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IMPACT OF INTERFERENTIAL CURRENT ON PAIN RELIEF AMONG PATIENTS WITH ORCHIALGIA

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ABSTRACT

Background: Scrotal discomfort can contribute to unusual impact on body scheme and result in behavioral alterations, as well as changes in sexual function such as delay of sexual ability that may affect both man and his companion. There are many physiotherapy modalities to reduce the intratesticular pain such as pelvic floor muscle training, hydrotherapy, ultrasound and electrotherapy. Interferential current therapy is a noninvasive therapy used to reduce acute and chronic, post-operative and post-trauma acute pain. It provides a safe and effective alternative to pharmacological approaches to pain control. The purpose of the current study was to investigate the efficacy of interferential current in alleviating testicular pain.

Methods: Randomized clinical study conducted on 50 participants. They divided into two equal groups: Group A received interferential current with two electrodes placed over the upper medial aspects of thighs and the other two electrodes were positioned over the suprapubic area. While group B received placebo interferential current. The treatment protocol was applied 3 times/ week for six successive weeks, in a total of 18 sessions. Patients were evaluated before and after the six weeks of the treatment by visual analogue scale and pain intensity while pain relief scale was measured after the treatment.

Results: Group A showed a significant pain improvement in both inter and intra group comparison in all measured parameters (visual analogue scale and pain intensity while pain relief scale) ($p < 0.05$).

Conclusion: The findings show that interferential current is an effective modality and can be recommended for the treatment of testicular pain.

Keywords: Interferential current, Orchialgia, Visual analogue scale, Pain intensity, Pain relief, Sexual ability

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INTRODUCTION

Chronic orchialgia is a typical dilemma recognized by essentially all urologists, and though it remains a strategic problem because of its various idiopathic causes, patients suffering as a result of not gaining immediate concern to solve it, and practitioner disappointment due to the inadequacy of trusted approved management to reach proper care [1]. Orchialgia can be defined as periodic or persistent testicular pain, 3 months or more that significantly impede the daily spiritedness regarding patients [2]. Truly, the chronic orchialgia is utilized regularly to explain chronic pain of the scrotum, as the pain could affect the testicle solely and/or the epididymis, paratesticular composition, furthermore the spermatic cord [3]. Hence, this work was directed to chronic intrascrotal pain. Different treatment strategies can be used, incorporating pharmaceutical and surgical possibilities with different outcomes in nearly inadequate and uncontrolled trials [4, 5]. Most researchers accept that orchiectomy is a procedure of latest opportunity and that remedy could be depend on biological as well as anatomic policies [6].

Intrascrotal pain may be due to primary causes, comprising epidemic, torsion, neoplasm, obstruction, scrotal varices, spermatic cysts, infrequently scrotal swelling, and can accompany immediate trauma in addition to medical insult following vasectomy or inguinal hernioplasty [7, 8, 9]. Urologists commonly notice postvasectomy pain syndrome, which is uncommon but remains a suffering vasectomy complications [10]. Various physical therapy tools are used for the control of intratesticular pain may include training for the pelvic floor muscles, stretching exercises, hydrotherapy, and electrotherapy modalities, ultrasound therapy as well as many complementary medicine trials [11,12].

Treatment with Interferential current (IFC) is considered as the application of medium frequency current (4,000 Hz) modulated at low frequency at the level of (0–250 Hz) [13]. A claimed use of IFC instead of low-frequency currents is its potential to reduce the skin impedance as well as its ability to penetrate into the deeper tissues [14]. Numerous logical interpretations such as pain gate control theory, increased blood flow, pain suppression and decreased nerve conduction have been introduced to support the pain controlling potential of IFC [15]. Inevitably, one could apply the higher frequencies (90-150 Hz) to spur the pain gate theory and consequently suppress the pain manifestations. On the other hand, stimulation through the use of lower frequencies (1-5 Hz) can be utilized to stimulate the opioid mechanisms, affording a degree of comfort. These two distinct sets can be interpreted physiologically and will have unusual possible periods and different durations of effect [16]. There was no previous studies had been done regarding the effect of physiotherapy modalities on the testicular pain so this study is considered as the first trial regarding this issue. The objective of this study was to evaluate the possible effects of interferential current in alleviating testicular pain.

METHODS

This is a randomized controlled clinical study, and the data collection was obtained from June 2015 to September 2015 at Kasr El-Aini University Hospital, Department of Urology, Cairo, Egypt.

50 Patients were invited to join the study furthermore, they were familiarized with aims, methodology and treatment approaches. All fitted testicular pain patients have adopted and signed the informed consent form. The sample was composed of participants with orchialgia equal to or higher than 5 regarding visual analogue scale (VAS), for a period more than three months, furthermore, they did not take any distinct medications during the study. Their age ranged between 20 - 30 years old. Exclusion criteria comprised those who during the study were under analgesics, patients with a past history of pelvic surgery, with one of the cognitive diseases or inability to fulfill questionnaires and with contraindications for the use of electrotherapy modalities as cardiac pacemakers and diabetes. The participants passed the corresponding baseline examination and were evaluated by visual analogue and pain intensity scales. Following the initial evaluation, the subjects were randomly assigned to Group A: 25 patients who received interferential current (IFC) treatment and Group B: 25 patients received placebo Interferential current, with patients rested on the back, two electrodes (5x10 cm) were placed on the upper medial aspects of thighs and the other two electrodes were positioned over the suprapubic area, parallel to the iliac crest, closing pain circuit, applying gel and sterilized tape for fixation. IFC was (Sonopuls-992) in the tetrapolar form. Carrier frequency was 4000 Hz, with pre-modulated frequency, amplitude (MFA) of 20 Hz, ΔMFA of 100 Hz and inclination of 1/1 for 30 minutes, and the intensity was increased according to tolerance of the patient. The procedure was repeated 3 times/ week for six weeks, for 18 sessions. After removing the electrodes from the area of application, a paper towel was used to clean the excessive gel. Then, electrodes were rinsed with water and a paper towel was used to dry it. This technique was regularly conducted following the individual therapy of every patient. Following the treatment protocol achievement (six weeks of treatment), participants were re-evaluated with the use of VAS, pain intensity and pain relief scales.

Statistical Analysis

Descriptive statistics were presented as mean, standard deviation (SD) and percentages for qualitative variables. Student t-test for comparing means between groups for age, duration and VAS before the treatment protocol. While Wilcoxon and Mann-Whitney tests were used to compare results of pain intensity and pain relief within and between groups respectively. Significance level of 0.05 was used throughout all statistical tests within the study; P value < 0.05 indicated significant results. The smaller P value obtained the more significant were the results.

RESULTS

Table (1) reveals the base line characteristic of both age and duration of the disease showing the non-significant difference between groups that means the homogeneity of groups before starting the treatment protocol.

Table (2) reveals the measurements of visual analogue scale (VAS) of group A and group B that reflects the significant difference between the measurements before and after the treatment protocol for group A while the results of group B revealed non-significant differences when comparing results before and after the treatment protocol.

Table (3) shows the VAS mean values for group A and groups B revealing the significant difference between both groups of the study in favor of group A when comparing the results after the treatment protocol.

Table (4) reveals the frequency and the percentages of patients of group A and group B regarding pain intensity before and after the treatment protocol presenting the significant difference when comparing the results of group A before and after the treatment. While the results of group B showing non-significant difference when comparing the results before and after the treatment protocol. As well as the significant difference when comparing the results of group A and group B at the end of the treatment protocol in favor of group A.

Table (5) reveals the frequency and the percentages of patients of group A and group B regarding pain relief after the treatment protocol presenting the significant difference when comparing the results of both groups in favor of group A.

DISCUSSION

The Sample of this study was homogeneous while analyzing groups regarding age (P= 0. 56) and duration of the disease (P= 0.13). Visual analogue scale, pain intensity and pain relief, evaluated electrotherapeutic potential of interferential current on testicular pain.

Studies have revealed that the utilization of interferential current to overcome pain is a possible method, significantly efficient and properly tolerated by patients. Additional physiotherapeutic tools were found to manage various types of pain, such as TENS, diadynamic current, HVPGS and sound waves [17].

It was also be perceived that there is nevertheless accord about the beneficial method for treating testicular pain concerning physiotherapeutic modalities, such erudition is generally changeable in the literature.

We observed ramification with respect to sample features, implying one explanation which is the shortage of standard treatment parameters. Different researchers faced troubles, including various completions owing to the application of many parameters and tools for the study.

Experimental trials on the analgesic impact of IFC are inadequate. We should state that IFC applied at a "strong but pleasant" intensity provide a higher decline in pain severity ratings for temporarily provoked ischemic pain than sham IFC.

It was proclaimed that IFC raises pain threshold if compared with sham electrotherapy modalities using cold-induced pain among pain-free subjects [18].

Despite, the analgesic impact of IFC on pain provoked experimentally following placebo-controlled circumstances are still to be approved by other authors.

The analgesia delivered through interferential current therapy can be justified by the Wednesky impedance of C- fibers, despite additional mechanisms are assuredly declared 'Pain gate' theory, stated by Malzack and Wall and much-modified afterwards persists as convenient to this interpretation [19]. The optimum frequency required for stimulation of large diameter and myelinated nerve fibers were 100 Hz and clinical practice intimates that interferential current at this frequency diminishes pain notably [20]. Pain is similarly decreased as motor stimulation enhances the blood flow inside the body and raises secretion of pain-inducing substances from the location of injury [21]. Another policy that serves to lessen the pain is attributed to the endogenous opiate system. Interferential therapy is usually implemented clinically to suppress pain, but less definite studies are stated to support this practice [22]. Taylor et al., (1987), perceived that pain arising in jaw was not managed appropriately through interferential current despite pain, provoked independently by immersion of a limb in iced water, compared to those treated with interferential current at 100 Hz. Pain originates from joint injury was lessened notably through a 15 minutes utilization of interferential current at a frequency ranging from 0 to 100 Hz also classical migraine well treated by interferential therapy at a frequency between 90-10 Hz for a period of 10 minutes directed to the zygomatic arch [23].

CONCLUSION

Our study has revealed definite results for testicular pain lessening through the application of Interferential therapy. IFC was simple to implement moreover, is a well-tolerated modality, not demanding subject's association that support while pain-induced restrictions are brought into consideration. This intimates the extensive usage of this type of practice in the rehabilitation of orchialgia.

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Table 1: Shows the mean and standard deviation as well as p value of age and pain duration for interferential current (Group A) and placebo interferential current (Group B) pre intervention.

	Age		Duration	
	Group A	Group B	Group A	Group B
Mean	24.84	24.40	7.24	6.12
SD	2.67	2.66	2.52	2.68
SE	0.53	0.53	0.50	0.54
P value	0.562*		0.134*	

*Non-significant

Table 2: Shows the mean and standard deviation as well as p value of VAS for interferential current (Group A) and placebo interferential current (Group B) pre and post intervention.

	Group A		Group B	
	Pre	Post	Pre	Post
Mean	7.224	1.776	6.940	6.952
SD	1.340	0.845	1.366	1.391
SE	0.268	0.169	0.273	0.278
P value	0.001**		0.559*	

*Non-significant **Significant

Table 3: Shows the mean and standard deviation as well as p value of VAS for interferential current (Group A) and placebo interferential current (Group B) at the end of the intervention.

	Group A	Group B
Mean	1.776	6.952
SD	0.545	1.391
SE	0.121	0.178
P value	0.001**	

**Significant

Table 4: Shows the frequency, percentages, Z value, U value as well as p value of pain intensity for interferential current (Group A) and placebo interferential current (Group B) pre and post intervention.

	Group A				Group B			
	Pre		Post		Pre		Post	
	No.	%	No.	%	No.	%	No.	%
None	0	0	10	40	0	0	0	0
Very mild	0	0	10	40	0	0	3	12
Mild	8	32	5	20	10	40	7	28
Mode-rate	14	56	0	0	10	40	7	28
Severe	3	12	0	0	5	20	8	32
z- value	-4.3724				-0.142			
p- value	0.001**				0.888*			
	Group A post				Group B post			
U value	47.5							
P value	0.001**							

*Non-significant **Significant

Table 5: Shows the frequency, percentages, U value as well as p value of pain relief for interferential current (Group A) and placebo interferential current (Group B) post intervention

	Group A Post		Group B Post	
	No.	Percent.	No.	Percent.
None	0	0	19	76
A little	3	12	4	16
Some	4	16	2	8
A lot	8	32	0	0
Complete	10	40	0	0
U value	16			
P value	0.001**			

**Significant

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