

Efficacy of Interferential Current in the Treatment of Pelvic Pain Associated with Endometriosis

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ABSTRACT

This study was conducted to determine the efficacy of interferential current (IFC) in the treatment of pain associated with endometriosis, forty volunteers women diagnosed with endometriosis participated in this study, they were divided into two groups, group (A) treated by IFC and group (B) treated by placebo IFC. They were treated for 12 sessions, one every other day, each session for 20 minutes. All patients were evaluated before treatment, after 2 weeks and after 4 weeks of treatment. All patients, were evaluated by visual analogue scale for pain and with serum cortisol level (S.C.L.). Results showed statistically significant reduction of pain and S.C.L in group (A), but in group (B) there was no statistically decrease after treatment. Accordingly it could be concluded that IFC was found to be effective in alleviating Pain of endometriosis.

Key words: Interferential, Endometriosis, Pain, Cortisol.

INTRODUCTION

Endometriosis is a disease affecting 15% in the general population and up to 25% to 30% in the infertility population^{1,22}. in some cases, the disease can have devastating effects, rendering a woman or adolescent unable to care for herself or her family, attend school or social functions, maintain her career or personal obligations. Endometriosis affects not only the patient but can impact every one around her^{2,3,23}.

Endometriosis is a very painful condition the name comes from the word "endometrium" which is the tissue that lines the inside of the uterus⁴. it occurs when this tissue is found outside the uterus-usually in the abdomen on the ovaries, fallopian tubes and ligaments that support the uterus, the area between the vagina and rectum, the outer surface of the uterus and the lining of the pelvic cavity. Other sites for these endometrial growth may include the

bladder and the abdominal surgical scars. They may also be found in the lungs, arm, thigh and other location^{5,6,25}.

This tissue respond to the menstrual cycle, as it would in the uterus. At every cycle, the endometrial tissue outside the uterus tends to break apart and bleed. However, the blood cannot be discharged as from the uterus. This cause the tissue surrounding endometriosis to be inflamed and swollen. This may produce scar tissue around the endometriosis, pain, adhesions and infertility^{7,24}.

The cause of this condition is unknown but, there are many theories as retrograde menstruation "during menstruation, a certain amount of blood is regurgitated, or forced backward from the uterus through fallopian tubes and showered upon the pelvic organs and pelvic lining"⁸. Another theory state that the disease is spread through the lymphatic and circulatory systems via blood flow⁹. Heredity can play a role as patients with relatives who have endometriosis may be

genetically predisposed to develop it themselves^{10,28}.

The most common symptoms of endometriosis are, pain with sex, infertility, fatigue, painful urination¹¹. pelvic pain in women with endometriosis manifests as progressive, premenstrual or menstrual pain, worsening of primary dysmenorrhea, dyspareunia^{12,27}. Other symptoms may include suprapubic pain, dysuria and hematuria^{13,26}.

On physical examination, there may be localized tenderness on suprapubic region and uterosacral ligaments in women with minimal or mild endometriosis¹⁴.

Diagnosis is made by laparoscopy which shows the location, size and extent of growth¹⁵.

Standard treatment for endometriosis relies on drugs and surgery. However, women do not obtain complete relief even after one or more surgeries¹⁶.

Alternative therapies for pain include, acupuncture, TENS, exercise, herbs and interferential therapy^{17,27}.

Interferential current (IFC) helps to alleviate pain, through muscle stimulation, it is proposed that soft tissue injuries can be healed. Small amounts of electrical impulses are induced into the tissues. It promotes the body to secrete natural pain killers, called endorphins, to ease pain. It increases blood and lymphatic flow in the injured tissue area. This in turn, increases the oxygenation and nutrients to the injured site so, it decreases pain, inflammation and swelling and accelerates healing¹⁸.

The physiological effects of IFC on the tissues depend on the following factors, frequency, rhythmic or constant frequency swing, intensity of current used, lesion, patency of circulations and neurological function¹⁹.

SUBJECTS, MATERIAL AND METHODS

Subjects

Forty patients suffering from endometriosis (Moderate) as proved by the scoring system of the American Society of Infertility and their age ranged from 35-50 years old, were recruited in this study from the gynecology department of Kasr El-Aini University Hospital. They were assigned randomly into two equal groups, group (A) received IFC and group (B) received placebo IFC. Both groups were diagnosed by laparoscopy to confirm the diagnosis and none of the patients received any medications during this study. Both groups (A) and (B) were unaware of whether the interferential device was active or inactive and the study procedures were identical for both groups.

Informed consent forms were signed by each subject before starting the treatment.

Material

- 1- Evaluation instruments: Pain scale: pain perception intensity was measured by visual analogue scale which is represented by a line scaled from (0) position which means no pain, to (10) position which means unbearable pain.
- 2- Treatment instruments: Medium frequency interferential stimulator, the frequency was 1/30 sec., the amplitude ranges from 10-100 MA. The four electrodes with dimension equal 100cm, that covered with sponge material which must be moist in a non conducting rubber pads.

Procedures

A- Evaluation

- a) Assessment of pain intensity for each patient was performed before starting the treatment, after two weeks of treatment and

at the end of treatment after one month, using visual analogue scale, the patient is asked to mark a point which refers to the degree of her pain scale.

- b) Estimation of serum cortisol level (S.C.L) was carried out before treatment, two weeks after treatment and at the end of treatment after one month for both groups. A venous blood sample of 8cc was taken in the morning centrifuged and stored at 20°C till analyzed.

B) Treatment procedures

Treatment starting one week after the end of menstruation, IFC was administered while the patient was lied in a relaxed crock lying position. Treatment was applied using four plate electrodes covered with wet sponge, two of them were placed on each side of the low back and two were placed on the suprapubic region parallel to iliac crest then, the four electrodes were tied with strap to ensure the electrodes were at their position all through the treatment time. For group (A), we started the first five minutes of treatment with constant frequency and the other 15 minutes with rhythmic frequency (10-100 Hz) which applied three times/week for twelve sessions, the intensity was adjusted according to the patient's tolerance.

For group (B), the same procedure was done, but the interferential was switched off.

Statistical analysis

Descriptive statistic was presented as mean, standard deviation and percentage for qualitative variable, analytic test included student t-test for comparing of means between before and after treatment. Significant level of 0.05 was used throughout all statistical tests within this study, P value < 0.05 indicated

significant results. The smaller the P value obtained the more significant was the result.

RESULTS

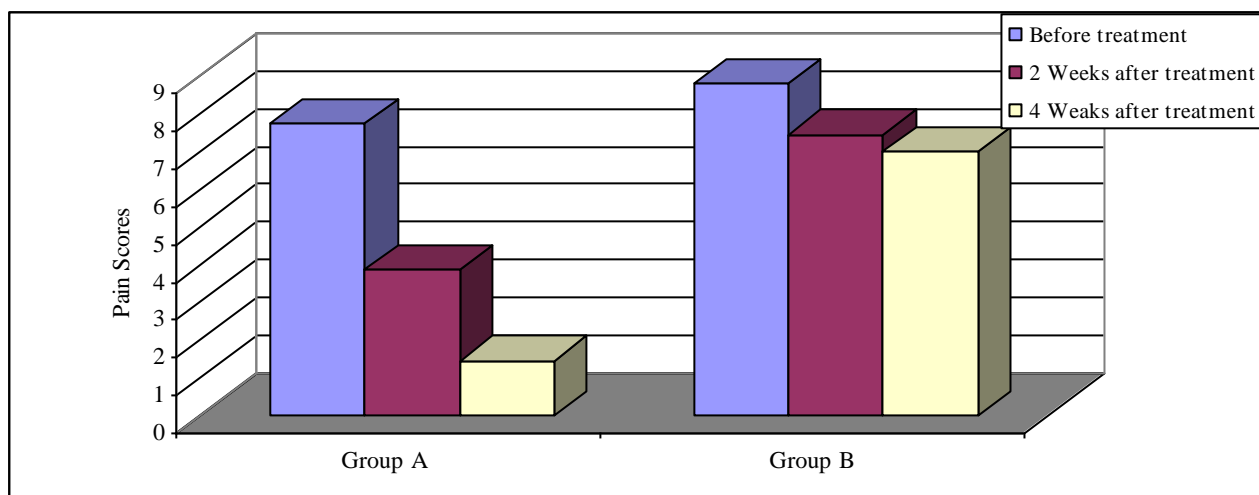
In the present study, the pain intensity in the two groups (A) and (B) was investigated before treatment, after two weeks and after four weeks of treatment, as shown in table (1), (Fig. 1) the pain in group (A) statistically significant decreased after two weeks and after four weeks of treatment, while in group (B) the decrease in pain intensity was non significant after two and four weeks of treatment. In table (2) and (Fig. 2) the percentage of decrease of pain intensity in group (A) was 50.49% after two weeks of treatment and 81.52% after four weeks of treatment, while in group (B) the percentage of decrease in pain intensity was 15.18% after two weeks and 19.8% after four weeks of treatment.

As shown in table (3) and (Fig. 3), the mean value of S.C.L. before treatment was 35.31 ± 2.88 , after two weeks it was 30.11 ± 1.62 and after four weeks of treatment it was 26.65 ± 1.36 while, in group (B) S.C.L was 37.20 ± 2.86 before treatment, 33.36 ± 3.17 after two weeks of treatment and 31.69 ± 2.80 after four weeks of treatment.

As shown in table (4) and (Fig. 4) the percentage of change of S.C.L. in group (A) was 14.52% after two weeks of treatment, 24.13% after four weeks of treatment while, in group (B) S.C.L. was 10.10% after two weeks of treatment, 14.60% after four weeks of treatment. The decrease of S.C.L. in group (A) was statistically highly significant, while in group (B) there was statistically non significant decrease.

Table (1): Mean values of visual analogue scale of group (A) and (B) during the study.

	Group (A)			Group (B)		
	Before treatment	2 weeks after treatment	4 weeks after treatment	Before treatment	2 weeks after treatment	4 weeks after treatment
Mean	7.75	3.85	1.45	8.8	7.45	7.00
SD.	1.07	1.04	0.76	0.83	0.83	0.79
P. value	3.46		22.58	0.87		0.90
Sig.	0.001		0.001	0.35		0.34

**Fig. (1): Mean values of visual analogue scale of group (A) and (B) during the study.****Table (2): Mean values of the percentage of change of the present pain in both groups (A) and (B) during the study.**

	Group (A)		Group (B)	
	2 weeks after treatment	4 weeks after treatment	2 weeks after treatment	4 weeks after treatment
Mean	50.49	81.52	15.18	19.86
SD.	9.73	8.89	7.18	11.19
P. value	13.05	19.28	1.71	0.57
Sig.	0.001	0.001	0.199	0.45

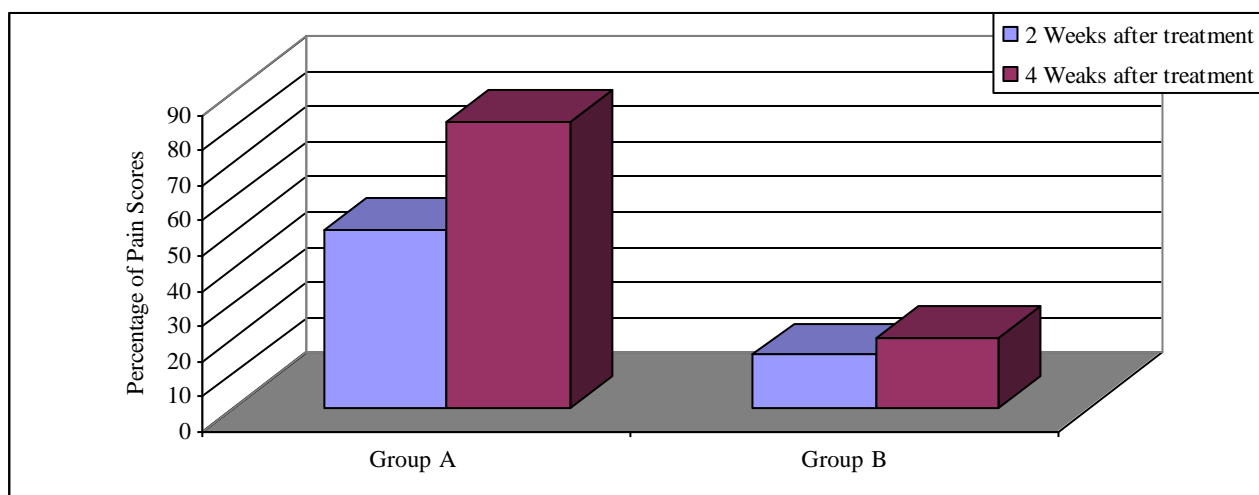


Fig. (2): Mean values of the percentage of change of the present pain in both groups (A) and (B) during the study.

Table (3): Mean values of serum cortisol level of group (A) and (B) during the study.

	Group (A)			Group (B)		
	Before treatment	2 weeks after treatment	4 weeks after treatment	Before treatment	2 weeks after treatment	4 weeks after treatment
Mean	35.31	30.11	26.65	37.20	33.36	31.69
SD.	2.88	1.62	1.36	2.86	3.17	2.80
P. value	4.07			19.83		
Sig.	0.001			0.34		

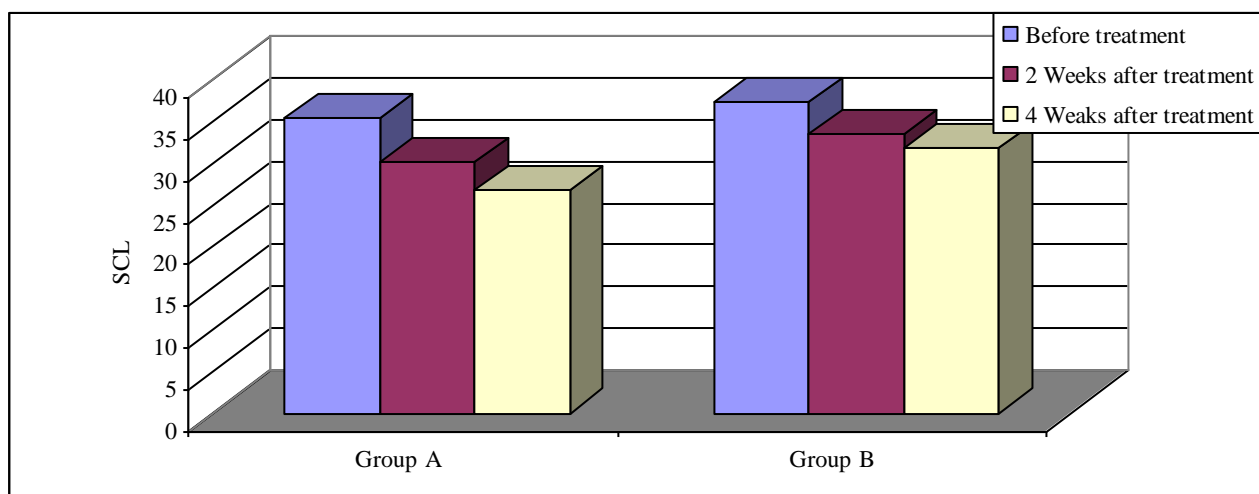


Fig. (3): Mean values of serum cortisol level of group (A) and (B) during the study.

Table (4): Mean values of the percentage of serum cortisol level in both groups (A) and (B) during the study.

	Group (A)		Group (B)	
	2 weeks after treatment	4 weeks after treatment	2 weeks after treatment	4 weeks after treatment
Mean	50.49	81.52	15.18	19.86
SD.	9.73	8.89	7.18	11.19
P. value	13.05	19.28	1.71	0.57
Sig.	0.001	0.001	0.199	0.45

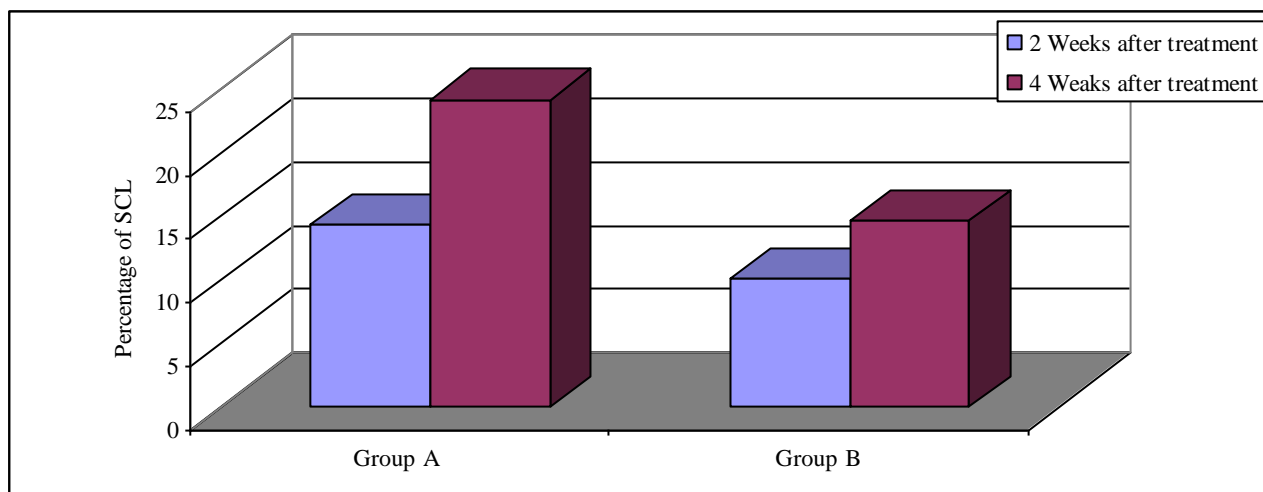


Fig. (4): Mean values of the percentage of serum cortisol level in both groups (A) and (B) during the study.

DISCUSSION

Interferential current (IFC) has deep penetration that produce vasodilatation effect that helping venous return, lymphatic drainage, allows the rapid elimination of toxic metabolic products, helps to disperse infiltration and adhesions and analgesic effect through affecting sensory nerve endings²⁰.

IFC at constant frequency (100Hz) causes oscillations which have marked amplitude and causes fine vibration of ions without heat, this fine vibration acts on the sensory nerve endings producing an analgesic effect, also direct stimulation by IFC produce inhibition of the sympathetic system and relieve pain. Also, vasodilatation of the blood

vessels following the use of IFC relieve pain by removing the pain metabolites and mobilizing exudates if present²¹.

The present study showed statistically significant decrease in pain and S.C.L. in group (A) and didn't in group (B) after 4 weeks of treatment.

This results agreed with Delitto, (1992)² who stated that IFC used for the management of acute and chronic pain and have potential benefits over other electro-analgesic techniques. Also, Ward and Robertson, (1998)²⁴ stated that for comfortable sensory stimulation for pain control a hitch frequency of alternating current is preferable that come in consistent with the results of Johnson and Wilson, (1997)⁸ who stated that the different

swing patterns of IFC may have different analgesic effects. Additionally, Savage, (1992)¹⁹ described the use of IFC in the treatment of pain of recent injuries, herpes zoster, rheumatic conditions, shoulder pain, back and disc lesion. However, the treatment of pain with IFC can affect both the cause and referred pain pathway. Complete remission of pain after IFC can be achieved in radicular pain caused by Prolapse, Kwassnechi, (1984)¹¹.

The major finding in this study is IFC which becomes one of the best choice in alleviating pain of endometriosis and can be added to the component of the whole complex of therapeutic measures to treat such a disease.

Conclusion

Data collected at the end of the treatment revealed a significant reduction in the mean values of S.C.L. and pain in group (A) but, there was a non significant difference in group (B).

So, IFC can consider as an accepted modality of alleviating endometriosis and as an alternative method for treating such case without side effect or complications to the patient.

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المخلص العربي

كفاءة التيار الكهربائي المتداخل في علاج حالات آلام الحوض المصاحبة لداء البطاني الرحمي

أجريت هذه الدراسة لمعرفة كفاءة التيار الكهربائي المتداخل في علاج حالات آلام الحوض المصاحبة لداء البطاني الرحمي . وقد أجريت هذه الدراسة على أربعين سيدة متطوعة تعانين من داء البطاني الرحمي وتم تقسيمهن إلى مجموعتين مجموعة (أ) وتضم 20 سيدة عولجت بالتيار الكهربائي المتداخل ومجموعة (ب) عولجت بالعلاج الإيحاء للتيار الكهربائي المتداخل لمدة 12 جلسة بواقع 3 جلسات أسبوعياً واستخدمت القياسات الآتية : مقياس شد مستوى الألم المنظور ونسبة الكورتيزول في الدم قبل بدء العلاج وبعد اسبوعين ثم بعد أربع أسابيع من بدء العلاج . أوضحت النتائج أن هناك انخفاض ذو دلالة معنوية عالية في شدة الألم ونسبة الكورتيزول بالنسبة للمجموعة (أ) التي عولجت باستخدام التيار الكهربائي المتداخل أما بالنسبة للمجموعة (ب) والتي عولجت باستخدام العلاج الإيحاء للتيار الكهربائي المتداخل فلا توجد فروق احصائية بالنسبة لشدة الألم وأيضاً نسبة الكورتيزول في الدم . وهذا يمكن أن نستخلص أن التيار الكهربائي المتداخل له تأثير فعال في علاج حالات آلام الحوض المصاحبة لداء البطاني الرحمي .

الكلمات الدالة : التيار الكهربائي المتداخل ، الألم ، داء البطاني الرحمي ، الكورتيزول .