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COMPARING THE EFFICACY AND ACCEPTABILITY OF NOVASURE ™ VERSUS CAVATERM™ PLUS IN DUB PATIENTS

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ABSTRACT

Objectives: To compare the clinical performance and acceptability of bipolar endometrial ablation (NovaSure TM) with thermal balloon endometrial ablation (Cavaterm TM plus) in management of Iranian women with dysfunctional Uterine Bleeding (DUB).

Methods: In this non randomized clinical trial, eighty women, ranging from 35 to 50 years old who had been afflicted with menorrhagia, secondary to DUB were investigated. They had been referred to the gynecology clinic of Arash Hospital in Tehran. They had been under treatment from March 2011 to March 2012. They underwent endometrial ablation via the NovaSure and Cavaterm™ *plus* technique and were followed up for 1 year. The outcomes of each method were compared with the other one considering the treatment results and complications. $P<0.05$ was considered to be statistically significant.

Results: 90% of patients in NovaSure group and 92.5% of patients in Cavaterm™ plus group reported improvement. Rate of amenorrhea, hypomenorrhea and eumenorrhea in the Cavaterm™ plus and Novasure™ groups after 12 months were 27.5% vs. 40%; 47.5% vs.

25%; and 17.5%vs. 25%, respectively. In total, 85.0% of women of each group were satisfied of their treatment. After 12 months, rate of failure for Cavaterm™ plus group was 10% and for Novasure™ group was 7.5%.

Conclusion: The Cavaterm™ and the Novasure™ techniques can significantly improve the menstrual status in Iranian women.

Keywords: Menorrhagia, Endometrial Ablation, Cavaterm™ *plus*, NovaSure™, Abnormal Uterine Bleeding

INTRODUCTION

Dysfunctional uterine bleeding (DUB) is irregular uterine bleeding that occurs in the absence of recognizable pelvic pathology, general medical disease, or pregnancy. The bleeding is unpredictable in many ways. It may cause menorrhagia and is a common problem in women of reproductive age. It has been estimated that 10 to 15 percent of women are afflicted with menorrhagia (6). It is also responsible for more than 1/3 of the annual hysterectomies (1, 2). Excessive menstrual bleeding is one of the major causes of morbidity in women affecting 1 in 5 women worldwide. It is also responsible for 21% of gynecology referrals (3). Menorrhagia is defined as blood loss of greater than 80 ml or lasting longer than 7 days. It is often seen among women who are older than 35 years of age (6). Most of current medical treatments are either ineffective or expensive (4, 5). In approximately 50% of patients no pathological cause is found and the diagnosis of dysfunctional uterine bleeding (DUB) is made (7).

Because of its serious impact on the quality of life, patients with menorrhagia require a proper treatment (6). The first line treatment of menorrhagia is usually medical. However, it is always satisfactory; it can be ineffective and thus not tolerated or refused by the patient. Alternative treatments such as dilation and curettage may be used, but as a definitive treatment it is not effective and has limited efficacy. For a long time, hysterectomy was the only choice for patient with menorrhagia in whom medical treatment had previously failed. However, hysterectomy is a major surgical procedure and is associated with high costs and has a high rate of morbidity and mortality (1). Severe complications rate of hysterectomy have been reported to be 3% (8).

Endometrial ablation was introduced in the 1980's as an alternative to hysterectomy for patients with abnormal uterine bleeding. It is a less invasive and aggressive approach and provides safe and effective treatment for women with menorrhagia (9- 11). Two

techniques for endometrial ablation have been described. First-generation techniques use hysteroscopic modalities and require a high qualification in therapeutically hysteroscopy. Second generation techniques (thermal balloons, microwaves, hot fluid circulation, monopolar electrical devices, laser devices, bipolar electrical devices, and cryosurgery) are significantly easier to perform and could be used in the outpatient or office setting, with no need to general anesthesia (1).

Thermal balloon endometrial ablation (TBEA) was the first technique of Global endometrial ablation which approved by the United States Food and Drug Administration (FDA) in December 1990 (6). Cavaterm was first described in 1993 (7). The first model consists of a balloon catheter that utilizes a combination of heat, pressure, and circulation to destroy the endometrium and the underlying myometrium to a depth of 9 mm. It was cost effective and did not need hospitalization. Its cure rate was estimated to be about 95% (12, 13).

Cavaterm plus is the new version, and differs from the older version in several important respects: first, the 6 mm diameter catheter of Cavaterm plus compared to the previous version (9 mm) obviates the need for cervical dilation in many cases. Secondly, its adjustable balloon length permits a greater range of uteri to be treated. Thirdly, a lower temperature and higher balloon pressure of Cavaterm plus has decreased the duration of treatment from 15 to 10 minutes in comparison with the first model (1, 14, 15).

NovaSure is another second-generation technique for endometrial ablation. It uses bipolar radiofrequency energy to ablate the endometrial line during 90 to 120 seconds (1). It is a safe and short procedure with less post-op pain and discomfort. Using Novasure, more than 90% of the patients are completely satisfied and high level of amenorrhea occurs (16).

This bipolar radiofrequency ablation method (RFA) was introduced in 2003 (6). We performed this study to compare the clinical performance and acceptability of bipolar endometrial ablation (NovaSure TM) and the new version of thermal balloon endometrial ablation (Cavaterm TM plus) for the management of menorrhagia due to DUB.

MATERIALS AND METHODS

In this nonrandomized clinical trial, 80 women with menorrhagia secondary to DUB were recruited. These patients had been referred to the gynecology clinic at Arash Hospital of Tehran, Iran during March 2011 and March 2012.

Inclusion criteria for this study were as follow: aged between 35 and 50 years, no

further fertility desired, failed or declined medical treatment, no desire for hysterectomy, normal endometrial biopsy, ability to answer the investigation questions. All the patients had to fill the informed consent form.

Exclusion criteria were consisted of: any kind of abnormal pathology in the uterine cavity (detected by ultra sonogram), active or chronic pelvic inflammatory disease at the time of the procedure, suspected genital or urinary tract infection, history of any kind of uterine surgeries (incision of uterine wall) except low transverse cesarean section, desire for pregnancy, concurrent open or laparoscopic surgery, endometrial hyperplasia or malignancy, hereditary malformations of the uterine cavity (T-shaped, unicornuate, septate), submucous fibroids and/or polyps that would significantly distort the uterine cavity, uterine cavity length equal or more than 12cm.

Baseline information including age, body mass index, parity, the pattern of bleeding, endometrial thickness, and endometrial disease, uterine length, uterine position, hemoglobin concentration and treatment history prior to surgery were obtained. All the participants were recruited to fill a questionnaire that contains the demographic and clinical information. All patients were asked to give their informed consent. Both therapeutic techniques (Cavaterm and NovaSure) were completely explained for them and they selected one of them based on the price or their desire. Tehran University of Medical Sciences Ethics Committee approved this study.

All women received Cavaterm or NovaSure, in two equal groups (40 patients in each group).

All ablation procedures were performed under general or local anesthesia via para-cervical block with intravenous sedation. Before performing the main procedure, diagnostic hysteroscopy were done with 5 mm diameter hysteroscopy to detect any possible pathology which did not determined previously. According to the use instructions of Cavaterm plus manufacturers, all patients underwent pre-procedure curettage in the operating room immediately before ablation.

Endometrial ablation was performed using the Cavaterm plus system according to the protocol provided by the manufacturer. The catheter was introduced into the uterine cavity and the balloon catheter was filled with 5% dextrose, inflated until intrauterine pressure stabilized between 230-240 mmHg. It was heated to 78°C for a period of 10 minutes.

NovaSure is a three-dimentional bipolar mesh. We performed endometrial ablation using the manufacturer's protocol. After 8

mm dilatation of cervix, we measured the size of uterine cavity, adjusted the NovaSure instrument and placed it in the uterus. The suction device was then turned on, in order to attach the instrument to the uterine walls. The bipolar radiofrequency energy was activated. Complete ablation of the endometrium was alarmed by the device. The complete ablation lasted 90 to 120 seconds.

All women received a 100 mg Diclofenac Sodium rectal suppository to reduce the post operation pain and discomfort (in the recovery room).

Twelve months after the operation, clinical outcomes were assessed. The criteria for this assessment were as follow: amenorrhea, menorrhagia, hypomenorrhea, spotting during the expected time of mense, patients' satisfaction and any complication after the procedure.

SPSS version 16 was used for statistical analysis. The data were analyzed by means of chi-square test, Student's t-test and Fisher's exact test. P<0.05 was considered to be statistically significant.

Results

Table 1 shows the demographic data and the menstrual pattern for the two groups of women in the study. Demographically, two groups were not significantly different.

Table 2 and 3 summarize effects of treatment with NovaSure and Cavaterm *plus* on the menstrual status and patients' satisfaction level after 1 year. The observed mean number of days of bleeding per month decreased significantly in both groups (P< 0.001).

Table 4 compares menstrual outcomes, patients' satisfaction and pelvic pain after 1 year between two groups.

Improvement of menorrhagia was reported in 90% of patients in NovaSure group and in 92.5% of patients in Cavaterm group, with no significant differences. Reported rates of amenorrhea was 40% in those who underwent NovaSure procedure and 27.5% in those who underwent Cavaterm procedure (*P*=0.23). The occurence rate of hypomenorrhea was 25% in NovaSure group and 47.5% in Cavaterm group (*P*=0.03) and the rate of eumenorrhea in NovaSure and Cavaterm was 25% and 17.5%, respectively (*P*=0.41). In general, there was no significant difference in menstrual changes except hypomenorrhea.

In addition, 10% of women in NovaSure group and 7.5% in Cavaterm group showed increased bleeding after the treatment (failure of treatment) (*P*=0.69). So, it seems that both methods have similar treating effect on DUB.

In addition, eighty five percent of participants of each group reached complete satisfaction after 12 months.

There was no significant difference between groups (*P*=0.791).

Comparing the occurrence rate of mild and moderate pelvic pain showed no significant difference between two groups (P= 0.13 for NovaSure group and 0.36 for Cavaterm plus group). However severe pain occurred with significantly higher incidence in Cavaterm group (P= 0.04).

Finally, we found no major complications among participants of this study.

DISCUSSION

Our study demonstrated that the safety and efficacy of endometrial ablation is similar in two second-generation techniques in patients with DUB. Each technique showed up to 90% of improvement in menstrual function.

In one study, Abbott et al. compared the NovaSure system with the Cavaterm in 2003; they reported that the overall "success" of the Cavaterm and NovaSure groups were 100% and 86%, respectively. The amenorrhea rate in NovaSure group was significantly greater than in the Cavaterm group (7). In our study, the amenorrhea rate in NovaSure group was greater than Cavaterm group but not significantly. This difference can be due to two reasons: first, in our study, the number of women who were recruited in each procedure was similar but the number of patients in NovaSure group in Abbott's study was twice as Cavaterm group. Secondly, we applied the new Cavaterm^{TM} *plus* system in our study.

Several published articles have reported a more efficacy of Cavaterm^{TM} *plus* system in comparison with its previous version (14, 15).

A study in 2005, evaluating a group of 128 women, reported that Cavaterm *plus* is less operator–dependent compared with previous version of Cavaterm and has a higher rate of satisfactory. In their study 78% of patients indicated overall satisfaction. Success rate of treatment was 83% (14).

We concluded in our study that the both methods (Cavaterm *plus* and NovaSure) had similar effects on the treatment of DUB. This result replicates other findings in the field.

A clinical trial in 2011 compared the NovaSure system with balloon ablation. The authors reported an amenorrhea rate of 21% with the balloon system, compared with 39% in the NovaSure group after 1 year, and the difference between two techniques was not statistically significant (17).

Another comparative study in 2008 reported that after a long term follow up (5 years), amenorrhea rate was 48% in those who had NovaSure and 32% in those who

had Cavaterm plus, with no significant difference (18).

In present study, hypomenorrhea rate in Cavaterm *plus* group was reported significantly higher than NovaSure group. This was similar to what Abbott's study found (7). Additionally, El-Toukhy et al (2004) investigated 220 patients who had underwent Cavaterm *plus* system, after one year follow-up. The amenorrhea and hypomenorrhea rates were reported to be 48% and 27%, respectively (15).

On the other hand, we found no major complications in our study; this was similar to other published data (6, 7). An investigation of over 10,000 cases has demonstrated the overall complication rate of 1.25%–4.58% for endometrial ablation and reported it as a safe procedure (19).

In this study the failure rate was estimated to be 10% for the NovaSure group and 7.5% for Cavaterm *plus* group. ln Abbott's study, the failure rate for the NovaSure group was reported to be 14% but there was no report for Cavaterm group. In the both Cavaterm and Novasure groups, there were no hysterectomies within the follow-up period (7). In other studies hysterectomy rate after Cavaterm ablation was reported 7% at 24 months and 15% at 49 months (16, 20).

Similar to other studies, our survey detected a high rate of improvement in dysmenorrhea (14, 17).

In present study, the pain experienced after endometrial ablation was significantly lower in the NovaSure group compared with the Cavaterm group. This replicated the findings of Abbott's and Laberg's study (7, 21).

According to our results, satisfaction rate for Cavaterm or NovaSure was 85% which was similar to other published data (7, 14).

CONCLUSION

Our findings demonstrate that second-generation techniques for endometrial ablation, either NovaSure or Cavaterm *plus,* can lead to a significant improvement in menstrual status. We also supported the idea that these techniques are a clinically effective alternative to hysterectomy in the treatment of menorrhagia secondary to dysfunctional uterine bleeding (DUB).

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DISCLOSURE

The authors had no conflict of interests related to the material in the manuscript.

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Table 1- Baseline patients characteristics in both Cavaterm and Novasure groups

Characteristic	Cavaterm Plus	Novasure	P Value
Age (yrs)	**43.2±5.46**	**41.3±4.18**	**0.084**
Body mass index (Kg/m2)	**29.2±7.0**	**30.1±7.3**	**0.57**
Parity (median)	**2 (2-5)**	**3(2-6)**	**0.71**
Previous cesarean delivery Number (%)	**16 (40.0)**	**12 (30.0)**	0.34
Tubal ligation Number (%)	**11 (27.5)**	9 **(22.5)**	**0.60**
Preoperative dysmenorrhea Number (%)	**13 (32.5)**	**16 (40.0)**	**0.48**
Mean uterine length (cm)	**9.2±1.2**	9.5**±1.39**	**0.30**
Mean hemoglobin (g/dl)	**12±1.7**	11.3**±1.58**	**0.06**
Mean endometrial thickness (mm)	**11.5**±5.66	**10.7±6.11**	**0.57**
Previous curettage Number (%)	**26 (65.0)**	**20 (50.0)**	**0.175**
Duration of menorrhagia (month)	**9.8±3.44**	**9.6±3.8**	**0.80**
History of medical treatment for menorrhagia Number (%)	**36 (90.0)**	**36 (90.0)**	**1**
Used pads per cycle Mean (lowest- highest)	**82 (10-200)**	**80 (10-150)**	**0.87**
Mean duration of bleeding per month (days)	**14.95±6.7**	**14.25± 6.35**	**0.63**
Clot discharge Number (%)	**33 (82.0)**	**34 (85.0)**	**0.76**

Table 2- Effects of treatment with Cavaterm plus after 12 months (n=40)

Variable	Before treatment	After treatment	P value
Days of bleeding per month	14.95**± 6.7**	**3.42± 3.04**	0.001
Used pads per cycle Mean (lowest- highest)	**82 (10-200)**	11.6 **(2-20)**	0.01
Intervals of bleeding (days)	**16.25± 5.50**	**21.30± 11.10**	0.01
Menstrual outcomes			
Amenorrhea Number (%)	**0 (0.0)**	**11(27.5)**	0.001
Hypomenorrhea Number (%)	**0 (0.0)**	1**9 (47.5)**	0.001

Eumenorrhea Number (%)	**0 (0.0)**	**7 (17.5)**	0.012
Menorrhagia Number (%)	**40 (100)**	**3 (7.5)**	**0.001**
Rate of satisfaction with treatment			
High satisfied Number (%)	**-**	28 **(70.0)**	
Moderate Satisfied Number (%)	**-**	**6 (15.0)**	
Relatively satisfied Number (%)	**-**	**6 (15.0)**	

Table 3- Effects of treatment with Novasure after 12 months (n=40)

Variable	Before treatment	After treatment	P value
Days of bleeding per month	14.25± **6.35**	**3.1± 2.6**	0.001
Used pads per cycle Mean (lowest- highest)	**82 (10-150)**	**12 (4-16)**	0.01
Intervals of bleeding (days)	**16.8± 6.3**	**20.7± 11.5**	0.01
Menstrual outcomes			
Amenorrhea Number (%)	**0 (0.0)**	**16 (40.0)**	0.001
Hypomenorrhea Number (%)	**0 (0.0)**	**10 (25.5)**	0.001
Eumenorrhea Number (%)	**0 (0.0)**	**10 (25.5)**	0.01
Menorrhagia Number (%)	**40 (100)**	**4 (10.0)**	0.001
Rate of satisfaction with treatment			
High satisfied Number (%)	**-**	**32 (80.0)**	
Moderate Satisfied Number (%)	**-**	**4 (10.0)**	
Relatively satisfied Number (%)	**-**	**4 (10.0)**	

Table 4- Comparison menstrual outcomes between two groups (Cavaterm and Novasure) after 12 months of treatment

Outcome	Cavaterm plus	NovaSure	P value
Amenorrhea Number (%)	**11(27.5)**	**16(40.0)**	**0.23**
Hypomenorrhea Number (%)	**19(47.5)**	**10(25.5)**	**0.03**
Eumenorrhea Number (%)	**7(17.5)**	**10(25.5)**	**0.41**
Menorrhagia Number (%)	**3(7.5)**	**4(10.0)**	**0.69**
Repeat surgery Number (%)	**0(0.0)**	**0(0.0)**	**1**
Rate of satisfaction			
High satisfied Number (%)	28 **(70.0)**	**32 (80.0)**	**0.79**
Pelvic Pain (VAS)			
Mild	**4 (10.0)**	**9 (22.5)**	**0.13**
Moderate	**15 (37.50)**	**19 (47.5)**	**0.36**
Severe	**21(52.5)**	**12 (30.0)**	**0.04**