



Microwaves: from the kitchen to the operating theatre

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Technology: Microwave endometrial ablation

History: In the treatment of abnormal uterine bleeding hysteroscopic endometrial ablation has become an accepted, less invasive alternative to hysterectomy.¹ Endometrial ablation involves resecting the endometrium or coagulating it with an electrocautery or laser. In an attempt to find simpler and safer techniques for endometrial ablation some physicians have used other devices, including a thermal balloon, to heat and destroy the endometrium without hysteroscopy.² However, because the use of the balloon requires contact with the endometrium, women with an irregular uterine cavity may not be good candidates for this procedure.

Use: A novel and simple technique that does not require hysteroscopy is endometrial ablation with microwave energy.³⁻⁵ Microwaves at

2-3 GHz in conventional microwave ovens provide deep and thorough penetration of food. Increasing the frequency dramatically reduces the penetrating ability of the waves; thus, microwaves at 9.2 GHz are used for endometrial ablation procedures because they penetrate human tissue to only 6 mm.

To perform the procedure the cervix must first be dilated. A microwave applicator is inserted into the uterine cavity, and when the tip of the applicator reaches the fundus it is heated to approximately 75°C (optimal temperature 70-80°C). The temperature at the tip is displayed on a real-time computer throughout the procedure while microwave energy is transmitted into the endometrium. The applicator tip is slowly moved in a hemispherical pattern until the entire fundal area has reached the therapeutic temperature. It is then withdrawn gradually, continuing the side-to-side movement until the cervical os is reached.

Promise: Endometrial ablation with microwave energy is technically very simple, takes 3-5 minutes on average and can be done under local anesthesia. In a recent randomized study Bain and Parkin⁴ found that endometrial ablation with microwave energy was as effective as standard endometrial resection. The duration of treatment was significantly shorter for

microwave treatment than for endometrial resection, and patients required fewer analgesics. Preliminary studies have shown that the dysmenorrhea rate following endometrial ablation with microwave energy is markedly reduced;⁵ Hodgson and colleagues found the overall satisfaction rate to be 83.7% (36 of 43 women) 3 years after the procedure, and only 16.3% of the women required further surgery.⁵

Problems: Few problems with microwave endometrial ablation are anticipated. However, the possibility of complications, including infection and injury to internal organs, exists. As with other ablative techniques occasional hematometra may also be encountered.⁵ Although the medical equipment is currently expensive the procedure can be performed under local anesthesia and on many patients in a short period.

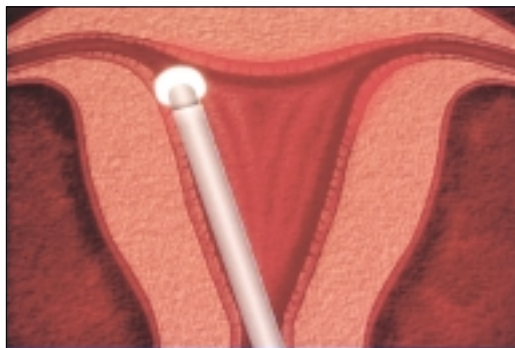
Prospects: In North America the device is currently being used in the Department of Obstetrics and Gynecology at McGill University, Montreal, Que. In the United Kingdom the procedure is routinely being done at the Royal United Hospital and Aberdeen Royal Infirmary. It is expected that, when endometrial ablation with microwave energy is more widely available, more gynecologists will choose to perform the procedure.

Competing interests: None declared.

References

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In this technique microwaves are radiated inside the uterine cavity in a hemispherical pattern from the tip of the applicator.