Original Article

Ultrasound Uterine Evaluation: Pre and Post Endometrial Ablation in Cases of Refractory Uterine Bleeding

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ABSTRACT

Background: Endometrial ablation is an alternative minimal invasive method to avoid invasive surgery such as hysterectomy.
Aim of the Work: This Prospective study aimed Pre and post endometrial ablation ultrasound evaluation after endometrial ablation. 50 cases complained of bleeding not responding to medical treatment with no pathological or structural causes were selected for the procedure.
Methods: D&C was done, followed by insertion of Foley`s catheter into uterine cavity, 30cc of boiled saline were used to inflate its ballon, temperature was maintained by frequently changing saline by another boiling one. Patients were instructed to come for follow up at 3 and 8 months after procedure. Pre and post endometrial ablation Ultrasound evaluation was done.
Results: (70%) of patients had clinical improvement, whereas (30%) Still have persistent uterine bleeding following ablation. Hypomenorrhea was the most frequent menstural pattern (34%) , on other had amenorrhea occurred in 20% of cases. There were significant increases of uterine artery RI in all cases at 3 and 8 months follow up except in patients with eumenorrhea and those with persistent bleeding.
Conclusion: Significant reduction of endometrial thickness was reported in all patients except in those with Eumenorrhea and persistent post ablation menorrhagia. A significant reduction in uterine volume was reported after 3 and 8 months in cases with post operative amenorrhea and hypomenorrhea. There were significant increases of uterine artery pulsitility index in all cases except 3 month post-operatively in patients with eumenorrhea and those with persistent menorrhagia where the changes were not significant.

Key Words: Ballon thermal ablation, endometrial ablation, uterine Doppler.

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INTRODUCTION

Endometrial ablative techniques aimed at destruction of functionally active endometrium along with some of underlying myometrium. First generation endometrial ablative methods and are, they all require direct visualization by hysteroscopy[1].

The cost and availability of these surgical instruments limit their universal usage and cause patients to opt in favor of more morbid and costly procedures, like hysterectomy. Therefore, several non-hysteroscopic techniques, i.e. second-generation techniques, have recently been introduced with the aim of providing simpler, quicker and safer procedures[1]. Furthermore, they do not require general anesthesia and can be performed in outpatient settings[2].

Second generation ablative techniques represent simpler, quicker and potentially more efficient means of treating menorrhagia, which require less skill on the part of operator. Examples of second generation are fluid filled thermal ballon endometrial ablation (TBEA), radiofrequency (thermoregulated) ballon endometrial ablation, hydrothermal endometrial ablation, bipolar radiofrequency endometrial ablation, microwave endometrial ablation, diode laser hyperthermy, cryoablation and photodynamic therapy[3].

Second-generation techniques are likely to be more cost-effective than first-generation techniques in most cases with heavy menstrual bleeding and hysterectomy continues to be a very cost-effective procedure compared to all endometrial ablation methods[4].

Thermal Balloon Endometrial Ablation (TBEA) is one of the alternatives. TBEA is a minimally invasive non-hysteroscopic technique, which combines heat and pressure within the uterine cavity to destroy endometrium and part of the myometrium. A flexible balloon attached to a catheter is placed into the uterus. The balloon is then inflated up to 160-180 mm Hg with a sterile fluid, which is heated up to 87°C and is maintained in the cavity for 8 min[2].

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The effect of TBEA therapy must be reflected through changes in endometrium and myometrium which may be detected by ultrasound and Doppler[5]. Studies proved different ultrasound changes which are considered a normal finding after radiofrequency ablation, but they did not correlate these changes to clinical outcomes[6].

AIM OF THIS WORK

Ultrasound evaluation Pre and post endometrial ablation in relation to endometrial ablation outcome.

METHODS

This Prospective study included 50 patients with refractory vaginal bleeding. All patient were treated with application of hot intrauterine Foley`s catheter ballon, Ultrasound evaluation was done Pre and post endometrial ablation

Inclusion criteria

Women with refractory refractory vaginal bleeding Completed her family, no evidence of general or local causes for bleeding problems.

Exclusion criteria

Uterine bleeding is caused by general or local uterine pathology.

All patients were subjected to the following:

- History taking and examination
- Routine laboratory investigation.
- Transvaginal ultrasound and Doppler examination: to exclude any local pathology in uterus, measurement of endometrial thickness and uterine volume and uterine artery Doppler indices
- Uterine Curretage and endometrial ablation:
- Formal uterine curettage to: Reduce the endometrial thickness to allow thermal destruction of the endometrial basal layer responsible for endometrial regeneration.

Thermal ballon ablation

1. Prophylactic antibiotic and analgesic were given at the start of the procedure
2. Foley's catheter (No.18) was prepared for use. The balloon of catheter was inflated with 9 cc of normal saline and then the tip was cut above the level of inflated balloon.
3. Foley's catheter was then ,inserted to fundus with the help of uterine packing forceps.
4. Then the balloon was inflated with boiling normal saline through a syringe. The inflation was continued till some resistance was felt. The hot saline was left in situ for 3-5 minutes, this was repeated till 9-15 minutes.
5. At the end of procedure, the ballon was deflated and catheter was withdrown.

follow up

All patient were advised to come for follow up at 3 and 8 month following the procedure, In each follow up visit, patients were enquired about: Post ablation menstural pattern changes .TVS for measurement of endometrial thickness and uterine volume and Doppler of uterine arteries were done:

All data were analyzed using SPSS 25.0 for windows (SPSS Inc., Chicago, IL, USA)

RESULTS

This study clinical interventional study 50 women in child bearing peroid with complaint of dysfunction uterine bleeding were enrolled in it . Patient characteristics are shown in (Table 1) mean age was 39.48±3.32 year old, Pariety was 2.19± 2.9, BMI 29.1± 5.92 and Duration of bleeding 8.2± 2.06 months. Mean Endometrial thickness(ml) was 7.83±1.23, uterine volume (cm^3) 102.15±30.21 , Uterine artery PI and RI were 1.27±.14 and 0.63 ± 0.11 respectively (Table 2). (70%) of patients had clinical improvement, whereas (30%) Still have persistent uterine bleeding following ablation. Hypomenorrhea was the most frequent menstural pattern (34%), on other hand amenorrhea occurred in 20% of cases (Table 3). There were significant increases of uterine artery RI in all cases at 3 and 8 months follow up except in patients with eumenorrhea and those with persistent bleeding. PI were more pronounce with amenorrhea and Hypomenorrhea at 3 and 8months. significant reduction of endometrial thickness was reported in all patients except in those with Eumenorrhea and persistent post ablation bleeding. significant reduction in uterine volume was reported at 3 and 8 months follow up in cases with post operative amenorrhea and hypomenorrhea (Tables 4,5,6,7).

Table 1: Demographic and clinical characteristics of the studied population

Age in years (mean±SD)	39.48±3.32
Pariety (mean±SD)	2.19± 2.9
BM I(mean±SD)	29.1± 5.92
Duration of bleeding in month (mean±SD)	8.2± 2.06

Table 2: Ultrasonographic findings before ablation

Variable	Ultrasonographic findings (mean±SD)
Endometrial thickness(ml)	7.83±1.23
uterine volume (cm^3)	102.15±30.21
Uterine artery PI	1.27±.14
Uterine artery RI	0.63 ± 0.11

Table 3: Post ablation menstural pattern after the procedure

Outcome	Number of cases	Percentage
Amenorrhea	10	20%
Hypomenorrhea	17	34%
Eumenorrhea	8	16%
No improvement	15	30%

Table 4: ultrasonographic findings after 3 months from procedure ablation

Variable	Ultrasonographic findings (mean±SD)
Endometrial thickness (ml)	5.83±1.23
uterine volume (cm^3)	92.15±30.21
Uterine artery PI	1.37±.14
Uterine artery RI	0.63 ± 0.11

Table 5: Ultrasonographic findings after endometrial ablation in relation to outcome results after 3 months from procedure

Outcome results	Amenorrhea	Hypomenorrhea	Eumenorrhea	No improvement	*P value*
Endometrial thickness(ml)	4.81±.94	4.62±1.39	4.95±1.58	6.18±1.93	0.014*
Uterine volume (cm3)	90.87±17.23	91.21±28.71	97.41±12.2	102.54±29.2	0.017*
Uterine artery PI	1.47±.14	1.38±.14	1.51±.14	1.33±.13	0.04*
Uterine artery RI	0.67 ± 0.11	0.65 ± 0.11	0.64 ± 0.17	0.63 ± 0.11	0.03*

Table 6: Ultrasonographic findings after 8 months from procedure ablation

Variable	Ultrasonographic findings (mean±SD)
Endometrial thickness(ml)	4.83±1.23
uterine volume (cm3)	82.15±30.21
Uterine artery PI	1.57±.14
Uterine artery RI	0.68 ± 0.11

Table 7: Ultrasonographic findings after endometrial ablation in relation to outcome results after 8 months from procedure

Outcome results	Amenorrhea	Hypomenorrhea	Eumenorrhea	No improvement	*P value*
Endometrial thickness (ml)	3.81±.94	3.62±1.39	3.95±1.58	6.18±1.93	0.015*
uterine volume (cm3)	82.87±17.23	87.21±28.71	88.41±12.2	100.54±19.2	0.016*
Uterine artery PI	1.55±.14	1.51±.14	1.45±.14	1.35±.13	0.01*
Uterine artery RI	0.69 ± 0.11	0.68 ± 0.11	0.64 ± 0.17	0.63 ± 0.11	0.03*

DISCUSSION

Endometrial thermal ablation could be one of the easiest, safest and most promising alternatives to the conventional management of the problem of menorrhagia in the era of minimal access surgery[7]. In this study , we have made the use of Foley's catheter ballon in conducting thermal endometrial ablation in patients with refractory bleeding. During ballon endometrial ablation, heating energy results in coagulation of the endometrium and desiccation of the superficial myometrium. This process creates mechanical and histological changes in the uterine cavity . In this study, we sought to evaluate the normal sonographic changes in patients who have undergone thermal ballon endometrial ablation (TBEA) and assess the relationship of these ultrasound parameters and outcome results.

Clinical outcomes after ablation revealed 70) of patients had clinical improvement, whereas (30%) Still have persistent uterine bleeding following ablation. Hypomenorrhea was the most frequent menstural pattern (34%), on other hand amenorrhea occurred in 20% of cases which is comparable to results of study conducted by other investigators[8], who studied foley`s catheter ablation effect on 430 patients and had succes rate (84.5%). Another study conducted on 48 cases, revealed improvement in 79% of patients[2].

Most frequent outcome result in this study was hypomenorrhea (35.7%), which go hand to hand with Helal *et al*., (2020) who had Hypomenorrhea (41.6%), but against Abd El Hameed, 2012 who had hypomenorrea less frequent (25%)[7,8].

In this study 30% of patients didn't have any mprovement of bleeding, this failure rate go on line with other authers who used thermal ablation by foley`s catheter as a conservative treatment for heavy menstural bleeding in 53 patients, and 30% did not improve at all[9].

Careful scrutiny to uterine artery Doppler blood flow changes in this study revealed that Only amenorhea and hypomenorrhea groups showed significant changes in pulsatility index early this agree with Ja¨rvela¨ *et al*., 2002, who compared Doppler changes after thermal ballon ablation and gestagen therapy in 27 patients[10].

This study is in agreement with Abdelazim And Belal (2013) who followed up 82 patient for 3 years to assess Doppler changes after ablation therapy. Doppler changes in this study may be attributed to early inflammatory reaction and tissue oedema[11].

The study also does not agree with the study of (Kužel *et al*., 2008); who followed 29 patients after thermal ablationup to one year , he assured that measuring the (PI, RI) before, one and six month after ablation can not predict the outcome, and he denied any Doppler changes before 1year[12].

In this study; significant reduction of endometrial thickness was reported in all patients except in those with persistent postablation menorrhagia, these significant changes persisted at six month follow up , these results go hand to hand with[12], who stated that:Only the thickness of endometrium one monthafter ablation is a significantly predictive variable for improvement.Also this study is consistent with (El-Nashar *et al*., 2009) who stated that endometrial thickness less than 4mm after one month can peredict cessation of menorrhagia[13] .

Uterine volume showed significant reduction after 8 month in amenorrhea and hypomenorrhea groups, these changes attributed uterine fibrosis and contracture, these finding was suggested by Ja¨rvela¨ *et al*.,(2002). also changes in uterine size and contracture were proved in different studies but through hysteroscopic evaluation of uterus as Luo *et al*., (2010) who proved uterine scaring and contracturein series of 53 patients who underwent microwave endometrial ablation[10,14].

CONCLUSION

Significant reduction of endometrial thickness was reported in all patients except in those with persistent post ablation menorrhagia. Significant reduction in uterine volume was reported after 8 months in cases with post operative amenorrhea and hypomenorrhea. There were significant increases of uterine artery pulsitility index in all casess except 3 month post-operatively in patients with eumenorrhea and those with persistent menorrhagia where the changes werenot significant. Changes of PI were more pronounce after 8 months compared to 3 month postoperative scores.so we can use ultrasound to counsel the women about the efficacy of endometrial ablation done to her.

CONFLICT OF INTERESTS

There are no conflicts of interest.

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