or leg pain. These symptoms were selected as being the most reported symptoms by women with symptomatic uterine myomas [13]. For each of nine items, women could indicate whether the symptom was present or not before RF myolysis. Six months after RF myolysis, the women were asked to indicate whether their symptoms had worsened, improved, or unchanged. The resolution of symptoms was evaluated clinically, by verbal description, and as subjectively described by the patient. We calculated the percentage of symptoms that improved for each woman.

4. RF myolysis procedure

RF myolysis of uterine myomas was performed under local anesthesia using diazepam (20 mg) and pethidine (100 mg) intravenously. Prophylactic antibiotics were not used. In the lithotomy position, a uterine manipulator was inserted for better exposure of the myomas puncture site to be treated. Then, a 2 mm trocar was inserted through an umbilical incision after injection of lidocaine. The RF needle was inserted percutaneously after insufflating CO_2 gas into the pelvic cavity, and placed within the target myoma under laparoscopic video guidance. The depth of the needle insertion was determined on the basis of a pre-operative ultrasound. The tip of the central prong was placed about 1-4 cm beyond the center of the myoma by size, so that the peripheral electrodes were localized where the cross-sectional area of the myoma was largest.

The target temperature for RF myolysis was 80°C. A RF generator (RF Medical, Seoul, Korea) automatically adjusts the power to maintain the selected temperature. The electric power was fixed at 50 watts. The time required to obtain a given volume of coagulation was a function of both temperature and tissue impedance. The operator decided the puncture site of the myomas based on experience.

In our research, we filled the pelvic cavity with Adept® (Baxter, Vienna, Austria) and sprayed using a 16 G spinal needle on the region for preventing adhesions after RF myolysis. The laparoscopy equipment was made by Karl Stortz GmbH & Co. (Tuttlingen, Germany).

5. Statistical analysis

Statistical analysis was performed with SPSS ver. 12.0 (SPSS Inc., Chicago, IL, USA). A paired t-test was used to analyze changes in the diameter and volume of the myomas, and proportions of responses for questions about sexual function before and 6 months after RF myolysis. A chi-square test was used to compare the results of clinical symptoms. Statistical significance was established at a $P<0.05$.

Table 4. Frequency of sex before and 6 months after radiofrequency (RF) myolysis

	Before RF myolysis (n=54)	6 months after RF myolysis (n=54)	*P*-value
Never	1 (1.9)	1 (1.9)	
1/month	11 (20.4)	8 (14.8)	
2-3/month	19 (35.2)	18 (33.3)	0.255
1-2/wk	20 (37)	26 (48.1)	
3-4/wk	3 (5.6)	1 (1.9)	

Values are presented as number (%).

Table 5. Frequency of dyspareunia before and 6 months after radiofrequency (RF) myolysis

	Before RF myolysis (n=54)	6 months after RF myolysis (n=54)	*P*-value
None of the time	35 (64.8)	45 (83.3)	
Little of the time	7 (13)	7 (13)	
Some of the time	6 (11.1)	2 (3.7)	<0.001
Most of the time	3 (5.6)	0	
All of the time	3 (5.6)	0	

Values are presented as number (%).

Results

1. Characteristics

Table 1 shows the demographic characteristics of the study population, the diagnoses, and the main indications for RF myolysis. Candidates for the study were pre-menopasual women at least 35 years of age.

The mean age of the patients was 43±4.048 years (range, 35-49 years). Impressions of patients undergoing RF myolysis included myomas (70.4%), adenomyosis (16.7%) and myomas with adenomyosis (13%). And, indicative symptoms for RF myolysis included dysmenorrheal (35.2%), menorrhagia (9.3%), menorrhagia with dysmenorrheal (29.6%), pelvic pressure (9.3%), vaginal bleeding (5.6%) and asymptomatic (11.1%).

The mean number of myomas was 1.5±1.1 (range, 1-5), the mean diameter of the myomas was 6.2±1.8 cm (range, 2-9 cm), and the mean volume of the myomas was 85.4±64.5 cm^3. Six months after RF myolysis, the mean diameters and volumes of the uterine myomas were decreased by 4.4±1.6 cm and 47.7±34.5 cm^3, respectively; the reduction in myoma's diameter and volume was 21.7±14.5 % and 49.5±29.4%, respectively (Table 2).

The diameter and volume of the myomas were significantly reduced 6 months after RF myolysis ($P<.05$). The mean procedure time was 32±14 minutes (range, 4-70 minutes).

2. Sexual function

Tables 3-7 show the frequency of patient responses regarding sexual function before and 6 months after RF myolysis. The results were not statistically significant difference in respect to desire for sex ($P>0.999$), frequency of sex ($P=0.255$), frequency of orgasm ($P>0.999$), and strength of orgasm ($P=0.455$).

But, the frequency of dyspareunia (Table 5) was statistically significant difference (P=0.001).

3. Clinical symptoms

The statistically significant changes in clinical symptoms are shown in Table 8. The symptoms reported by patients at the first were menorrhagia in 81.5%, dysmenorrhea in 59.3%, back pain in 48.1%, abdominal pain in 37%, urinary frequency in 35.2%, dyspareunia in 31.5%, pelvic pressure in 27.8%, constipation in 29.6% and leg pain in 16.7%. At 6 months after RF myolysis, dysmenorrhea was improved in 91%, menorrhagia in 90.9%, abdominal pain in 90%, dyspareunia in 88.2%, pelvic pressure in 86.7%, back pain in 84.6%, urinary frequency in 78.9% and leg pain in 66.7%. At 6 months after RF myolysis, there were no statistically significant differences on the only constipation.

Discussion

We determined the effects of RF myolysis on sexual function and on clinical symptoms before and 6 months after RF myolysis. We did not find significant changes in sexual desire and frequency, orgasmic frequency, or orgasmic strength after RF myolysis. However,

Table 6. Frequency of orgasm before and 6 months after radiofrequency (RF) myolysis

	Before RF myolysis (n=54)	6 months after RF myolysis (n=54)	*P*-value
None of the time	9 (16.7)	7 (13)	
Little of the time	7 (13)	9 (16.7)	
Some of the time	23 (42.6)	23 (42.6)	>0.999
Most of the time	6 (11.1)	8 (14.8)	
All of the time	9 (16.7)	7 (13)	

Values are presented as number (%).

Table 7. Strength of orgasm before and 6 months after radiofrequency (RF) myolysis

	Before RF myolysis (n=54)	6 months after RF myolysis (n=54)	*P*-value
Never	8 (14.8)	7 (13)	
Very mild	8 (14.8)	7 (13)	
Mild	15 (27.8)	16 (29.6)	0.455
Somewhat strong	22 (40.7)	23 (42.6)	
Very strong	1 (1.9)	1 (1.9)	

Values are presented as number (%).

our findings suggest a significant benefit for patients with dyspareunia who had undergone RF myolysis. Patients were significantly less likely to complain of pain with intercourse after the procedure compared with before the procedure.

Some limitations are inherent in the study of patients who have undergone surgery. As was suggested by Rhodes et al. [7], patients who are interviewed at the time of or shortly before the RF myolysis may have a lower desire for sex and sexual frequency because of anxiety of operation. It is difficult to determine whether a change in sexual functioning can completely be assigned to RF myolysis. The change in sexual function might be more pronounced when corrections are made for these items.

Also, we found a statistically significant improvement in clinical symptoms 6 months after RF myolysis in patients with symptomatic myomas. Most of the patients had relief of symptoms followed by a significant reduction in myoma diameter and volume at 6 months after RF myolysis.

The major limitation of this study was the short follow-up time, which does not allow evaluation of the mid- and long-term recurrence rates, or to draw definite conclusions about the efficacy of RF myolysis. No intra- or post-operative complications occurred during or after RF myolysis. Only 4 patients complained of menorrhagia, but they were improved after treatment with thermachoice endometrial balloon ablation. All patients were observed overnight and discharged from the hospital on the first post-operative day.

Myolysis as a treatment option for uterine myomas was first introduced in the late 1980s as a hysteroscopic technique [14]. Subsequently, myolysis was performed as a variation on the technique of laparoscopic myomectomy in which myomas are coagulated rather than removed. The first series, when myoma ablation was performed with Nd:YAG laser, have clearly shown the efficacy of this technique in achieving myoma shrinkage [10,11]. However, concerns have arisen because of the extremely high incidence of adhesion formation was detected during second-look laparoscopy.

The aim of our pilot study was to demonstrate that directed RF myolysis is an effective minimally invasive technique. Even though laparoscopic or open myomectomy are considered the classic surgical approaches for women who desire uterine preservation, the current literature on this subject underlines the need for new, alternative, less invasive techniques to treat symptomatic myomas. RF myolysis, ultrasonography, and thermal tissue ablation are promising methods for treating uterine fibroids. Laparoscopic myolysis has been shown to reduce the size of uterine myomas [15]. Kim and Jung [16] also reported a reduction in the size of uterine myomas and improvement of the symptoms after RF myolysis. Based on the results of our study, the diameter and volume of myomas were statistically significantly reduced 6 months after RF myolysis ($P<0.05$).

A limitation of this study is that we did not include a control group. This might have been useful, especially to investigate the changes in sexual functioning in a healthy population and to compare them with a symptomatic population. Another limitation was the lack of some general characteristics among our study population, such as social status, marital status, general health, and

Table 8. Clinical symptoms before and 6 months after radiofrequency (RF) myolysis

	Before RF myolysis (n=54)		6 months after RF myolysis (n=54)			Total	*P*-value
	Symptoms		Worsened	Improved	Unchanged		
Dysmenorrhea	Present	32 (59.3)	0	31 (96.9)	1 (3.1)	32 (100)	<0.001
	Not	22 (40.7)	1 (4.5)	0	21 (95.5)	22 (100)	
Menorrhagia	Present	44 (81.5)	0	40 (90.9)	4 (9.1)	44 (100)	<0.001
	Not	10 (18.5)	1 (10)	0	9 (90)	10 (100)	
Abdominal pain	Present	20 (37)	0	18 (90)	2 (10)	20 (100)	<0.001
	Not	34 (63)	2 (5.9)	0	32 (94.1)	34 (100)	
Dyspareunia	Present	17 (31.5)	0	15 (88.2)	2 (11.8)	17 (100)	<0.001
	Not	37 (68.5)	0	0	37 (100)	37 (100)	
Pelvic pressure	Present	15 (27.8)	1 (6.7)	13 (86.7)	1 (6.7)	15 (100)	<0.001
	Not	39 (72.2)	0	0	39 (100)	39 (100)	
Back pain	Present	26 (48.1)	0	22 (84.6)	4 (15.4)	26 (100)	<0.001
	Not	28 (51.9)	2 (7.1)	0	26 (92.9)	28 (100)	
Urinary frequency	Present	19 (35.2)	0	15 (78.9)	4 (21.1)	19 (100)	<0.001
	Not	35 (64.8)	0	0	35 (100)	35 (100)	
Leg pain	Present	9 (16.7)	1 (11.1)	6 (66.7)	2 (22.2)	9 (100)	<0.001
	Not	45 (83.3)	2 (4.4)	0	43 (95.6)	45 (100)	
Constipation	Present	16 (29.6)	0	3 (18.8)	13 (81.2)	16 (100)	0.023
	Not	38 (70.4)	0	0	38 (100)	38 (100)	

Values are presented as number (%).

financial worries, as these might influence sexual functioning. A recent prospective study, however, are reported that no difference before and after of RF myolysis regarding frequency of intercourse, sexual desire, or orgasm but did find a reduction in frequency of dyspareunia.

We conclude that clinical symptoms statistically significantly improved 6 months after RF myolysis in women with symptomatic uterine myomas. Furthermore, there was statistically significant in frequency of dyspareunia. Although the number of patients in our study was not sufficient, we think that there should be more studies about RF myolysis on uterine myomas.

Acknowledgments

This study was supported by research fund from Chosun University, 2011.

References

1. Lee BY, Jung MH, Ji YI, Kim HY. Efficacy of add-back therapy with tibolone for prevention of bone mineral density loss in women treated with GnRH agonist for endometriosis. J Korean Soc Osteoporos 2009;7:28-34.
2. Buttram VC Jr, Reiter RC. Uterine leiomyomata: etiology, symptomatology, and management. Fertil Steril 1981;36:433-45.
3. Lumsden MA, Wallace EM. Clinical presentation of uterine fibroids. Baillieres Clin Obstet Gynaecol 1998;12:177-95.
4. Stovall DW. Clinical symptomatology of uterine leiomyomas. Clin Obstet Gynecol 2001;44:364-71.
5. Keshavarz H, Hillis SD, Kieke BA, Marchbanks PA. Hysterectomy surveillance -United States, 1994-1999. MMWR CDC Surveill Summ 2002;51(SS05):1-8.
6. Nevadunsky NS, Bachmann GA, Nosher J, Yu T. Women's decision-making determinants in choosing uterine artery embolization for symptomatic fibroids. J Reprod Med 2001;46:870-4.
7. Rhodes JC, Kjerulff KH, Langenberg PW, Guzinski GM. Hyster-

ectomy and sexual functioning. JAMA 1999;282:1934-41.
8. Helström L, Lundberg PO, Sörbom D, Bäckström T. Sexuality after hysterectomy: a factor analysis of women's sexual lives before and after subtotal hysterectomy. Obstet Gynecol 1993;81:357-62.
9. Dennerstein L, Wood C, Burrows GD. Sexual response following hysterectomy and oophorecomy. Obstet Gynecol 1977;49:92-6.
10. Goldfarb HA. Comparison of Bipolar Electrocoagulation and Nd:YAG Laser Coagulation for Symptomatic Reduction of Uterine Myomas. J Am Assoc Gynecol Laparosc 1994;1:S13.
11. Nisolle M, Smets M, Malvaux V, Anaf V, Donnez J. Laparoscopic myolysis with the Nd:YAG laser. J Gynecol Surg 1993;9:95-9.
12. Dragisic KG, Milad MP. Sexual functioning and patient expectations of sexual functioning after hysterectomy. Am J Obstet Gynecol 2004;190:1416-8.
13. Voogt MJ, De Vries J, Fonteijn W, Lohle PN, Boekkooi PF. Sexual functioning and psychological well-being after uterine artery embolization in women with symptomatic uterine fibroids. Fertil Steril 2009;92:756-61.
14. Donnez J, Gillerot S, Bourgonjon D, Clerckx F, Nisolle M. Neodymium: YAG laser hysteroscopy in large submucous fibroids. Fertil Steril 1990;54:999-1003.
15. Lefebvre G, Vilos G, Allaire C, Jeffrey J, Arneja J, Birch C, et al. The management of uterine leiomyomas. J Obstet Gynaecol Can 2003;25:396-418.
16. Kim SA, Jung H. The 1-year follow-up results of radiofrequency myolysis on uterine myomas. Korean J Obstet Gynecol 2008;51:1137-41.

자궁근종이 있는 여성에서 자궁근종용해술 전후 성기능과 임상 증상에 대한 연구

조선대학교 의과대학 산부인과학교실
최은영, 엄미정, 김수아, 정 혁

목적
자궁근종이 있는 환자에서 고주파 자궁근종용해술 후 성기능과 임상 증상의 개선 여부를 알아보고자 하였다.

연구방법
조선대학교 산부인과에서 고주파 자궁근종용해술을 시행 받은 54명의 환자들에서 수술 전과 6개월 후의 성기능과 임상 증상에 대해 설문조사 하였다.

결과
고주파 자궁근종용해술 후 성교통, 생리통, 월경과다, 복부 통증, 복부 압박, 허리 통증, 다리 통증, 빈뇨 등의 임상 증상이 통계적으로 의의있게 개선되었으며, 자궁근종의 크기도 평균 4.41.6 cm 감소하였다(P=0.043). 그러나 성욕, 성교 횟수, 오르가즘 빈도, 오르가즘 강도는 고주파 자궁근종용해술 전 후 큰 차이가 없었다.

결론
고주파 자궁근종용해술은 성 기능에 영향을 미치지 않으면서 자궁근종의 임상 증상을 개선시키고 근종의 크기를 줄일 수 있는 효과적인 시술이다.

중심단어: 자궁근종, 고주파 자궁근종용해술, 성기능