# Instruments & Methods

## Hysteroscopic endomyometrial resection: A new technique for the treatment of menorrhagia

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**Thirty-five patients with menorrhagia and a normal uterine cavity underwent hysteroscopic endomyometrial resection. None underwent any form of medical or surgical preparation of the endometrium. A standard gynecologic resectoscope was used to excise a minimum of 3 mm of endomyometrium from the entire uterine cavity. This depth was reduced to 2 mm at the tubal ostia. All patients were followed for 3–6 months. Twenty-one of the 25 patients (84%) who were followed at 6 months reported amenorrhea. The mean dysmenorrhea scores improved from 2.84 to 0.56 postoperatively. Seven of the 35 patients were diagnosed with adenomyosis. One woman was found to have adenomatous hyperplasia of the endometrium. Hysteroscopic endomyometrial resection is a highly effective method for the treatment of menorrhagia. This technique produces a very high rate of amenorrhea, provides a histologic specimen of the endomyometrium, and obviates the need for medical or surgical preparation of the endometrium.** ***(Obstet Gynecol 1994;83:295–8)***

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Hysteroscopic techniques are becoming increasingly popular for the control of menorrhagia. Goldrath et al,[1] Vancaillie,[2] and Magos et al[3] have reported methods that can be classified as either selective thermal destruction of the endometrium or simple resection. These techniques offer the woman minimally invasive outpatient surgery, low morbidity, and early return to full physical activity.

Despite these advantages, a number of problems persist. Most patients will require some form of medical or surgical preparation of the endometrium for adequate thermal destruction of the endometrium basalis; none of these techniques provide the surgeon with a predictable depth of tissue destruction; and with the exception of endometrial resection, they do not provide the surgeon a histologic specimen.

Endomyometrial resection, a technique that uses the continuous-flow resectoscope equipped with a wire loop electrode, is defined as the systematic removal of a least 3 mm of endomyometrium. In the region of the uterine cornua, 2 mm of endomyometrium is excised. This technique provides a histologic specimen for examination and is well suited for the unprepared endometrium.

### *Technique*

The cervix was dilated to 9 mm with Hegar dilators. A vasopressin solution containing 10 units diluted in 40 mL of normal saline was injected 1.5 in deep into the cervical stroma, at the 3- and 9-o'clock positions, for a total of 20 mL at each site. A 26 French continuous-flow resectoscope (Karl Storz Endoscopy, Culver City, CA), fitted with an 8 × 5-mm wire loop electrode, was passed into the uterine cavity. Glycine 1.5% was introduced through a gravity-fed system of 2-L bottles held up to 90 in at their spouts. The fluid collection system consisted of 2-L containers connected in a series to wall suction set at 150 mmHg. A variety of electrosurgical generators were used, producing a pure cutting current with settings ranging from 100–210 W. Settings were judged adequate when the loop could be moved at 3 cm/second without the sensation of tissue drag.

Dissection began on the anterior uterine wall (Figure 1). The 8-mm loop electrode was extended 1 cm and brought to the mid-fundus, then buried in the endomyometrium to its full 5-mm depth. The entire assembly was held in that position and brought through the endocervical canal to the exocervix. The dimensions of each strip were measured to ascertain that at least



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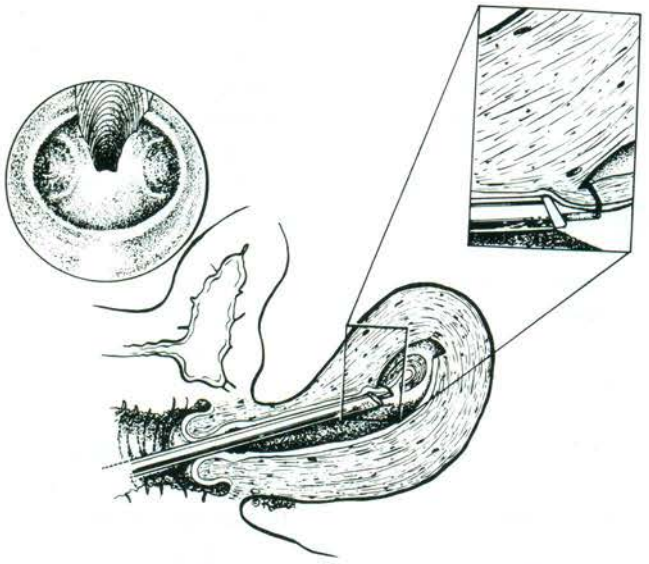

**Figure 1.** Dissection of the anterior uterine wall.

**Figure 2.** Appearance of the uterine cavity after the cardinal specimens of the anterior, posterior, and lateral walls have been resected.

3 mm of uterine endomyometrium had been removed. After removal of the initial strip of tissue, the suction was turned off and continuous flow occurred as a result of egress from the cervix. The posterior and lateral walls were similarly resected to the internal cervical os. The lateral-wall dissection began 5 mm proximal to the tubal ostia. These primary four tissue strips are referred to as the "cardinal endomyometrial specimens" (Figure 2).

The remaining endomyometrium formed long, triangular tissue specimens on the anterolateral and posterolateral walls of the uterus. These triangular specimens were removed in continuous strips using the same technique, along with large ridges of underlying myometrium. In this manner, the entire endomyometrium was removed (Figure 3). The tubal ostia were excised to a depth of 2 mm. The number of strips varied between eight and 16. With the exception of the tissue surrounding the tubal ostia, all specimens were 3–5 mm deep. The procedure was completed using a 3-mm ball-end electrode to coagulate the exposed myometrial surface. The power settings varied between 70–130 W of coagulation current. All patients who were not penicillin-allergic received cefonicid, 1 g intraoperatively; those with penicillin allergy received gentamicin, 80 mg intraoperatively.

## *Results*

Thirty-five women with menorrhagia were treated between May 1, 1992, and April 30, 1993. All patients underwent a preoperative assessment including history, physical examination, office hysteroscopy, hematocrit determination, and endometrial biopsy. The patients were asked to describe their menstrual cramps on a 6-point dysmenorrhea scale, in which zero represented none and 5 represented severe menstrual cramps. The average age of the study group was 39.5 years (range 26–53). None had had a satisfactory response to hormone therapy or previous curettage.

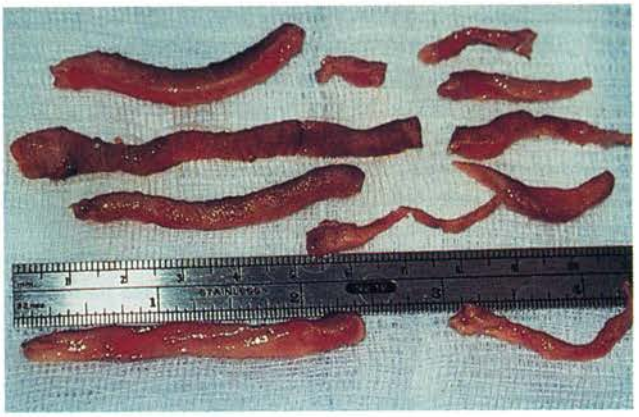

**Figure 3.** Strips of endomyometrium.

Hormone therapy included oral medroxyprogesterone alone or in combination with various estrogen preparations. Several patients had been treated with oral contraceptives. Diagnostic hysteroscopy was performed using a rigid 5-mm, 30° hysteroscope delivering carbon dioxide from the Hamou Microcolpohysteroflator (Karl Storz Endoscopy). The endometrium was biopsied with a Novak curette in all subjects. No patients with fibromyomas, acute or chronic endometritis, endometrial polyps, or adenomatous hyperplasia were admitted into the study. All subjects had refused hysterectomy, and none underwent any form of medical preparation of the endometrium. All procedures were performed at an ambulatory surgery center under general anesthesia. In all cases, surgery was scheduled without regard for phase of the menstrual cycle.

All subjects were seen postoperatively at 2 weeks and were interviewed by telephone (AD) at 3 and 6 months following the procedure. They were asked to rate their results for both menstrual flow and cramps. Menstrual flow was described using the following terms: amenorrhea, scant flow, moderate improvement, and no improvement. Scant flow was defined as flow that required pad or tampon changes no more frequently than every 8 hours on the worst day of flow. Moderate improvement was defined as any improvement not fitting the criteria for scant or no improvement. Patients were also asked to describe their menstrual cramps on the 6-point dysmenorrhea scale.

Endomyometrial resection was completed successfully in all 35 patients. The average procedure lasted 27 minutes (range 14–60) and resulted in a mean (± standard deviation) net fluid absorption of 760 ± 484 mL (range 0–2000) of 1.5% glycine. The average power setting was 104 W (range 100–150) of cutting current for the resection portion of the procedure and 108 W (range 100–130) of coagulation current for the desiccation of exposed myometrium.

None of the 35 patients experienced any intraoperative complications. All were discharged within 3 hours of surgery. One woman developed persistent diarrhea 2 weeks after her procedure and was found to have pseudomembranous colitis secondary to *Clostridium difficile*. She improved rapidly with oral metronidazole. There were no other complications.

Table 1 presents the histopathologic diagnoses of all 35 patients. Seven of the specimens revealed adenomyosis.[4] One patient was noted to have focal adenomatous hyperplasia without atypia. Her preoperative endometrial biopsy revealed only proliferative endometrium. She is currently considering participation in a protocol.

**Table 1.** Histopathologic Findings in 35 Patients Undergoing Endomyometrial Resection

| | |
|---|---|
| Secretory endometrium | 16 |
| Proliferative endometrium | 14 |
| Dyssynchronous endometrium | 3 |
| Menstrual endometrium | 1 |
| Cystic hyperplasia | 2 |
| Adenomatous hyperplasia, focal | 1 |
| Adenomyosis* | 7 |

* Endometrial islands were noted at least one high-power field below the basal layer of the endometrium.

Twenty-five patients were followed for at least 6 months. Table 2 gives the results of the menstrual flow and dysmenorrhea scores. Although the mean scores decreased from 2.84 to 0.56, these scores cannot be held to a criterion of statistical significance.

## *Discussion*

Hysteroscopic ablation of the endometrium is rapidly gaining acceptance among gynecologists for the treatment of menorrhagia unresponsive to medical management. There remain at least three significant shortcomings associated with this technique.

First, it generally requires expensive medical pretreatment to cause atrophy of the zona functionalis of the endometrium. Apart from their cost, these preparatory agents often produce undesirable side effects for the patient. In contrast, endomyometrial resection can be performed on women who have not undergone any form of medical preparation of the endometrium. The technique also produces very high rates of amenorrhea (84%) at 6-month follow-up. This compares favorably

**Table 2.** Results of Hysteroscopic Endomyometrial Resection on Menstrual Bleeding and Dysmenorrhea at 6-Month Follow-Up

| | All patients ($n$ = 25) | Normal myometrium ($n$ = 20) | Adenomyosis ($n$ = 5) |
|---|---|---|---|
| Bleeding outcome | | | |
| Amenorrhea | 21 (84%) | 17 (85%) | 4 (80%) |
| Scant bleeding | 2 (8%) | 2 (10%) | |
| Moderate bleeding | 2 (8%) | 1 (5%) | 1 (20%) |
| No improvement | | | |
| Dysmenorrhea score (0–5) | | | |
| Average preoperative | 2.84 | 2.43 | 4.0 |
| Average postoperative | 0.56 | 0.50 | 0.80 |

with either the Nd:YAG laser, which has been reported to produce amenorrhea rates of 12–71%,[5,6] or electrosurgical ablation of the endometrium ("rollerball coagulation"), which produces amenorrhea in 40–67% of patients.[2,7,8]

Second, the present methods of endometrial ablation do not allow a predictable depth of tissue destruction. There are many factors that determine thermal destruction of tissue, including current density, waveform, the rate of electrode movement, and the mechanical force on the electrode as it is applied to the tissue. Endomyometrial resection, on the other hand, relies on the measurement of excised tissue as a simple determinant of its effect.

Third, the technique of endometrial ablation does not provide a tissue specimen for histopathologic examination. This may prove a real concern as more patients with menorrhagia are treated with endometrial ablation techniques. How often do patients have an undetected area of adenomatous hyperplasia or focal areas of atypical adenomatous hyperplasia? This possibility was demonstrated in one of our patients, whose preoperative biopsy had revealed only proliferative endometrium. Apart from this concern, the lack of a specimen from endometrial ablation prevents evaluation of those patients with adenomyosis. In our limited study, the short-term data reveal that all four of the patients diagnosed with adenomyosis were amenorrheic and without dysmenorrhea at 6 months. Although encouraging, this needs further evaluation in long-term prospective studies.

The technique of endomyometrial resection also differs, both qualitatively and quantitatively, from transcervical resection of the endometrium as described by Magos et al.[9] Their method does not emphasize the removal of continuous strips of tissue, resulting in an unpredictable depth of excision. With any resection technique, predictability depends on the systematic removal of continuous tissue strips of endomyometrium. Our method provides this predictability by removing continuous strips of endomyometrium from the uterine fundus to the internal os, and removal to a uniform depth determined by the geometric relationship of the loop electrode to the endomyometrium. The tissue specimen produced by this technique allows proper orientation and is drawn from sufficient depth to permit the diagnosis of adenomyosis. Quantitatively, the technique of Magos et al aims "to excise tissue to include 1–2 mm of myometrium."[9] Unfortunately, Magos et al did not specify how 1–2 mm of myometrium can be excised from a uterus with an unknown depth of endometrium. Endomyometrial resection does not pretend to remove a predictable depth of myometrial tissue. However, endomyometrium can be removed to a predictable depth. When comparing these two techniques, the rates of amenorrhea differ dramatically. Magos et al[3] reported an amenorrhea rate of 27% at 6-month follow-up, compared to 84% in our study.

Hysteroscopic endomyometrial resection appears to offer distinct advantages for the patient and the gynecologist. In our study, the amenorrhea rate was greater than those reported with other hysteroscopic methods. The exact role of this technique has yet to be determined and will await further evaluation in long-term randomized studies.

## *References*


1. Goldrath MH, Fuller TA, Segal S. Laser photovaporization of the endometrium for the treatment of menorrhagia. Am J Obstet Gynecol 1981;140:14–9.
2. Vancaillie TG. Electrocoagulation of the endometrium with the ball-end electrode resectoscope ("rollerball"). Obstet Gynecol 1989;74:425–7.
3. Magos AL, Baumann R, Lockwood GM, Turnbull AC. Experience with the first 250 endometrial resections for menorrhagia. Lancet 1991;337:1074–8.
4. Jones HW, Jones GS, eds. Novak's textbook of gynecology. 10th ed. Baltimore: Williams and Wilkins, 1981:447.
5. Davies JA. Hysteroscopic endometrial ablation using the neodymium:YAG laser. Br J Obstet Gynaecol 1989;96:928–32.
6. Baggish MS, Baltoyannis P. New techniques for laser ablation of the high-risk patient. Am J Obstet Gynecol 1988;159:287–92.
7. Townsend DE, Richart RM, Paskowitz RA, Woolfork RE. "Rollerball" coagulation of the endometrium. Obstet Gynecol 1990;76: 310–3.
8. Wortman M, Daggett A. The hysteroscopic management of intractable uterine bleeding: A review of 103 cases. J Reprod Med 1993;38:505–10.
9. Magos AL, Baumann R, Turnbull AC. Transcervical resection of endometrium in women with menorrhagia. Br Med J 1989;298: 1209–12.



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