

# Radiofrequency Endometrial Ablation with Hysteroscopic Verification: Report of Four Cases Conducted in Brazil

## *Ablação Endometrial por Radiofrequência e Verificação Histeroscópica: Relato de 4 Casos Conduzidos no Brasil*

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### Abstract

Endometrial ablation (EA) is a minimally invasive surgical procedure to reduce abnormal uterine bleeding contemplated for women who have achieved their reproductive goals. EA consists of the destruction of the endometrial layer with preservation of the uterus, although EA has lower complication rates than hysterectomy, it may be associated with metrorrhagia recurrence. One of the major causes of treatment failure is incomplete ablation of the endometrium. Thanks to techniques that have been developed in recent years, endometrial ablation can be performed on an outpatient basis, including by radiofrequency ablation. The main objective of this case series was to report four cases in which Radiofrequency Endometrial Ablation (RFEA) was used to treat abnormal uterine bleeding at a single ambulatory surgical center in Brazil. Hysteroscopic evaluation of the uterine cavity was performed immediately prior to the RFEA to diagnose possible endometrial pathologies and again at the conclusion of the procedure to assess the aspect of the newly treated endometrium. Verification of the completeness of the ablation was assessed by a third hysteroscopy 30 or 60 days after the ablation. In this case series RFEA was efficacious and safe for outpatient use. Although radiofrequency endometrial ablation can be performed without the use of the hysteroscope, we believe it is an important tool for the timely verification of the completeness of the endometrial ablation.

**Keywords:** Endometrial Ablation Techniques. Radiofrequency Ablation. Hysteroscopy. Metrorrhagia

### Resumo

*A ablação endometrial (AE) é um procedimento cirúrgico minimamente invasivo destinado a mulheres com prole estabelecida visando redução do sangramento uterino anormal. A AE consiste na destruição da camada endometrial com a preservação do útero, apesar da AE possuir menores índices de complicação do que a histerectomia, pode estar associada a recorrência do sangramento. Uma das causas da falha de tratamento é a ablação incompleta do endométrio. Atualmente, a ablação endometrial pode ser realizada ambulatorialmente graças às técnicas que vêm sendo desenvolvidas nos últimos anos, as quais incluem o uso de radiofrequência. O objetivo dessa série de casos é descrever 4 casos de Ablação Endometrial por Radiofrequência (AERF) para o tratamento de sangramento uterino anormal realizados em um mesmo ambulatório especializado no Brasil. Uma avaliação histeroscópica da cavidade uterina foi realizada imediatamente antes da AERF para diagnosticar possíveis patologias endometriais e imediatamente ao final do procedimento, para avaliar o aspecto do endométrio recém tratado e a necessidade de nova aplicação de radiofrequência. A integralidade da ablação foi verificada por uma terceira histeroscopia após 30 ou 60 dias depois da ablação. A técnica mostrou-se adequada para uso ambulatorial. Embora a ablação endometrial por radiofrequência possa ser realizada sem o uso do histeroscópio, acreditamos que seja uma ferramenta importante para a verificação oportuna da integralidade da ablação endometrial.*

**Palavras-chave:** Técnicas de Ablação Endometrial. Ablação por Radiofrequência. Histeroscopia. Metrorragia

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## 1 Introduction

Abnormal uterine bleeding (AUB) is a very common complaint throughout the reproductive life of women. It can progress to anemia and significantly worsens quality of life. The first line of treatment is hormonal therapy, but hormonal therapy is not well tolerated by all patients<sup>1,2</sup>. Removal of the uterus (hysterectomy) is an effective and definitive surgical option for AUB. However, despite a reduction of up to 50% in the number of complications with the use of minimally invasive techniques, hysterectomy is still associated with increased risk of complications and a longer recovery time compared to conservative surgical techniques<sup>3,4</sup>.

Endometrial ablation (EA) is a minimally invasive

surgical procedure offered to women who have achieved their reproductive goals. EA seeks to reduce AUB by destroying the endometrial layer while preserving the uterine wall. The first-generation technique consisted of removing the endometrial layer by hysteroscopic resection of the endometrium using a surgical loop<sup>5</sup>. Thanks to technological advances in hysteroscopy equipment, EA can be safely performed in an outpatient setting without general anesthesia and has a fewer side effects than treatment with an intrauterine device (IUD) with levonorgestrel<sup>2,6,7</sup>. EA is not 100% effective and may require repetitions; patients with associated adenomyosis or prior tubal ligation were significantly more likely to have continued bleeding.<sup>8</sup>

New techniques for EA have been developed in recent years. These include the use of laser, microwave, thermo-balloon, cryo-ablation, hyperosmolar solution, and radiofrequency – the subject of this study. The aim of this case series is to describe our experience with four cases of radiofrequency endometrial ablation (RFEA) performed in Brazil, which incorporated evaluation of the uterine cavity by hysteroscopy immediately before and at the very end of the procedure. The uterine cavity lining was re-evaluated by hysteroscopy 30 to 60 days after the RFEA for verification of the completeness of the ablation.

## 2 Case Series

In this series, we present the cases of four women from the State of Minas Gerais (MG) who presented to the public healthcare system (*Sistema Único de Saúde*) with a complaint of abnormal uterine bleeding and were referred to the Gynecological Endoscopy Service of the Therezinha de Jesus Maternity Hospital in Juiz de Fora, MG between January 10

and March 13, 2020.

All patients signed an informed consent form specific to this procedure and which authorized data abstraction from their medical records for scientific study, provided that confidentiality is guaranteed. The updated Preferred Reporting of Case Series in Surgery (PROCESS) guidelines were followed to improve the quality of reporting.<sup>(9)</sup> The study was approved by the Research Ethics Committee (CEP/CONEP) Faculdade de Ciências Médicas de Juiz de Fora under CAEE Registry 40277320.6.0000.5103; decision number: 4.526.375.

In this case series, three patients were in menopause and not using hormonal contraception and one patient was postmenopausal. All four patients had a normal gynecological physical examination, but they presented abnormal findings on transvaginal ultrasound, which included endometrial thickening and the presence of endometrial polyps - findings later confirmed histopathologically with biopsies obtained during outpatient hysteroscopy. Individual patient characteristics are presented in Tables 1 and 2.

**Table 1 - Demographic Characteristics and comorbidities**

	Case I	Case II	Case III	Case IV
Age (years)	47	53	63	50
Weight (Kg)	69	75	68	103
Height (cm)	153	162	160	165
BMI (Kg/m <sup>2</sup> )	29.5	28.6	26.6	37.8
Birthplace (State)	Minas Gerais	Minas Gerais	Minas Gerais	Minas Gerais
Ethnicity (self declared)	White	Brown	White	Black
Profession	Saleswoman	Housekeeper	Retired	Cleaning lady
Schooling	Did not complete primary school	Did not complete primary school	Completed High School	Completed High School
Household Income*	2-4	<2	2-4	<2
<b>Social Habits</b>				
Alcohol Consumption	Weekly	Abstained for more than a year	Never	Less than once a week
Smoking	Never	Never	Never	Never
Comorbidities				
Hypertension	Yes	No	Yes	Yes
Diabetes Mellitus	Yes	No	No	No

\*Income: Total household income expressed in multiples of the monthly minimum wage

Source: the authors.

**Table 2 - Directed history and physical examination and prior uterine assessment evaluations**

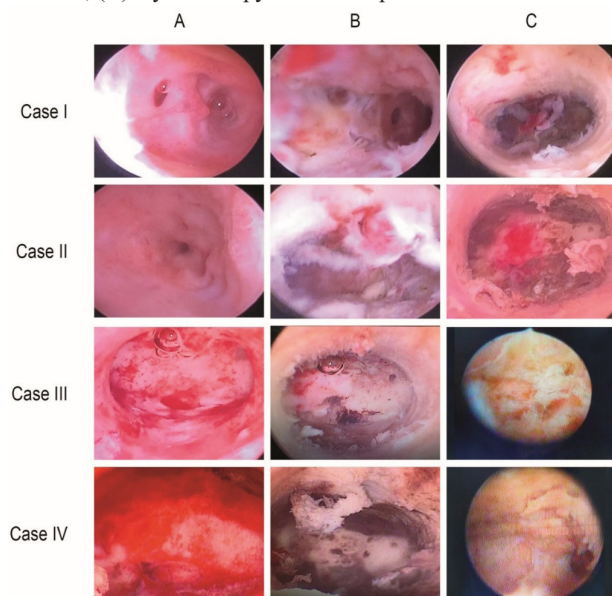
	Case I	Case II	Case III	Case IV
<b>Medications</b>				
Anti-hypertensives	Losartan + Hydrochlorothiazide	No	Losartan	Losartan + Hydrochlorothiazide
Hypoglycemics	Metformin	No	No	No
Oral Contraceptive Pill (OCP)	No	No	No	No
Platelet antiaggregants	No	No	No	No
<b>Obstetric-Gynecological History</b>				
Menarche (age in years)	15	12	14	11
Menopause	No	No	Yes	No
Gesta (n)	1	5	4	3
Para (n)	0	3	3	3
Abortion (n)	1	2	1	0
Cesarean deliveries (n)	0	1	3	3

	Case I	Case II	Case III	Case IV
Other prior surgeries	No	Unilateral Oophoroplasty	Tubal Ligation	No
Pelvic pain	No	No	No	Yes
<b>Hysteroscopic findings</b>				
Endometrial polyp observed during hysteroscopy	Yes	Yes	Yes	Yes
Fibroids observed during Hysteroscopy	No	No	No	No

Source: the authors

Hysteroscopic excisional biopsy (polypectomy) and endometrial ablation in the same surgical procedure were indicated as treatment for the AUB. The treatment protocol included intraoperative pelvic ultrasound monitoring to assess device placement and the integrity of the uterine wall, and a hysteroscopic review with clinical assessment of uterine bleeding after a period of 30 to 60 days (Figure 1).

**Figure 1** - Hysteroscopic images of the Uterine Cavity before and after radiofrequency endometrial ablation (RFEA). (A) Hysteroscopy pre-ablation, (B) Hysteroscopy immediately post-ablation, (C) Hysteroscopy at follow-up



Source: the authors

## 2.1 Anesthesia and analgesia

The anesthetic technique used was intravenous anesthesia (titrated with Propofol and Alfentanil) with oxygen support via face mask. There were no complications or side effects related to the anesthesia. Preemptive multimodal analgesia (at induction) was performed with Dipyron, Ketoprofen and N-butylscopolamine bromide. Based on a numerical analogue pain scale in which 0 = no pain and 10 = unbearable pain, the level of pain reported by patients one hour after the procedure was considered very good: maximum score = 1.

## 2.2 Surgical Technique

Hysteroscopic polypectomy was performed with Gubinni® resectoscope equipment, with a 16Fr bipolar loop. Next, the

RFEA was performed with the M-3004® radiofrequency generator (RF Medical Co., Seoul, South Korea) coupled to a specific endometrial device (EMT) with foot pedal and dispersion pad from the same manufacturer. Following the manufacturer's recommendations, the dispersive pad was placed on the anterior aspect of each of the patient's thighs.

The steps of the RFEA procedure are as follows: (1) progressive cervical dilation using Hegar's dilators up to size 5 (prepared in advance for use with the resectoscope); (2) measurement in centimeters of the length of the uterus and cervical canal using the actual EMT electrode; (3) insertion of the pelvic ultrasound-guided EMT electrode to verify proper intrauterine placement; (4) set the temperature to 85° Celsius and the duration on the radiofrequency generator at 1 minute and 30 seconds. Endometrial ablation was performed sequentially, on the two lateral sides and midline of the uterus, followed by immediate removal of the EMT electrode.

Right after the RFEA, the uterine cavity was again visually inspected by hysteroscopy as shown in Figure 1B. Thus, it was possible to confirm the integrity of the uterine walls and assess the effect of heat on the endometrium by direct vision, by inspecting the change in color and whether this occurred uniformly. With this hysteroscopic verification, in three cases we found homogeneous endometrial destruction. In one of them (Case II), however, we elected to repeat the RFEA, as the hysteroscopy performed immediately after the RFEA identified an "endometrial island" – suggestive of an area that had not been adequately treated by the initial radiofrequency treatment.

Considering the four cases, the maximum length of stay in the service from admission to discharge was 75 min; total time for polypectomy was less than 10 min; the total time to radiofrequency ablation was less than 10 min; the total time between entry to and exit from the operating room was less than 30 min. The estimated absorption of the 0.9% NaCl irrigation solution – known as intravasation – during the procedures was negligible (< 50mL).

The histopathological report of the surgical specimens of all four women were benign polyps. All four women underwent follow-up hysteroscopy. Timing was flexible: two chose to do it 30 days after the procedure and two scheduled the hysteroscopy 60 days after the procedure. All four patients reported improvement of the bleeding and denied other gynecological complaints (pain, discharge or pruritus). During

the follow-up hysteroscopy, no residual endometrial polyp was observed, and the endometrium was macroscopically atrophic, with a whitish color; no glandular structures were observed (Figure 1C).

All procedures were performed by a single gynecologist (CMAJr, responsible for the Hysteroscopy Service), who has more than 20 years of experience in surgical hysteroscopy for polypectomy and endometrial ablation.

### 2.3 Discussion

RFEA is a safe and effective method for the treatment of AUB in cases where the response to medical management has been unsatisfactory<sup>10</sup>. A double-blind randomized study carried out with 160 women in menacme with menorrhagia compared the treatment between two second-generation techniques: RFEA and hydrothermic ablation. RFEA proved to be more effective for the treatment of menorrhagia, but it has disadvantages, as it is performed without direct vision – i.e., without hysteroscopic vision – of the uterine cavity<sup>11</sup>.

In one prospective study involving 38 women in menacme, the use of specific equipment for endometrial ablation was demonstrated: the procedures used pelvic ultrasound as a safety method to monitor radiofrequency device placement and uterine integrity<sup>10</sup>.

In the present study, we similarly employed hysteroscopy – the gold standard for uterine cavity evaluation – at two points during the procedure – immediately before and immediately after RFEA – in order to be able to conduct a more detailed evaluation of the ablation result. This hysteroscopic verification enabled the surgeon to ensure the RFEA was thorough and re-ablate any areas of the endometrium that had been missed. Respecting the manufacturer's instructions for using the equipment, the surgical treatment of the four cases by RFEA was simple, quick and uneventful.

In three of the cases the appearance of the endometrium as seen hysteroscopically after RFEA was similar. In one case the RFEA needed to be repeated to achieve complete ablation of the endometrium. Good clinical outcomes – for both objective and subjective parameters – were observed at the 30 or 60 day follow-up assessments.

The technique is suitable for outpatient treatment and is an alternative to first-generation endometrial ablation (hysteroscopic resection). As a growing literature establishes the safety and efficacy of RFEA, its clinical application could be expanded, especially if the pricing of RFEA procedures can approximate the pricing of the first-generation techniques. We also believe that some gynecologists may want to perform RFEA in their offices, as procedure does not necessarily require the use of the hysteroscope, although hysteroscopic visualization confers additional safety and allows the gynecologist to assess the completeness of the endometrial ablation before concluding the procedure.

The goal of RFEA is eliminate or substantially reduce menstruation. The best time to perform RFEA is in the first

phase of the menstrual cycle, when the endometrium is thinner<sup>12</sup>.

Among the advantages suggested by these first four cases, we highlight (1) the practicality and simplicity of RFEA and that it is efficient and safe; (2) the absence of a requirement for an aseptic environment in the operating room; and (3) the possibility of being performed on an outpatient basis. Another positive point of RFEA is the possibility of partial ablation of the uterus, which allows one to decide on the extent of ablation in special circumstances. If AUB is caused by uterine fibroids, this condition will require specific treatment<sup>13</sup>.

The potential complications of RFEA are similar to those associated with hysteroscopic EA. These include laceration of the cervix, uterine injury, post-ablation tubal syndrome, cervical stenosis, infection and hematometra – probably secondary to occlusion of the endocervical canal at the cervical-uterine junction.<sup>(14,15)</sup> Hysteroscopic assessment before and after the procedure allows the gynecologist to assess the success of any of the second generation technique.

### 3 Conclusion

RFEA is a second-generation minimally invasive strategy suitable for outpatient treatment of abnormal uterine bleeding and is an alternative to first-generation endometrial ablation (hysteroscopic resection). Although not mandatory, the gynecologist should consider the potential risks of not performing hysteroscopic verification after RFEA to evaluate the completeness of the endometrial ablation.

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