Effect of Ultrasound Therapy Versus Splinting in Carpal Tunnel Syndrome During Pregnancy

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ABSTRACT

***Objective**: this study conducted to determine the effectiveness of low intensity ultrasound therapy versus wrist splint in alleviating mild to moderate CTS during pregnancy. **Patients and methods:** Forty volunteer's pregnant women at the late of the second and early of the third trimester were selected from the obstetrics outpatient clinic of Maternity Hospital, Faculty of Medicine, Ain Shams University with clinical and electrophysiologic evidences of mild to moderate idiopathic CTS were included. All the women were randomly divided into two equal groups in numbers. The group (A) was treated by ultrasound therapy. The group (B) was treated placebo ultrasound therapy and wrist splint. All patients were treated for three weeks, five days/week and were evaluated twice at the beginning and at the end of the treatment program in term of measuring. The Boston carpal tunnel syndrome questionnaire (the severity of symptoms and the functional status of patients with carpal tunnel syndrome patients) & Neurophysiological tests (Median nerve sensory and motor distal latency & conduction velocity) in both groups. **Results :** before straining the treatment program no significant difference in either test was recorded between the two groups however, data collected at the end of treatment indicated significant decrease in the score of Boston CTS questionnaire & Median nerve sensory and motor distal latency and significant improve Median nerve sensory and motor conduction velocity in both groups except the Median nerve motor conduction velocity in group (B) was not significant improve.However, at the end of treatment period the mean value of ultrasound therapy revealed significant difference as compared with the corresponding mean value of placebo ultrasound and splint in all the parameters. **Conclusion:** According to the results of the present study, it could be concluded that ultrasound therapy and wrist splint are an effective conservative modalities for treating carpal tunnel syndrome during pregnancy without any side effects to the mother or her foetus however, ultrasound therapy superior to wrist splint in such cases.*

***Key words**: pregnancy, ultrasound therapy, wrist splint.*

INTRODUCTION

Carpal tunnel syndrome (CTS) is the most common focal neuropathy occurring in pregnancy with reported incidences of 25%–62%, depending on diagnostic criteria[32]. The increased swelling that occurs with pregnancy probably results in a decrease in the space of the carpal tunnel, leading to irritation of the median nerve. It reported occurs twice as commonly in pregnant patients who have swelling of the fingers as in those who do not this was attributed to fluid retention by the hormone prolactin also, occurs more commonly in those who have pre-eclampsia and hypertension[3].

Carpal tunnel syndrome occurs most commonly in the second and third trimesters and presents with pain, numbness and tingling in the distribution of the median nerve, although numbness in all fingers may be a more common complain, symptoms are usually worse at night and can awaken patients from sleep. However, acute deterioration can

be closely associated with a recent change to more strenuous manual activities, especially those who are involved with repetitive motions of the wrists[18].

Treatments of CTS include conservative modalities and surgical procedures[16]. Conservative therapy is usually reserved for mild to moderate CTS and it commonly consists of using a Resting Hand Splint (RHS)[36], Nonsteroidal Anti-inflammatory Drugs (NSAIDs) or the local steroid injection have their own limitations and complications[24,14].

Surgery can relieve the pressure on the median nerve by sectioning the Transverse Carpal Ligament (TCL), which forms the roof of the CT[20]. There is no universal agreement between surgeons on the precise timing and the criteria for indications of Surgery in CTS[3]. The majority of US hand surgeons will try conservative therapy for an average of 8 weeks before surgery [38&8]. The long-term results of surgery show a large incidence of symptom recurrence and morbidity. Up to 30% of patients report poor to fair strength and long-term scar discomfort and 57% have recurrence of some pre operative symptoms, most commonly pain, beginning an average of 2 years after surgery. The average time to maximum improvement of symptoms is 9.8 months[25].

Among the different options for conservative treatment, application of heat has been recommended for the treatment of peripheral neuropathy[17] and it is well accepted that ultrasound thermotherapy is a safe and commonly applied deep-heat modality in physical therapy field. In addition, low dose of ultrasound might facilitate recovery of experimental acute compression neuropathy[19].

The mechanical and heating properties of ultrasound have been reported to affect the ability of nerve fibers to propagate action potentials, although the physiological mechanisms were not clear[2]. In addition, continuous application of ultrasound to healthy functioning nerves was found to increase sensory nerve conduction velocity (NCV)[21,19] but could either increase or decrease motor NCV at different doses[34]. Moreover, findings of an anti-inflammatory effect of such treatment[12] support the concept that ultrasound treatment might facilitate recovery from nerve compression[28].

The benefit of non-surgical treatment seems to be limited[7] although not all patients respond to surgery[6]. On the other hand, the efficacy of most conservative treatment options for carpal tunnel syndrome during pregnancy is still little known[30].

The purpose of this study was to determine the effect of low intensity ultrasound thermotherapy versus wrist splint in alleviating mild to moderate CTS during pregnancy.

SUBJECTS, MATERIAL METHODS

Subjects

This study included Forty volunteer's pregnant women at the late of the second and early of the third trimester with clinical and electrophysiologic evidences of mild to moderate idiopathic CTS were studied. They were selected from the obstetrics outpatient clinic of Maternity Hospital, Faculty of Medicine, Ain Shams University. Their age ranged from 25 to 35 years and their mean age (26.40±1.08) years.

All these patients fulfilled the Criteria for the diagnosis of CTS were as follows: history: (1) dull, aching discomfort in the hand, forearm or upper arm; (2) progressive clumsiness and weakness in the hands associated with hypesthesia and tingling in the distribution of the median nerve distal to the

wrist joint; (3) pain at night, awakened by burning pain in the thumb, index and long fingers; physical examination: (1) hypoesthesia, either objective or subjective, restricted to the median distribution in the hand; (2) a positive wrist flexion test; (3) Tinel's sign, a tingling sensation radiating out into the hand, produced by light percussion over the median nerve at the wrist. The clinical diagnosis of CTS has to be confirmed by electrodiagnostic studies,

Patients are excluded from the study if: 1) they have already been treated with a wrist splint or have had previous carpal tunnel release; 2) they have a history of wrist or median nerve injury from trauma (e.g. contusion, fractures) or prior surgery on the wrist; 3) they have a history suggesting underlying causes of CTS, such as diabetes mellitus, thyroid disease, rheumatoid arthritis, chronic renal failure treated by hemodialysis, space-occupying lesions in the volar wrist area, anatomic abnormalities of the wrist or hand; 4) they have clinical signs or symptoms, or electrodiagnostic studies suggesting conditions that could mimic CTS or interfere with its validation, such as cervical radiculopathy, brachial plexopathy, thoracic outlet syndrome, pronator teres syndrome, ulnar neuropathy, polyneuropathy, Raynaud's disease or sympathetic dystrophy; 5) there is severe thenar muscle atrophy.

These inclusion and exclusion criteria are designed to select a relatively homogeneous group of patients with idiopathic CTS, suitable for both ultrasound and splinting. For patients with bilateral CTS, we designate a "study hand" based on the following priorities[13]: 1) most severe according to patient reporting, 2) most severe based on electrodiagnostic reports, and 3) the dominant hand. Only one hand was included in the study. None of the subjects received medical treatment during the study course might affect the results.

Subjects were divided randomly into two equal groups: group (A) twenty subjects were treated by low intensity ultrasound thermotherapy and group (B): twenty subjects were treated by placebo low intensity ultrasound thermotherapy with wearing wrist splint. Both groups were unaware of whether the ultrasound device was active or inactive during the course of the study also, the study procedures were identical for both groups. All Women signed informed consent after reading it and hearing verbal explanations of the relevant doubts before starting the study.

Material

- Computerized electromyography system was used in this study to conduct the neurophysiological tests {electromyography (EMG) and nerve conduction studies (NCS)} for diagnosis of CTS and classified as mild moderate and severe by EMG/NCS criteria; Mild: prolonged sensory latency of the median nerve; Moderate: prolonged sensory and motor latencies of the median nerve; Severe: same as moderate plus denervation potentials in the Abductor Pollicis Brevis muscle[27,9].
- The Boston carpal tunnel syndrome questionnaire is self-applied and evaluates the severity of symptoms and the functional status of patients with carpal tunnel syndrome[22].
- The Therasonic 450 model is a dual frequency ultrasound unit operating at 1or 3 MHz. Two sizes of transducer are available both of which operate at both frequencies. Technical specification: Power Input 100-240v ac 50/60 Hz; Ultrasound Frequency 1.1MHz ± 5% & 3.3 1MHz ± 5%; Maximum Intensity 2

w/cm^2; Maximum Output Power 10W Output Modes CW and Pulsed, Pulse Duration 2 ms, Pulse Repetition Rate 100Hz; Pulse temporal-peak/average ratio 5;Treatment Time 20 minutes maximum; Contact Monitor light on applicator; Classification class1.

- Prefabricated splint, which contains a metal strip that can be adjusted to immobilize the wrist in a neutral position in order to avoid flexion or extension of the wrist, which increases carpal tunnel pressure[4].

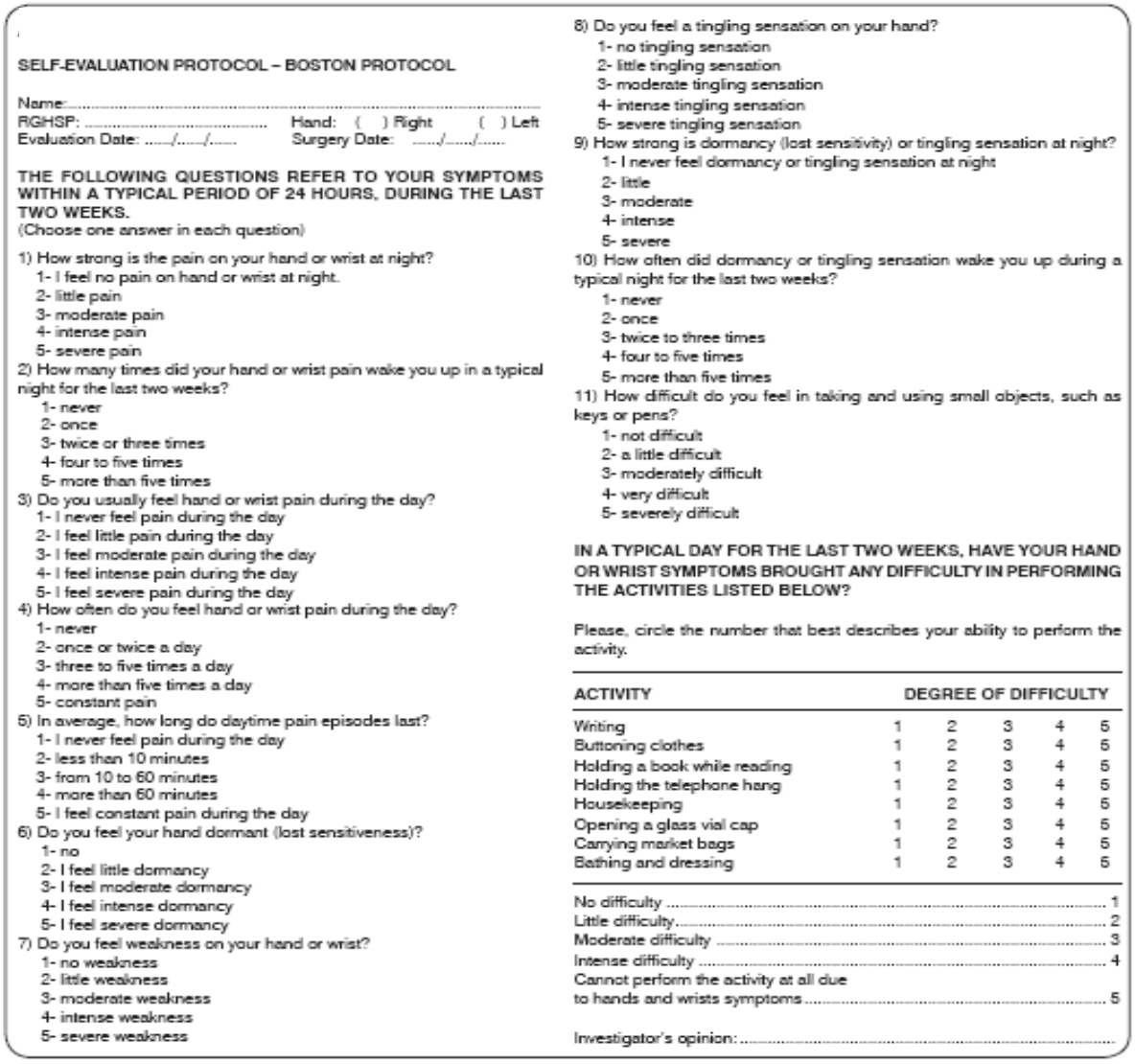
Methods

A. Evaluation procedure

1. The Boston CTS questionnaire is composed of the symptoms severity scale (SSS) evaluates symptoms regarding severity, frequency, and time kind. The functional status scale (FSS) evaluates how the syndrome affects daily life[22] fig (1).

- Questions concerning symptoms severity scale are composed of 11 questions addressing: pain intensity during daytime and nighttime, time of pain during the day, dormancy, weakness, tingling sensation at night, frequency of that night tingling sensation, and skill. Each question has five answers numbered from 1 to 5, arranged in an increasing order of symptoms severity. Therefore, 1 means no symptoms, 2 mild symptoms, 3 moderate symptoms, 4 intense symptoms, and 5 severe symptoms.
- Questions concerning functional status are composed of 8 questions, where each one corresponds to a functional activity (writing, buttoning clothes, holding a book while reading, holding a telephone hang, housekeeping, opening a glass vial cap, carrying market bags, bathing and dressing). Each activity has five difficulty degrees, labeled according to a table shown at the end of the question, where degree 1 corresponds to no difficulty, degree 2 little difficulty, degree 3 moderate difficulty, degree 4 intense difficulty, and degree 5 cannot perform the activity at all due to hands and wrists symptoms.

Each woman in both groups was evaluated twice, prior to the treatment session and at the end of the treatment program for checking the effectiveness of the treatment.



SELF-EVALUATION PROTOCOL – BOSTON PROTOCOL

Name:.....
RGHSP: ..... Hand: ( ) Right ( ) Left
Evaluation Date: ...../...../..... Surgery Date: ...../...../.....

THE FOLLOWING QUESTIONS REFER TO YOUR SYMPTOMS WITHIN A TYPICAL PERIOD OF 24 HOURS, DURING THE LAST TWO WEEKS.
(Choose one answer in each question)

1) How strong is the pain on your hand or wrist at night?
1- I feel no pain on hand or wrist at night.
2- little pain
3- moderate pain
4- intense pain
5- severe pain

2) How many times did your hand or wrist pain wake you up in a typical night for the last two weeks?
1- never
2- once
3- twice or three times
4- four to five times
5- more than five times

3) Do you usually feel hand or wrist pain during the day?
1- I never feel pain during the day
2- I feel little pain during the day
3- I feel moderate pain during the day
4- I feel intense pain during the day
5- I feel severe pain during the day

4) How often do you feel hand or wrist pain during the day?
1- never
2- once or twice a day
3- three to five times a day
4- more than five times a day
5- constant pain

5) In average, how long do daytime pain episodes last?
1- I never feel pain during the day
2- less than 10 minutes
3- from 10 to 60 minutes
4- more than 60 minutes
5- I feel constant pain during the day

6) Do you feel your hand dormant (lost sensitiveness)?
1- no
2- I feel little dormancy
3- I feel moderate dormancy
4- I feel intense dormancy
5- I feel severe dormancy

7) Do you feel weakness on your hand or wrist?
1- no weakness
2- little weakness
3- moderate weakness
4- intense weakness
5- severe weakness

8) Do you feel a tingling sensation on your hand?
1- no tingling sensation
2- little tingling sensation
3- moderate tingling sensation
4- intense tingling sensation
5- severe tingling sensation

9) How strong is dormancy (lost sensitivity) or tingling sensation at night?
1- I never feel dormancy or tingling sensation at night
2- little
3- moderate
4- intense
5- severe

10) How often did dormancy or tingling sensation wake you up during a typical night for the last two weeks?
1- never
2- once
3- twice to three times
4- four to five times
5- more than five times

11) How difficult do you feel in taking and using small objects, such as keys or pens?
1- not difficult
2- a little difficult
3- moderately difficult
4- very difficult
5- severely difficult

IN A TYPICAL DAY FOR THE LAST TWO WEEKS, HAVE YOUR HAND OR WRIST SYMPTOMS BROUGHT ANY DIFFICULTY IN PERFORMING THE ACTIVITIES LISTED BELOW?

Please, circle the number that best describes your ability to perform the activity.

ACTIVITY	DEGREE OF DIFFICULTY				
Writing	1	2	3	4	5
Buttoning clothes	1	2	3	4	5
Holding a book while reading	1	2	3	4	5
Holding the telephone hang	1	2	3	4	5
Housekeeping	1	2	3	4	5
Opening a glass vial cap	1	2	3	4	5
Carrying market bags	1	2	3	4	5
Bathing and dressing	1	2	3	4	5

No difficulty 1
Little difficulty..... 2
Moderate difficulty 3
Intense difficulty 4
Cannot perform the activity at all due to hands and wrists symptoms 5

Investigator's opinion:.....

Fig. (1): Shows the BOSTON CTS questionnaire (quoted from Levine etal. 1993)[22]

2. Neurophysiological tests: objective evaluation was done bilaterally before starting the 1st session and after the end of 15th sessions of treatment for all subjects participated in this study. According to the guidelines of the American Association of Electrodiagnostic Medicine[1] the Median sensory and motor nerve distal latency & conduction velocity were studied for both hands, using surface electrodes for stimulating and recording a sensory latency of greater than 3.5 millisecond or a motor latency of greater than 4.5 millisecond is considered an abnormal finding[29].

B. Treatment procedure

- All subjects were instructed briefly about the nature of ultrasound therapy and it effect in controlling CTS. Each woman of

both groups (A&B) received a fifteen sessions of ultrasound for 3 weeks, either low intensity ultrasound thermotherapy in circular fashion was performed with intensities of 0.5 W/cm2 in groups (A) and 0.0 W/cm2 (without energy emission) and prefabricated wrist splint, were wear during the night for 3 weeks in group (B).

- A Therasonic 450 ultrasound machine with a frequency of 1 MHz and a 2.5 cm diameter sound head, in conjunction with a coupling media of Aqua sonic ultrasound transmission gel, were used. The ultrasound head and transmission gel were at room temperature before treatments. The size of the sonation area was approximately 2 cm x 4 cm. The ultrasound was applied to the palmar carpal tunnel area, which expanded from the wrist crease to the palmar region and covered an area of 4 to 4.5 cm in length and 3.5 to 4.0 cm in width. The ultrasound therapy lasted 10 minutes per session, 5 days a week, for 3 weeks, and patients were unaware of the treatment groups.

Statistical Analysis

The collected data were fed into computer for statistical analysis using SPSS software and the statistical significance at a confidence of 95% (α-level of 0.05).

RESULTS

In this study, by applying the Boston questionnaire score in women suffered from carpal tunnel syndrome with a purpose of evaluating the severity of symptoms and the degree of manual skill in both groups before and after treatment. As shown in table (1&2), the Boston scale of the symptoms severity score (SSS) and functional status score (FSS) revealed a statistically highly significant decrease ($P < 0.01$) after three consecutive weeks of the treatment by low intensity ultrasound thermotherapy. While, in the splint group, there was a statistically significant decrease ($P<0.05$) between pre treatment and post placebo low intensity ultrasound with usage of wrist splint. While comparing both groups, the results showed that group (A) was significantly decrease ($P < 0.05$) than group (B) after the end of the 15th session of treatment.

Table (1): Shows the mean values and standard deviations of symptoms severity score (SSS) before and treatment in both groups.

		Group A		Group B	
		Before ttt	After ttt	Before ttt	After ttt
symptoms severity score	S1	4.9	1.28	4.7	3.6
	S2	4.3	1.3	4.8	3.7
	S3	4.68	1.45	5	3.8
	S4	4.92	1.51	4.7	3.8
	S5	5	1.55	4.3	3.5
	S6	4.6	1.34	4.3	3.8
	S7	5	1.74	4.5	3.1
	S8	4.2	1.32	5	3.2
	S9	4.7	1.34	4.6	2.8
	S10	4.6	1.26	4.8	2.7
	S11	4.1	1.43	4.7	3.3
Statistical comparison	Mean	4.64	1.41	4.67	3.21
	SD	0.32	0.14	0.24	0.28
	MD	3.23		0.16	
	T-value	39.00		1.82	
	Sig.	HS		S	

SD: Standard Deviation t- value: Unpaired t value MD: Mean difference HS= Highly significant. S= significant

Table (2): Shows the mean values and standard deviations of functional status score (FSS) before and after treatment in both groups.

		Group A		Group B	
		Before ttt	After ttt	Before ttt	After ttt
functional status score	F1	4.9	1.4	4.8	2.5
	F2	4.8	1.4	4.7	3.6
	F3	4.5	1.42	4.6	3.9
	F4	4.4	1.43	4.5	3.5
	F5	4.8	1.65	4.8	2.8
	F6	4.6	1.75	4.7	3.2
	F7	4.8	1.8	4.8	3.4
	F8	3.9	1.3	4.2	3.9
Statistical comparison	Mean	4.59	1.52	4.64	3.11
	SD	0.33	0.19	0.21	0.24
	MD	3.07		0.33	
	T-value	30.04		1.20	
	Sig.	HS		S	

SD: Standard Deviation t- value: Unpaired t value MD: Mean difference HS= Highly significant S=significant

The results of electrodiagnostic studies included: Median motor and sensory latencies and nerve conduction velocities were measured across the wrist before and after treatment. As shown in table (3) the electrophysiological results post treatment in group (A) showed statistically highly significant decrease ($P < 0.01$) in Median motor and sensory latencies while, it showed statistically highly significant increase ($P < 0.01$) in Median motor and sensory conduction velocities. In addition, in group (B) the electrophysiological results post treatment revealed significant decrease ($P<0.05$) in Median motor and sensory latencies however, the post treatment results of Median motor conduction velocities was statistically non-significant ($P>0.05$) while, Median sensory conduction velocities results showed statistically significant ($P < 0.05$) increased. Hence, comparing both groups, the results showed that group (A) was significantly decrease ($P < 0.05$) in Median motor and sensory latencies and highly significant increase ($P < 0.01$) in Median motor and sensory conduction velocities than group (B) after the end of the 15^{th} session of treatment.

Table (3): Shows the mean values and standard deviations of Neurophysiological tests before and after treatment in both groups.

			X±SD	max	min	% imp.	MD	t-test	Sig
MDL (m/sec)	Group (A)	before	5.96 ± .95	7.1	4.5	50	3.02	14.72	HS
		after	2.95±0.58	4.2	2.5				
	Group (B)	before	5.75±1.16	7.5	4	22.7	1.305	3.895	S
		after	4.44±0.87	5.6	2.9				
SDL (m/sec)	Group (A)	before	5.39±0.89	6.8	4.1	39.7	2.14	7.56	HS
		after	3.25±0.82	5	2.7				
	Group (B)	before	5.41±0.87	6.8	4.1	15.7	1.345	5.041	S
		after	4.565±0.86	5	2.3				
MCV (m/sec)	Group (A)	before	44.05± 2.98	47	40	24.05	12.11	11.39	HS
		after	56 ± 1.65	63	54				
	Group (B)	before	44.14±2.89	49	39	1.7	0.765	-0.681	NS
		after	44.91± 6.14	54	35				
SCV (m/sec)	Group (A)	before	43.45±2.33	49	40	24.05	10.45	10.61	HS
		after	53.9±3.02	56	53				
	Group (B)	before	44.15±3.07	49	37	5.7	1.55	3.089	S
		after	46.7±3.10	51	42				

X±SD: Mean ±Standard Deviation t- value: Unpaired t value MD: Mean difference
% imp= Percentage of improvement. Sig. =Significance HS= Highly significant.
S= Significant NS= Non significant

DISCUSSION

Carpal tunnel syndrome" An increase in pressure in the carpal tunnel is usually caused by non-specific flexor tenosynovitis. Chronic focal compression of a nerve trunk can cause focal demyelination by mechanical stress deforming the myelin lamellae. Ischaemia also plays a pathogenic role in the carpal tunnel syndrome[37]. The carpal tunnel syndrome and pregnancy have long gone hand-in-hand. In fact, medical expert's estimate that 28-50% of pregnant women get carpal tunnel syndrome in the third trimester of pregnancy due to changes in pregnancy hormonal and build up of fluid can put pregnant women at greater risk of getting CTS, especially during the last few months however; this problem often subsides after delivery of the baby[13,31].

Conservative treatment approaches seem to offer clear advantages over surgical treatment of the carpal tunnel syndrome. Recent studies have confirmed the effects of Conservative treatment into the carpal tunnel, with modest or complete pain relief in up to 92% of the patients, although long-term recurrence rates seem variable[15&16]. Treatment for carpal tunnel syndrome during pregnancy can be a difficult medical problem. Health care providers are increasingly reluctant to treat the pain with drugs in order not to compromise the safety of the fetus[26]. Wrist splints worn at night seem to be an excellent solution; studies have shown that resting the fingers, hand and wrist in a neutral position is the most effective way to manage the pain[35,4]. In addition, ultrasound therapy may facilitate the recovery from carpal tunnel syndrome[23,11].

The aim of this study was to investigate the therapeutic efficacy of low intensity ultrasound therapy versus wrist splint as a conservative treatment agent in CTS during pregnancy.

After 3 weeks, 5 days/week of 10 minutes' daily continuous ultrasound therapy, all Boston Carpal Tunnel Questionnaire parameters due to pain, paresthesia and frequency of awakening showed significant improvement in both treatment groups. The findings of improvement were similar to a previous report by Oztas et al (1998)[28] who studied the effect of ultrasound therapy with intensities of 0.8 W/cm2 and 1.5 W/cm2 compared to placebo ultrasound as a conservative treatment in CTS. The clinical parameters at the end of treatment showed statistically significant improvement in all groups. According to the pathophysiology of the carpal tunnel syndrome, ultrasound therapy has been shown to increase the pain threshold in human subjects and the placebo ultrasound might cause pain relief by its local massage effects[34].

Ultrasound could elicit anti-inflammatory and tissue stimulating effects, as already shown in clinical trials [12] and experimentally[5]. In this way, ultrasound has the potential to accelerate normal resolution of inflammation[10].

The obtained results of electrodiagnostic studies after treatment are in agree with Ebenbichler et al., (1998)[11] who reported significant changes of electroneurographic variables when comparing electrophysiological parameters before and after treatment and among the study and the placebo groups The result reveal decreased motor distal latency and increased sensory nerve conduction velocity after ultrasound treatment.

The findings of the present study confirm that ultrasound treatment is more effective than wrist splinting in patients with carpal tunnel syndrome during pregnancy. The rate of improvement from ultrasound treatment was similar to that reported in other studies[11,34] and may indicate its similar effectiveness to steroid injection[14,15], but without their complications[24] or limits[4].

Conclusion

According the results of this study objectively demonstrates that low intensity ultrasound thermotherapy and wrist splint might have a therapeutic effect on mild to moderate idiopathic carpal tunnel syndrome during pregnancy. However, ultrasound therapy is more of superior than wrist splint on treating such cases.

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الملخص العربى

تأثير الموجات الصوتية العلاجية مقابل جبائر الرسغ في علاج الضغط علي العصب الأوسط للرسغ أثناء الحمل.

الهدف من هذه الدراسة : أجريت هذه الدراسة لتحديد تأثير الموجات الصوتية العلاجية مقابل جبائر الرسغ فى حالات الضغط علي العصب الأوسط للرسغ أثناء الحمل . **المرضى والطرق:** أجريت هذه الدراسة على أربعين سيدة حامل تعانين من الضغط علي العصب الأوسط للرسغ. وتراوحت أعمارهن ما بين 25 إلي 35 سنة وقد تم جمع المرضى عشوائياً وتقسيمهن إلى مجموعتين متساويتين فى العدد وتم علاج المجموعة الأولى بواسطة الموجات الصوتية العلاجية والمجموعة الثانية بالعلاج الايحائى بالموجات الصوتية العلاجية جبائر الرسغ وكانت مدة العلاج لكلا المجموعتين ثلاثة أسابيع بمعدل خمس أيام أسبوعياً تم تقييمهن مرتين قبل بداية العلاج والمرة الثانية فى نهاية العلاج عن طريق قياس استبان بوسطن لمتلازمة الضغط علي العصب الأوسط للرسغ و سرعة توصيل الأعصاب و العضلات لقياس سرعة التوصيل الحركي و الحسّي للعصب الأوسط للرسغ . **النتائج:** أثبتت النتائج أن هناك فروق ذات دلالة إحصائية على المجموعتين عند مقارنتها بالنتائج الأولية قبل إجراء البحث كذلك وجود فروق ذات دلالة إحصائية واضحة على نتائج مجموعة الموجات الصوتية العلاجية عند مقارنة نتائج العلاج للمجموعتين. **الخلاصة:** أثبتت النتائج من هذه الدراسة أن كلا من الموجات الصوتية العلاجية و جبائر الرسغ كان كل منها ذا تأثير فعال وأن كانت الموجات الصوتية العلاجية أكثر تأثيراً وفاعلية إذ ما قورنت بجبائر الرسغ كوسيلة بديلة من وسائل العلاج التحفظي لعلاج الضغط علي العصب الأوسط للرسغ أثناء الحمل بدون أيّ آثار جانبية إلى الأمّ أو جنينها .