Microwave endometrial ablation after endometrial curettage for the management of heavy menstrual bleeding

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Summary

Objectives: The aim of the present study was to evaluate the efficacy of microwave endometrial ablation after endometrial curettage, in selected patients with heavy menstrual bleeding. *Material and Methods:* Thirty-two premenopausal women with heavy menstrual bleeding underwent microwave endometrial ablation at the Department of Obstetrics and Gynecology of the University of Patras Medical School. All patients did not respond to previous medical treatment, had completed their childbearing, and did not desire future fertility. The authors chose endometrial curettage rather than hormonal pre-treatment (GnRH analogs, danazol) for endometrial preparation. Post-treatment follow up protocol included physical and ultrasonographic evaluation at three, six, nine, and 12 months for the first year and yearly after. *Results:* The authors had no cases of uterine perforation, thermal injury to adjacent organs, and infection or sepsis. During follow up, there was a gradual decrease in amenorrhea rate (90.6% - 68.8%) and in satisfaction rate (90.6% - 71.9%). Moreover during follow up, eight women underwent to total abdominal hysterectomy. Among them, seven women had uterine myomas and one woman had adenomyosis. *Conclusions:* Endometrial preparation with endometrial curettage seems to be a good alternative to hormonal pre-treatment. It has the advantage of avoiding delays, side effects, and cost of hormonal pre-treatment. Moreover, microwave endometrial ablation after endometrial curettage is successful and highly acceptable.

Key words: Microwave endometrial ablation; Endometrial curettage; Heavy menstrual bleeding.

Introduction

Heavy menstrual bleeding is a significant healthcare issue in premenopausal women and the main reason for referral to gynecologist [1, 2]. It is a common cause of iron deficiency anemia and may reduce their quality of life [2].

For most patients with heavy menstrual bleeding, medical management should be the initial approach [3]. Medical treatment options include: intravenous (conjugated equine estrogens), oral (progestins, combined oral contraceptives, non-steroidal anti-inflammatory drugs, anti-fibrinolytic drugs) or intrauterine medication (levonorgestrel releasing devices) [2-8]. However the effectiveness, side effect profile, and acceptability to women show considerable variation [2-10].

The choice of surgical treatment option depends on clinical stability, suspected etiology, underlying medical problems, contraindications or lack of response to medical treatment, and desire for future fertility [3]. Surgical treatment options include: dilation and curettage, endometrial ablation, uterine artery embolization, and hysterectomy [3, 8].

Recent years, microwave endometrial ablation gained popularity. It is a minimally invasive surgical technique for patients with heavy menstrual bleeding [11]. It uses low-power, high-frequency microwave energy to destroy the basal layer of the endometrium and the glands by heating them to 70-80°C [11].

The aim of this study was to evaluate the efficacy of microwave endometrial ablation after endometrial curettage, in selected patients with heavy menstrual bleeding.

Materials and Methods

Between January 2005 and December 2007, 32 premenopausal women with heavy menstrual bleeding underwent microwave endometrial ablation at the Department of Obstetrics and Gynecology of the University of Patras Medical School. All patients did not respond to previous medical treatment, had completed their childbearing, and they did not desire future fertility.

Preoperatively the authors evaluated myometrial thickness, uterine cavity length, and configuration with vaginal ultrasound, in order to avoid thermal injury of adjacent organs. In this study, the authors chose endometrial curettage rather than hormonal pre-treatment (GnRH analogs, danazol, progestogens) for endometrial preparation.

Exclusion criteria from the study were: pregnancy, desire for future fertility, menopausal status, previous endometrial ablation, uterine cavity length < six cm or >14 cm, previous uterine surgery (cesarean section, myomectomy), previous uterine trauma (resulting myometrial thickness < ten mm), submucosal fibroids, intrauterine device, active genital or urinary tract infection, active pelvic inflammatory disease, atypical endometrial hyperplasia, endometrial cancer, cervical dysplasia, clotting defects or bleeding disorders.

The procedure was performed under light general anesthesia and the patient placed in dorsal lithotomy position. The cervix dilated up to nine mm and the authors confirmed uterine cavity

length. They performed endometrial curettage and sent specimen for pathologic evaluation. Immediately after, the authors performed microwave endometrial ablation. Microwaves generated at a frequency of 9.2 GHz using magnetron. The microwave probe was inserted into the uterine cavity until the tip reached the fundus and then activated. Once a temperature of 95°C was achieved, the probe was moved from side to side to uterine walls with gradual withdrawal at a rate that allowed the temperature to be maintained within the therapeutic range of 70-80°C. Care was taken to avoid treating the cervical canal.

Preoperatively, all women received a single dose of intravenous antibiotics. Also, they received non-steroidal anti-inflammatory drugs for postoperative analgesia.

Post-treatment follow up protocol included physical and ultrasonographic evaluation at three, six, nine, and 12 months for the first year and yearly after.

The study was approved by the Ethical Committee of the Hospital. Informed consent was obtained from each woman included in the study.

Results

The median age of women was 46.4 years (range 35-53). The median uterine cavity length was 87 mm (range 60-120). The median endometrial thickness was ten mm (range 8-15). The median operating time for microwave endometrial ablation was 89 seconds (range 47-180). All tissue specimens from endometrial curettage were negative for malignancy.

All patients did not responded to previous medical treatment for heavy menstrual bleeding. Moreover they had completed their childbearing and they did not desire future fertility.

Most patients had little or no postoperative discomfort. All patients received non-steroidal anti-inflammatory drugs for postoperative analgesia. All of them, returned home at the same day.

Postoperatively, almost all patients had a mild vaginal discharge for three to four weeks. The discharge was usually watery and occasionally blood-stained. In the present study population, there were no cases of uterine perforation, thermal injury to adjacent organs, infection or sepsis.

During follow up, there was a gradual decrease in amenorrhea rate (90.6% - 68.8%) and in patient satisfaction rate (90.6% - 71.9%) (Table 1).

Moreover during follow up, eight women underwent total abdominal hysterectomy. Among them, seven women had uterine myomas and one woman had adenomyosis.

Discussion

Microwave endometrial ablation is a minimally invasive surgical technique for patients with heavy menstrual bleeding [11]. It is a second generation endometrial ablative technique and introduced in clinical practice in 1995 [11, 12]. Microwave endometrial ablation is a non-hysteroscopic technique that is easily learned and does not require irrigation fluid [13]. It is used in patients that completed their childbearing and they do not desire future fertility [14, 15].

Table 1. — *Amenorrhea and patient satisfaction rates.*

Follow up	Amenorrhea rate	Patient satisfaction rate
3 months	90.6%	90.6%
6 months	87.5%	90.6%
9 months	78.1%	84.4%
12 months	75%	81.2%
24 months	68.8%	71.9%
36 months	68.8%	71.9%

Such patients have experienced failure or were intolerant to medical therapy for heavy menstrual bleeding [15]. They should be willing to accept normalization of menstrual flow, not necessarily amenorrhea, as an outcome [15].

The device uses microwave energy at a fixed frequency of 9.2 GHz [11, 12, 16]. At the wavelength chosen, microwaves cause direct tissue heating to a depth of three mm (close to the applicator tip) [11, 13, 17]. Moreover they cause conductive heating to adjacent tissue for an additional depth of two to three mm [13,17]. At therapeutic temperatures, the total depth of penetration (five to six mm) coagulates and destroys the basal layer of endometrium and glands, while spares myometrium [11-14,16]. The mean treatment time is approximately 3.5 min and determined by the size of the endometrial cavity and endometrial thickness [11, 13, 15]. Especially in women with large and severely distorted uterine cavity, endometrial ablation tends to be incomplete [18].

Postoperative, endometrium and superficial myometrium undergoes necrosis with various degrees of acute inflammation lasting three months [18,19]. This may be followed by a phase of repair and regeneration [19]. In many cases that phase results in endometrial scarring and fibrosis [19]. The degree of intrauterine adhesions may become progressively more severe [19]. Moreover, intrauterine adhesions can obstruct any bleeding from residual or regenerated endometrium [19, 20].

Generally, endometrial ablation is more effective when performed in relatively thin or atrophic endometrium [14,21]. This can be achieved in three ways: scheduling procedure to the immediate postmenstrual phase, using hormonal pre-treatment (GnRH analogs, danazol) for four to six weeks or performing preoperative endometrial curettage [14 21-23].

Scheduling procedure to the immediate postmenstrual phase or inducing a withdrawal bleed with progestogen, is an acceptable and efficacious alternative without detriment to long term outcome [23].

Hormonal pre-treatment especially with GnRH analogs, associated with shorter operating time, lower rate of postoperative dysmenorrhea, and increased rate of postoperative amenorrhea [15, 21, 22, 24]. However, it has additional cost and unpleasant side effects [12, 23, 25]. Moreover increases significantly the cervical resistance and the risk for cervical trauma and false passage formation [12, 23, 25].

Preoperative endometrial curettage has the advantage of avoiding delays, side effects, and cost of hormonal pre-treatment [14,26]. In most cases, microwave endometrial ablation without hormonal pre-treatment is successful and highly acceptable [22]. In the present study population, the authors used preoperative endometrial curettage for endometrial preparation.

The most common postoperative side effects are: cramping/pelvic pain, nausea and vomiting, vaginal discharge, and vaginal bleeding/spotting [11,17].

Cervical manipulation and microwave endometrial ablation release prostaglandins that cause postoperative discomfort and pelvic pain [12]. The use of non-steroidal anti-inflammatory drugs reduce that symptoms significantly [12, 16, 27]. In the present study population, most patients had little or no postoperative discomfort. All patients received non-steroidal anti-inflammatory drugs for postoperative analgesia and returned home at the same day.

Postoperative, almost all patients have a mild vaginal discharge for three to four weeks [11, 27]. It is usually watery and occasionally blood stained [27]. In the present study population, most patients had a mild vaginal discharge for three to four weeks.

Although rare, the most severe postoperative complications are: uterine perforation, thermal injury to adjacent organs, infection or sepsis [17, 28-30]. Most of them occur due to unrecognized uterine perforation at the time of dilation [12, 17, 20, 29, 30]. It is obvious that preoperative diagnostic hysteroscopy is necessary to recognize false passage or uterine perforation [12, 13]. In the present study, although the authors did not use preoperative diagnostic hysteroscopy, they had no severe postoperative complications.

Pregnancy and its associated complications (miscarriage, preterm labor, intrauterine growth retardation, intrauterine fetal demise, abnormal placental adherence, and caesarean hysterectomy), are well recognized after endometrial ablation [31]. For that reason premenopausal patients undergoing microwave endometrial ablation should be counseled to use an appropriate contraception method [15, 31, 32].

The success rate of microwave endometrial ablation depends on definition of success (amenorrhea, oligomenorrhea or normal menstrual flow), patient satisfaction (adequate counseling, realistic goals), and length of follow up [24]. Most patients have a reduction in menstrual loss within three months after treatment [33]. However, the maximum reduction observed six months after treatment [33]. As the reduction is gradual, six months should be allowed before considering the treatment as a failure [33].

Microwave endometrial ablation results in amenorrhea in 50-65% of women [13, 15]. Residual or regenerated endometrium can be present in those patients [18, 19]. However, intrauterine adhesions can obstruct any bleeding from that residual or regenerated endometrium [19, 20]. The main reason for treatment failure is incomplete endometrial ablation [18, 34]. In the present study, there was a gradual decrease in amenorrhea rate (90.6% - 68.8%) during follow up.

Especially in patients with preoperative endometrial curettage, it seems that there is a lower amenorrhea rate after microwave endometrial ablation [26]. This may be due to inadequate endometrial curettage [26]. Moreover, intrauterine blood clots after endometrial curettage may decrease the transmission of microwave energy [26]. Although hormonal pre-treatment has a global effect on endometrium, endometrial curettage may miss some areas [26].

There is an additional effect on dysmenorrhea, that improved in most cases [16]. A possible explanation is that microwave energy destroys endometrium and adenomyotic foci in myometrium [26]. Therefore patients with adenomyosis and severe dysmenorrhea should have pre-treatment consultation regarding treatment effects on dysmenorrhea [26].

Moreover, microwave endometrial ablation results in satisfaction in 70-98.5% of women [15, 16, 24, 33, 35]. In the present study, there was a gradual decrease in patient satisfaction rate (90.6% - 71.9%) during follow up.

It is obvious that microwave endometrial ablation is a safe non-hysteroscopic endometrial ablative technique that offers distinct advantages for both patients and surgeons. According to the present results, endometrial preparation with endometrial curettage seems to be a good alternative to hormonal pre-treatment. It has the advantage of avoiding delays, side effects, and cost of hormonal pre-treatment. Also, it provides tissue specimen for further pathologic evaluation. Moreover, microwave endometrial ablation after endometrial curettage is successful and highly acceptable.

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