Original Article

Assessment of the efficacy of uterine artery Doppler in predicting the response to Mefenamic acid during treatment of women having IUCD associated menorrhagia

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ABSTRACT

Background: Bleeding with IUCDs is considered iatrogenic dysfunctional uterine bleeding. The bleeding associated with IUCD use may either occur during menstruation (heavy and/or prolonged) or in the form of intermenstrual bleeding and spotting.

Patients and Methods:This study was carried out on 156 women attended the family planning out-patient clinic in the Obstetrics and Gynecology Department, Ain-Shams University Hospitals, during the period from May 2017 to May 2018. Patients were divided according to the response to treatment into two groups: Group (I): Responders to treatment with Mefenamic acid and Group (II): Non-responders to treatment with Mefenamic acid. Response to treatment was evaluated according to: Pictorial blood loss assessment chart.

Results: Interpretation of the results of this work showed that uterine artery mean value of the PI of the women who responded to treatment with Mefenamic acid (group I) (1.54±0.42) were significantly higher than mean value of PI of women who didn't respond to treatment with Mefenamic acid (group II) (0.96±0.28), also showed that uterine artery mean value of the RI of the who responded to treatment with Mefenamic acid (group I) (1.01±0.25) were significantly higher than mean values of RI of women who didn't respond to treatment with Mefenamic acid (group II) (0.71±0.21). Doppler indices showed that pulsatility index ≥ 1.27 had moderate sensitivity (75.3%) and NPV (75.3%) but high specificity (90.1%) and PPV (90.1%) in prediction of responders. Resistive index ≥ 0.93 had low sensitivity (69.4%) and NPV (70.8%) but moderate specificity (88.7%) and PPV (88.1%) in prediction of responders.

Conclusion:There is a strong relationship between uterine artery Doppler indices and prediction of response to Mefenamic acid.

Key Words: Mefenamic acid, menorrhagia, IUCD, treatment, uterine artery Doppler

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INTRODUCTION

A normal menstrual cycle is 21-35 days in duration, with bleeding lasting on average for 5 days and a total blood loss of 25-80 ml. Menorrhagia is defined as having menstrual period with longer duration or excessively heavy flow (total menstrual flow >80ml per cycle, or soaking a pad/tampon every 2 hours or less)[1].

An intrauterine contraceptive device (IUCD) is one of the most frequently used methods for birth control around the world. However, menorrhagia is one of its side effects. Menorrhagia may cause iron deficiency anemia and usually ends by removing the IUCD in the first year after its insertion in many cases[2].

Although the intrauterine contraceptive device (IUCD) has been used for more than 30 years, its mode of action as a contraceptive still remains poorly defined. It is currently believed that it acts by prevention of fertilization through a sterile inflammatory reaction produces tissue injury that is spermicidal. In copper IUCD users; the copper concentration in cervical mucus is substantial and that leads to inhibition of sperm motility. Because copper ions also result in significant endometrial changes, sperm migration, quality and viability at the level of endometrium is hindered[3].

There are several mechanisms that explain the cause of excessive bleeding in patients using IUCD. Several studies reported that IUCD insertion increase the production of prostaglandins in the endometrium which cause an increase in vascularity, vascular permeability, and inhibit platelet activity and therefore increase menstrual bleeding[2].

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Studies have reported that IUCD causes COX-2 (cyclooxygenase isoenzyme 2) up-expression, the subsequent elevated prostanoids biosynthesis and signaling can promote the expression of pro-angiogenic factors, such as VEGF (vascular endothelial growth factor), bFGF (basic fibroblast growth factor), PDGF (platelet-derived growth factor), Ang-1 (angiopoietin-1), and Ang-2 (angiopoietin-2) or down-regulate the expression of anti-angiogenic genes such as cathepsin-D[4].

The resulting exaggerated inflammation within the endometrium may lead to increased and prolonged tissue damage at the time of menstruation. Therefore, limitation of the production of inflammatory mediators is helpful in the treatment of women with heavy menstrual bleeding[5].

The Cochrane Review states that non-steroidal anti-inflammatory drugs (NSAIDs) are the most effective treatment to reduce the bleeding with IUCD use. They are prostaglandin synthetase inhibitors acting by decreasing production of endometrial prostaglandins; thus can enhance both uterine bleeding and pain[6].

NSAIDs exert their anti-inflammatory effect through inhibition of cyclooxygenase, which is the enzyme that catalyzes the transformation of arachidonic acid to prostaglandins and thromboxanes. Mefenamic acid is the most commonly used NSAID for treatment of heavy menstrual bleeding and results in a reported blood loss reduction of 25-50%. However, other NSAIDs show similar efficacy to the more commonly prescribed Mefenamic acid[5]. In addition, there is also a recent systematic review reported that NSAIDs are the first line used for treatment of menorrhagia and dysmenorrhea associated with Cu-IUCD[7].

However, many women responded well to NSAIDs and showed high acceptability and satisfaction. On the other hand, a group of women may not respond to this line of treatment and obligated to shift to other treatment line or have IUCD removal[6].

For this reason, the prediction of the responsiveness to these drugs in controlling menorrhagia associated with Cu-IUCDs is challenging issue which should be addressed. The present study examined the hypothesis that usage of uterine artery power Doppler before starting Mefenamic acid can help in prediction of the responsiveness for this treatment at one month. To our knowledge, no clinical trial had been registered or conducted to study the potential predictors of responsiveness for Mefenamic acid in controlling the uterine bleeding with Cu-IUCDs.

AIM OF THE WORK

The aim of this work is to use the uterine artery Doppler for prediction of response to Mefenamic acid as a treatment in women having IUCD-associated menorrhagia.

PATIENTS AND METHODS

This study was a single arm clinical trial that was conducted on a total of 156 patients presented with IUCD (copper T 380A)-associated menorrhagia selected from the family planning clinic at Ain shams University Hospital after approval from Ain-Shams University Hospital Ethics of Committee for Human Research during the period started from May 2017 to May 2018. All enrolled women provided informed consent for participation in this research studying the potential benefit from Mefenamic acid on IUCD-related menorrhagia. At the end of the study, Patients who complained of IUCD (copper T 380A) (Pregna) associated menorrhagia were treated with Mefenamic acid (Ponstan-forte 500mg Pfizer®) tablets three times daily for one cycle. After the end of the cycle, Response was assessed according to Pictorial blood loss assessment chart where responders scores were ≤ 150 and non-responders scores were >150.

Thereafter, patients were divided according to the response to treatment into two groups: Group (I): Responders to treatment with Mefenamic acid. Group (II): Non-responders to treatment with Mefenamic acid. Diagnosis of menorrhagia was done according to Pictorial blood loss assessment chart where patients with normal menstrual bleeding scores were ≤ 150 and patients with heavy menstrual bleeding scores were › 150. Response to treatment was evaluated according to Pictorial blood loss assessment chart where responders scores were ≤ 150 and non-responders scores were >150. All women in the study used the same pads 'Always Ultra®' to avoid misinterpretation of heavy menstrual bleeding and to unify the absorptive ability of the pad.

The study included women in child bearing period (age 20-35 years) with history of regular menstrual cycles, presented with recent onset of ≥ 3 months menorrhagia after IUCD (copper T 380A) (Pregna) insertion. Menorrhagia was defined as soaking through one or more sanitary pads or tampons every 2 hours or less for several consecutive hours, or having periods that last longer than seven days or longer than a usual menstrual period and it was assessed using pictorial blood loss assessment chart.

While patients with history of bleeding tendency, history of abnormal uterine bleeding due to other causes, history of active liver disease, history of antiplatelet or anticoagulant intake in the last month (e.g. aspirin), history of thyroid disease, women having contraindication to use NSAIDs e.g. peptic ulcer or kidney disease, history of endometritis, history of allergy to NASIDs or Adenomyosis were excluded from the study.

Study Interventions:

Women attending to family planning clinic at Ain-Shams University Hospital were subjected to the following steps: full medical history, general clinical examination,

local Per-Vaginal (PV) examination, conventional pelvic U/S for all patients for volumetric study of uterus, transvaginal Doppler ultrasound for all patients before starting medication and patients were treated with Mefenamic acid (Ponstan-forte500 mg Pfizer®) tablets three times daily for one cycle.

According to their response to medication, patients were divided into 2 groups: Group (I): Responders to treatment with Mefenamic acid and group (II): Non-responders to treatment with Mefenamic acid.

Diagnosis of menorrhagia was done according to pictorial blood loss assessment chart where patients with normal menstrual bleeding scores were ≤ 150 and patients with heavy menstrual bleeding scores were > 150. Response to treatment was evaluated according to pictorial blood loss assessment chart where responders scores were ≤ 150 and non-responders scores were > 150.8. The results obtained from Doppler indices from both groups were compared.

Color Doppler blood flow assessment:

Timing of ultrasound scanning and Doppler evaluation: Assessments of the uterine arteries were performed in the same sitting before starting medication during the early menstrual days (early proliferative).

Technique of transvaginal ultrasound and Doppler examination: The women were instructed to empty the urinary bladder before examination. The women were asked to lie in the dorsal lithotomy position. Condoms were used to cover the vaginal probe with K-Y gel inside and outside the condoms. The probe was advanced into the vagina till the posterior fornix. The uterus and ovaries were first visualized using conventional B mode ultrasound to rule out any pathology. The probe was turned 90 degrees at the level of cervix to bring its transverse section and the flow velocity wave forms of the main uterine artery were obtained on right or left side at the level of the inner cervical or just beside the cervix. When three systolic peaks of equal heights were visualized, the image was frozen on display screen and sonographic printout is taken for further analysis. Doppler indices of the main uterine artery were measured and the mean was obtained.

Equipment:

Color Doppler assessments is performed using the same equipment of 7.5 MHz electronic frequency vaginal probe (GE LOGIQ P3) (3- to 9-MHz) transvaginal 3D probe between 8 and 11 AM to avoid inter-ultrasound transducer, inter-cyclic variation, and circadian rhythm effects on the results.

The Doppler indices, which were used are the pulsatility index (PI; A-B/mean) and the resistance index (RI; A-B/A), in which A was the maximum (systolic) Doppler frequency shift; B was the minimum (diastolic) Doppler frequency shift; and the mean represented the average Doppler frequency shift. Three waveforms were studied for the uterine artery.

RESULTS

Out of 156 patients examined, 85 patients were responders to treatment and scored ≤150 using PBAC score; while 71 patients were non-responders and scored >150 using PBAC score.

The study showed no statistical significant difference between responders and non-responders to treatment as regards age, BMI, parity, cesarean section, duration (*p value*=0.412, 0.618, 0.366, 0.719, 0.614, consecutively). Pulsatility index and resistive index were statistically significantly higher among responders than among non-responders (*p values <0.001*) (Table 1).

The study showed that PBAC statistically significantly decreased after treatment ; in which Mean ± SD before treatment = 201.9 ± 20.1, Mean ± SD after treatment =144.2 ± 36.1, reduction Mean ± SD = 57.7 ± 34.4 (*p value <0.001)* (Table 2).

As shown in Table 3, age, BMI, parity, cesarean section, duration and PBAC had no statistical significant diagnostic performance in prediction of responders (*p values* = 0.622, 0.655, 0.494, 0.523,0.550, consecutively). Only pulsatility index and resistive index had statistically significant moderate diagnostic performance in prediction of responders; higher in pulsatility index than in resistive index. (*p values <0.001*).

The results showed that pulsatility index ≥1.27 had moderate statistical sensitivity (75.3%) and NPV (75.3%), but high specificity (90.1%) and PPV (90.1%) in predictability of responders. Resistive index ≥ 0.93 had low statistical sensitivity (69.4%) and NPV (70.8%) but moderate specificity (88.7%) and PPV (88.1%) in predictability of responders (Table 4).

The results showed that age, BMI, parity, cesarean section, duration, PBAC had no statistical significant effects on being responders (*p values* =0.229, 0.282, 0.166, 0.255, 0.227, 0.245, consecutively). Only pulsatility index and resistive index had statistical significant effects on being responders (*p values* <0.001, 0.002, consecutively); their rise increases the possibility of being responders (Table 5).

Table 1 : Comparison between responders and non-responders to treatment regarding basal characteristics

Variables	Responder (N=85)	Non-responder (N=71)	^*P*
Age (years)	27.7±3.3	27.3±2.8	0.412
BMI (kg/m2)	24.2±2.0	24.3±1.9	0.618
Parity	2.4±1.1	2.3±0.9	0.366
Cesarean section	2.0±1.2	2.0±1.3	0.719
Duration of menorrhagia (months)	6.0±1.5	5.9±1.4	0.614
Pulsatility index	1.54±0.42	0.96±0.28	<0.001*
Resistive index	1.01±0.25	0.71±0.21	<0.001*

Significant values are indicated with * for $p<0.05$

Table 2: Pictorial blood loss assessment chart (PBAC) before and after treatment in studied cases

Time	Mean±SD	Range	*P*
Before	201.9±20.1	153.0–252.0	
After	144.2±36.1	73.0–204.0	<0.001*
Reduction	57.7±34.4	2.0–105.0	

Significant values are indicated with * for $p<0.05$

Table 3: Diagnostic performance of basal characteristics in prediction of responders

Variables	AUC	SE	*P*	95% CI	Cut off
Age	0.523	0.046	0.622	0.432–0.614	--
BMI	0.521	0.047	0.655	0.388–0.571	--
Parity	0.532	0.046	0.494	0.441–0.622	--
Cesarean section	0.530	0.047	0.523	0.438–0.622	--
Duration of menorrhagia (months)	0.509	0.046	0.855	0.417–0.600	--
Pulsatility index	0.882	0.028	<0.001*	0.827–0.936	≥1.27
Resistive index	0.835	0.033	<0.001*	0.771–0.899	≥0.93
PBAC	0.528	0.048	0.550	0.435–0.621	--

Significant values are indicated with * for $p<0.05$

Table 4: Diagnostic characteristics of pulsatility index ≥1.27 and resistive index ≥0.92 in prediction of responders

Characters	Pulsatility index ≥1.27		Resistive index ≥0.93	
	Value	95% CI	Value	95% CI
Sensitivity	75.3%	64.7%–84.0%	69.4%	58.5%–79.0%
Specificity	90.1%	80.7%–95.9%	88.7%	79.0%–95.0%
DA	82.1%	75.1%–87.7%	78.2%	70.9%–84.4%
Youden's index	65.4%	53.9%–76.9%	58.1%	45.9%–70.4%
PPV	90.1%	80.7%–95.9%	88.1%	77.8%–94.7%
NPV	75.3%	64.7%–84.0%	70.8%	60.2%–79.9%
LR+	7.64	3.74–15.59	6.16	3.16–12.01
LR-	0.27	0.19–0.40	0.34	0.25–0.48
LR	27.86	11.07–70.12	17.87	7.50–42.58

Table 5: Logistic regression for basal characteristics for their effect on being responder

Variables	β	SE	P	OR (95% CI)
Age	0.01	0.01	0.229	1.01 (1.00–1.02)
BMI	0.01	0.01	0.282	1.01 (0.99–1.02)
Parity	0.09	0.06	0.166	1.09 (0.96–1.23)
Cesarean section	0.08	0.07	0.255	1.08 (0.95–1.24)
Duration of menorrhagia (months)	0.03	0.03	0.227	1.03 (0.98–1.09)
Pulsatility index	0.46	0.13	<0.001*	1.58 (1.23–2.02)
Resistive index	0.26	0.08	0.002*	1.29 (1.10–1.52)
PBAC	0.01	0.01	0.245	1.01 (0.99–1.02)

DISCUSSION

The chiefly used intrauterine contraceptive device side effect is heavy uterine bleeding. The menstrual blood volume is usually doubled after intrauterine contraceptive device insertion and could be severe to the extent to cause iron deficiency anemia[8].

This is considered a crucial issue particularly in countries where IUCD are extensively used. Various molecular and cellular level pathophysiological pathways cause excessive pattern of bleeding in cases using IUCD. Various research studies mentioned that IUCD insertion raises the productivity levels of prostaglandins within the endometrial lining causing raised vascularity, increased vascular permeability, and suppress platelet activity levels consecutively causing increased menstrual volume[4,9].

According to close linkage of raised vascularity issues in those category of cases uterine artery Doppler indices (RI), (PI) are broadly investigated by various research groups particularly in response to hemostatic medications implemented to reduce menstrual blood loss to reveal and observe the uterine hemodynamic changes in cases with IUCD induced bleeding and response levels to used medications which is considered a useful imaging tool to asses, manage and evaluate those cases[10,11].

The current study results demographic characteristics of the responders of the studied cases in which mean age +/- SD of age (years), BMI (Kg/m2), parity, cesarean section, duration of menorrhagia =27.7 ± 3.3 years, 24.2 ± 2.0 kg/m2, 2.4 ± 1.1, 2.0 ± 1.2, 6.0 ± 1.5 months, consecutively. Basal characteristics of the responders of studied cases were PI Mean ± SD =1.54 ± 0.42, RI Mean ± SD =1.01 ± 0.25.

The current study results demographic characteristics of the non-responders of the studied cases in which mean age +/- SD of age (years), BMI (Kg/m2), parity, cesarean section, duration of menorrhagia = 27.3 ± 2.8 years, 24.3 ± 1.9 kg/m2, 2.3 ± 0.9, 2.0 ± 1.3, 5.9 ± 1.4 months, consecutively. Basal characteristics of the non-responders of studied cases were PI Mean ± SD =0.96 ± 0.28, RI Mean ± SD =0.71 ± 0.21.

Furthermore, the current study findings have shown that PBAC scoring system statistically significantly decreased after treatment. In which Mean ± SD before treatment = 201.9 ± 20.1 cc, Mean ± SD after treatment = 144.2 ± 36.1 cc, reduction Mean ± SD = 57.7 ± 34.4 cc (*p value <0.001*). More than half of the studied cases were responders to treatment in which responders represented 54.5% of cases (n=85), non-responders =45.5% of cases (n=71). No statistical significant difference between responders and non-responders to treatment as regards age, BMI, parity, cesarean section, duration (*p value*=0.412, 0.618, 0.366, 0.719, 0.614, consecutively). Pulsatility index and resistive index were statistically significantly higher among responders than among non-responders (*p values <0.001*).

Furthermore, the current study findings have shown that uterine artery mean value of the PI of the women who responded to treatment with Mefenamic acid (group I) (1.54±0.42) were significantly higher than mean value of PI of women who did not respond to treatment with Mefenamic acid (group II) (0.96±0.28). Also, it showed that uterine artery mean value of the RI of the cases who responded to treatment with Mefenamic acid (group I) (1.01±0.25) were significantly higher than mean values of RI of women who did not respond to treatment with Mefenamic acid (group II) (0.71±0.21).

Doppler indices showed that pulsatility index ≥ 1.27 had moderate sensitivity (75.3%) and NPV (75.3%) but high specificity (90.1%) and PPV (90.1%) in prediction of responders. Resistive index ≥ 0.93 had low sensitivity (69.4%) and NPV (70.8%) but moderate specificity (88.7%) and PPV (88.1%) in prediction of responders.

A prior prospective observational study was performed on 60 cases at the outpatient clinic of Al-Zahraa University Hospital for insertion of an IUCD. Both transvaginal sonography and power Doppler were performed to cases at time of IUCD insertion, after one month and after 3 months of clinical follow up. According to presence or absence of menorrhagia, the cases were categorized into two research groups: Research group 1 (30 cases) no menorrhagia and research group 2 (30 cases) presence of menorrhagia. There was no statistically significant difference among the two research groups concerning the demographic data and sonographic data revealed as regards uterine size and endometrial thickness at the start of the research study. After three months of clinical follow up, there was a statistical significant difference between the two research groups in direct correlation to increase in endometrial thickness[2].

Furthermore PI and RI were statistically significantly lower in cases with IUCD-induced abnormal uterine bleeding than in those using IUCD with normal menstrual bleeding. Implementing statistical ROC curves, the optimum cutoff value revealed by the research team of investigators of PI discriminating between cases with IUCD-induced abnormal uterine bleeding and study subjects using IUCD with normal menstrual

bleeding pattern was 1.14. At this cutoff value level the statistical sensitivity of PI was 44.4% and specificity was 93.9%. Furthermore, the optimum cutoff value of RI discriminating between cases with IUCD -induced abnormal uterine bleeding and study subjects using IUCD with normal menstruation was 0.72. At this cutoff value level the statistical sensitivity of RI =48.1% and specificity = 93.9%According to the results obtained in this study, it would appear that the uterine artery blood flow during menstruation was statistically significantly higher in women with Copper IUD-induced abnormal uterine bleeding than in those with normal menstrual volume. This denotes that the rise in uterine blood flow occurs only in cases of IUCD -induced abnormal uterine bleeding[9].

Another group of investigators transvaginal Doppler sonography assessment and evaluation of uterine artery blood flow was conducted. Resistance and pulsatility indices were obtained from 101 cases, 74 of the study subjects had an intrauterine contraceptive device and 27 controls that were not using any contraceptive method. The resistance and pulsatility values were statistically significantly lower in the research group of women using intrauterine contraceptive devices than who had abnormal bleeding than in all other research groups. The findings of those research studies show great harmony with the current research findings as regards presence of menorrhagia in IUCD users and changes associated in uterine artery RI and PI indices[2,7].

Furthermore another group assessed and evaluated the PI and RI of uterine arteries in 68 study subjects, involving 44 cases using intrauterine contraceptive device and 24 control study subject snot using a contraceptive method. Both the PI and RI were statistically significantly lower in cases with IUCD- triggered bleeding than in those using IUCD and not complaining of abnormal vaginal bleeding. Moreover, there were no statistically significant differences observed in PI and RI between cases using IUCD without complaining of abnormal vaginal bleeding and women in the control research group. They mentioned that the PI was less than 2 in cases with IUCD- triggered bleeding, whereas the mean PI in cases using IUCD without complications was 2.38 with the lowest PI being 1.98[1,2].

Another study assessed the PI of uterine arteries, arcuate arteries and radial arteries in 60 spontaneously menstruating cases complaining of menorrhagia. Menstrual blood loss volume was measured by the alkaline haematin method. A statistically significant inverse correlation was revealed between uterine artery PI and the volume of menstrual blood loss denoting that women with lower uterine flow impedance bleed more. Interestingly, in a different approach to the current research study, another group of investigators assessed. Three dimensional transvaginal sonographic examinations were conducted on 180 women 3-6 months after intrauterine device (IUD) insertion. Seventy six women were suffering from pain (research group I), forty four presenting with abnormal vaginal bleeding (research group II), and sixty women with no complaint (research group III). Uterine artery PI was measured by color Doppler for all cases Mean uterine artery pulsitility index was statistically significantly lower in women suffering from pain with IUD than women with excess menses and both had lower mean pulsitility index than control research group[13].

A possible mechanism explaining the association of the PI of uterine artery with menstrual blood loss may be that women with menorrhagia showed a significant increase in endothelial cell proliferation reflecting disturbed angiogenesis. It is possible that there are also other vascular abnormalities resulting from disturbed angiogenesis. In abnormal vessels, poor contractibility and dysfunction of the haemostatic system may cause menorrhagia and decreased impedance[6,14].

Another similar research study tested the hypothesis that the clinical and sonographic data reported at baseline visit could predict the responsiveness of ibuprofen in controlling heavy menstrual bleeding with copper intrauterine device (IUD) at 3 months follow-up visit this was a prospective research study involving 128 cases complaining of heavy/prolonged menstrual bleeding with copper IUD. Demographic research data, menstrual bleeding pattern as well as uterine volumetric measures and uterine Doppler blood flow indices related details were recorded before intervention. Then the eligible women were asked to receive ibuprofen 1200 mg per day for 5 days starting from first day of the cycle for the next three menses. Seventy cases (54.68%) responded to ibuprofen while 58 cases (45.31%) did not respond. To examine the correlation between individual cases, clinical and sonographic characteristics (at baseline visit) and ibuprofen responsiveness in controlling the uterine bleeding with copper IUD at 3 months; while controlling for all other characteristics, we estimated a maximum likelihood model using statistical multivariate linear regression[13].

The model involved all the research variables reported on theoretical grounds might affect the ibuprofen response. The research team of investigators revealed the following results in which cases reporting higher number of bleeding days per month (OR 4.06, 95% CI 1.63-10.13, *p value* =0.003), larger uterine volume (OR 1.12, 95% CI 1.00-1.25, *p value* =0.04) and lower uterine pulsatility index (PI) (OR 0.01, 95% CI 0.001-0.22, *p value* =0-002) are likely to fail to be managed by ibuprofen. A ROC curve statistical analysis revealed that more than 7

days of menses clearly predicts the failure of ibuprofen management course with a statistical sensitivity (64%) and statistical specificity (93.2%), whereas for the uterine size, a volume more than 49 ml could predict the non-responsiveness with sensitivity (80%) and specificity (71.8%) and a uterine PI < 2.1 yielded 88% statistical sensitivity and 85% statistical specificity. A predictive model was innovated by the research team of investigators to predict the responsiveness to ibuprofen, and utilized the 3 prior predictors will have a 100% sensitivity, specificity (55.3%) and accuracy (64%). The research team came to the conclusion that women reporting bleeding days more than 7 per month, high uterine volume and low uterine artery PI at the baseline are probably unresponsive to ibuprofen as management to control the heavy menstrual bleeding linked with copper IUD[6].

The results of the current study could aid to predict future uterine bleeding due to IUCD responsiveness to management by Mefenamic acid therapy it furthermore reveals that Doppler examination of uterine arteries in such women is an easy, cheap and non-invasive tool for follow up and adjustment of adjuvant or alternative therapy whenever required.

CONCLUSION

According to the results of the study, we can conclude that there is a strong relationship between uterine artery Doppler indices and prediction of response to Mefenamic acid. Doppler ultrasonography measuring uterine artery blood flow indices is useful to identify women who may respond to treatment of abnormal uterine bleeding using Mefenamic acid. High Doppler PI and RI in women may be associated with higher response to treatment with Mefenamic acid in patients having menorrhagia.

CONFLICT OF INTEREST

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