Therapeutic outcomes and postoperative courses in microwave endometrial ablation for menorrhagia

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Abstract

Objective: Microwave endometrial ablation (MEA) with a 2.45 GHz microwave was first in Japan performed to treat intractable menorrhagia by Kanaoka et al., in 1998. Since then satisfactory results have been reported. The present study was conducted to assess symptomatic rating improvements, complication statuses and evidence of no recurrence after surgery.

Methods: MEA was performed on 30-51-year-old patients with complaint of menorrhagia (52 patients) or prolonged menstruation (3 patients). Postoperative findings were evaluated, including subjective symptoms, hematological improvement ratings and complication statuses, with periodic ambulatory follow-ups for recurrences and complications. Also studied were patients with complicating dysmenorrhea.

Results: All 52 patients with menorrhagia achieved amelioration of their subjective symptoms; in 92.2% of treated cases, anemia treatment became no longer necessary. All 3 patients with prolonged menstruation achieved remarkable amelioration. In all patients who experienced recurrent menorrhagia requiring treatment after surgery, the recurrence was within 6 months and no patients were experienced recurrent disease beyond 6 months after surgery. One patient experienced pyosalpinx one month after surgery; she underwent hysterectomy and salpingooophorectomy. In three other patients, endometrial cytology was not available, due to cavity adhesion; however, no other severe complications were observed. Effective amelioration of dysmenorrhea was obtained in 94.7% (18/19) of the patients without complicating adenomyosis uteri, but the ratio was low, at 66.7% (12/18), in the patients with complicating adenomyosis uteri.

Conclusion: MEA is potentially a safe and highly effective surgical procedures for menorrhagia, when performed taking into account its technical features, indications and complications. It seems necessary to follow the course for at least six months after surgery.

Key words: endometrial ablation, microwave, menorrhagia

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Introduction

Microwave endometrial ablation (MEA) for intractable menorrhagia was developed by Sharp et al. in 1995, when they proposed the use of a 9.2 GHz microwave \(^1\). Since then, it has been reported as being safer and technically more convenient than conventional endoscopy-based endometrial ablation \(^2,3\). In Japan, Kanaoka et al. conducted the nation’s first MEA surgery using a 2.45 GHz microwave applicator, with satisfactory effects, in 1998 \(^4\). Furthermore, a curved microwave applicator for MEA (Sounding Applicator, Alfresa Pharma Co.) was developed to enable treatment of cases with cavity distortion due to hysteromyoma and the like \(^5,6\). In this paper, we report on the therapeutic outcomes of MEA in our patients with intractable menorrhagia or prolonged menstruation, with a discussion of their complications and prognosis.

Subjects and Methods

The study population comprised 55 women who underwent MEA at the Yokohama City University Medical Center or affiliated hospitals between September 2002 and September 2008. Chief complaint was menorrhagia in 52 patients and prolonged menstruation in 3 patients. Ages varied from 30 to 51 years at the time of surgery, with a mean age of 44.2 years. Thirteen patients had an intramural (< 5 cm) or submucosal myoma (< 2 cm), their preoperative uterine cavity length ranging from 6.5 to 13 cm, with a mean of 8.5 cm. 15 patients had generalized complications necessitating careful management after surgery (Table 1). The following criteria were indicated for surgery. (i) Menorrhagia or severe prolonged menstruation was strongly resistant against several conservative treatments. (ii) Patients who do not plan to become pregnant in the future. (iii) No evidence of endometrial malignancy. (iv) Microwave applicator is able to reach all endometrium (deformations of intumetrium cavity due to malformation or myoma are little), and (v) myometrial thicknesses are less than 10 mm in any area of the uterus.

The specific procedures are described below. At admission, uterine cavity length was measured and confirmed more than 10 mm of myometrial thickness. Under general or spinal anesthesia, the subject was placed in lithotomy position. The urinary bladder was filled with 200 mL of physiological saline to facilitate transabdominal ultrasound examination of applicator position and coagulation status, and a balloon catheter was clamped in place. Before MEA initiation, a hysteroscopic examination was carried out to assess the endometrial surface and tubal horn, and cervical length. In case of endometrial thickening due to endometrial hyperplasia or the secretory phase, endometrial curettage was also performed. One patient had a pedunculated submucosal myoma 1 cm in size and also underwent uteroscope-guided myomectomy. Operating conditions for the 2.45 GHz microwave applicator were set at an output of 70 W and an exposure time of 50 seconds for each application (tissue necrotized to a depth of 6-7 mm below the microwave applicator surface \(^6\)). Under the guidance of transabdominal ultrasound, the microwave applicator was introduced into the tubal horn on either side, and microwaves were applied. Then, while keeping the applicator along the side wall, microwaves were applied at a position 2 cm back. The tubal horn and side wall on the opposite side were likewise exposed to microwaves. Subsequently, the median side was exposed to microwaves. As with the side walls, microwaves were applied with the tip of the applicator positioned at the center of the uterine fundus and at a position 2 cm back. In case of a wide cavity, microwaves were applied in two divided exposures, one for the anterior part and the other for the posterior part. For a uterus of normal size (cavity length about 7 cm), coagulation was nearly completed through the above steps. A hysteroscope was inserted and if non-coagulated area was confirmed, made additional ablation.

Table 1 Complications observed before surgery

<table>
<thead>
<tr>
<th>Complication</th>
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<tbody>
<tr>
<td>Mitral regurgitation (prosthetic valve replacement)</td>
</tr>
<tr>
<td>Mitraparesis</td>
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<tr>
<td>Diabetes mellitus, Cerebral infarction, Chronic heart illness</td>
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<tr>
<td>Parkinson’s disease Epilepsy, Anxiety neurosis Depression</td>
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<tr>
<td>Superior sagittal sinus thrombosis</td>
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<tr>
<td>Systemic lupus erythematosus, Chronic renal failure</td>
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<tr>
<td>Diabetes mellitus, Chronic renal failure</td>
</tr>
<tr>
<td>Pulmonary embolism (P.H.)</td>
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<tr>
<td>Deep venous thrombosis, Pulmonary embolism</td>
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<tr>
<td>Ehlers-Danlos syndrome</td>
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<tr>
<td>Rheumatoid arthritis</td>
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<tr>
<td>Depression, Bronchial asthma</td>
</tr>
<tr>
<td>Mitral regurgitation (prosthetic valve replacement)</td>
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P.H.: past history
procedure does not include ablation in to cervical canal, so as to avoid postoperative hematometra and pyometra. Postoperative pain is seldom complained of; in the event of any such pain, however, NSAIDs were to be administered. The patient was discharged from hospital after 3 hours recovery care.

Two weeks after surgery, the patient was intrauterine infections and of fluid retention in the uterus. To prevent adhesion in the uterine cavity, particularly near the internal os-tium, Hegar's cervical dilator (No. 1 or 2) was inserted into the cavity. Effects on the menorrhagia, prolonged menstruation and dysmenorrhoeal, was evaluated every 3 to 6 months up to 2 years.

Results

1. Evaluations on menorrhagia and prolonged menstruation just after surgery

Subjective symptoms were ameliorated in all 52 patients with menorrhagia as chief complaint before surgery. Amenorrhea or petechiae during period was reported in 31% of patients; reduced menstrual bleeding to about one-tenth of preoperative level in 35%.

Amenorrhea or petechiae during period occurred in 31% of those patients, and reduced menstrual bleeding to about one-tenth the preoperative level was observed in 35% (Fig. 1). In 25 patients, hematology test results were obtained both before preoperative anemia treatment (administration of iron preparation) and after MEA; mean blood hemoglobin level improved significantly (p = 0.0000128: Wilcoxon t-test) from 7.78 ± 1.77 mg/dL before treatment to 12.32 ± 1.52 mg/dL after treatment.

Of the 3 patients who had prolonged menstruation as chief complaint before surgery, 2 experienced amenorrhea; the other had a remarkably shortened duration of menstruation, from 14 days to 3 days.
2. Effects on dysmenorrhea

Of 37 patients who complained of dysmenorrhea before surgery, 30 (81.1%) achieved amelioration; the mean visual analog scale score decreased significantly (p = 0.0000000201: Wilcoxon t-test), from 7.35 ± 2.25 points before MEA to 3.43 ± 3.25 points after MEA. Comparing the findings between presence and absence of complicating adenomyosis uteri, however, amelioration was achieved in 94.7% (18/19) of the patients without complicating adenomyosis uteri, but in a lower percentage, 66.7% (12/18), of those with complicating adenomyosis uteri, including 1 patient who suffered exacerbation. Two patients with complicating adenomyosis uteri underwent hysterectomy for dysmenorrhea at 1 year after surgery, which suggests that the effect on dysmenorrhea in patients with adenomyosis uteri is uncertain.

3. Long-term prognosis

Of the 52 patients with menorrhagia, all cases course follow-up for 6 months or more after surgery; 47 permitted it for 12 months or more. In all the aforementioned 4 patients requiring menorrhagia treatment even after surgery, the disease recurred within 6 months, with no patients experiencing recurrent menorrhagia necessitating treatment beyond 6 months after surgery. None of the 3 patients with prolonged menstruation as chief complaint experienced recurrence.

4. Complications

No patients suffered prolonged hospitalization with complication after surgery. A 31-year-old patient with complicating diabetes mellitus and chronic renal insufficiency experienced pyometra 1 month after surgery; she underwent hysterectomy and adnexitomy. No complications were observed in any other patients during the followup period.

Aside from complications, endometrial cytology test was impossible because of uterine cavity adhesion in 3 patients.

Discussion

Amelioration in abnormal uterine bleeding was attained in all cases after MEA; anemia treatment became no longer necessary in 92.2% of them. The effect on menorrhagia was reported satisfactory in other reports. Regarding the 4 patients who required anemia treatment even after surgery, excluding the only patient who early underwent hysterectomy for complications, 3 were considered to have insufficient exposure because of uterine cavity distortion or dilation due to myoma or the like. While hysterectomy was chosen for 2 of them, the other received a GnRH agonist to constrict her uterus and then again underwent MEA before restoration of menstruation; she achieved remarkable amelioration of her menorrhagia. Since then, administration of the GnRH agonist before MEA has been successful in the 3 patients. It was suggested that in patients having a relatively large uterine cavity, the surgical success rate might be increased by narrowing the range of exposure with preoperative administration of a GnRH agonist. For the remaining patient, it was presumed that endometrial hyperplasia interfered with sufficient coagulation and necrosis of the basement membrane, and that surgical success might therefore be made possible by performing endometrial curettage before MEA. Currently, in patients with a thickened endometrium presurgery, such as those who are to undergo MEA while in the secretory phase, we make it a rule to perform endometrial curettage before MEA.

Postoperative courses for 12 months or more could be followed in 47 of the 52 patients with menorrhagia as chief complaint who underwent MEA. In all 4 patients with recurrent menorrhagia, recurrence was within 6 months, with no patient experiencing a menorrhagia relapse requiring anemia treatment beyond 6 months after surgery. Judging from these findings, ambulatory followup is necessary for at least 6 months after MEA surgery.

Regarding dysmenorrhea, magnitude of amelioration varied whether complicated adenomyosis or not. It was presumed that in patients without adenomyosis uteri, endometrial ablation remarkably reduced menstrual blood regurgitation into the peritoneum, resulting in amelioration of dysmenorrhea. Meanwhile, in patients with adenomyosis uteri, it is thought that individual differences arise in the improvement rating for dysmenorrhea due to retention of adenomyosis uteri lesions, because this surgical technique involves tissue necrosis to a depth of about 6 to 7 mm from the endometrium. One patient became amenorrheic after MEA surgery but com-
plained of dysmenorrhea regularly every month, with a rating of 10 points on the visual analog scale, despite the absence of hematometra. We make it a rule to perform MEA only in treating menorrhagia or prolonged menstruation, and consider it contraindicated for patients with dysmenorrhea as the only chief complaint.

Reported complications in MEA include thermal damage of the gut, uterine perforation, hematometra and intrauterine infections. Gut burns and uterine perforation can be avoided by ensuring a uterine wall thickness of 10 mm or more before surgery, and using ultrasound tomography in combination during MEA. Hematometra is considered avoidable by preventing coagulation near the internal ostium of the uterus, using hysteroscopy in combination, and by inserting Hegar’s cervical dilator into the internal ostium at the outpatient clinic after surgery. None of these complications were noted in our patients. A case underwent hysterectomy and adnexectomy because of pyosalpinx which was evoked by MEA procedures (after 1 month). Her background included some factors for increased infection susceptibility, such as diabetes mellitus and chronic renal insufficiency. This case is also thought to resemble the postablation tubal sterilization syndrome reported in a patient with past history of tubal ligation. Although onset was not found in our case, it seems necessary to take into account the possibly increased likelihood, in patients with tubal occlusion, of abscess development in the tube after MEA.

Aside from complications, endometrial cytology test was impossible because of uterine cavity adhesion in 3 patients. Although the use of MEA to treat atypical endometrial hyperplasia has been considered, it seems that great care must be exercised in introducing this approach, since postoperative endometrial cytology test may be difficult in some patients.

Conclusion

With its low invasiveness, MEA is believed to be highly effective for menorrhagia, even with severe complications, when performed in conformity with indications and technical procedures. Since in our patients all recurrences were within 6 months after surgery, it is felt that the course must be followed for at least 6 months.

References

3) PMA P020031: Summary of safety and effectiveness data Microwave Endometrial Ablation System (MEA). Food and Drug Administration. USA. 2003