

The Effectiveness of Injection of Trigger Points with Platelet Rich Plasma as A Pain Management Method in Chronic Tension Type Headache

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Abstract: Objective: This study designed to evaluate the effectiveness of injection of trigger points with platelet rich plasma as a pain management method in chronic tension type headache.

Methodology: a retrospective study conducted over 2.5 year period (July 1, 2016- March 31, 2018), 71 patients (57 females and 14 males) in Dr Abdullah Al-Karboli Medical Center For Family Medicine And Pain Management in Kirkuk, Iraq because of CTTH, they received trigger points PRP injections. The PRP was prepared by centrifuging patients' own blood. The response to therapy was graded as excellent, good, fair and poor.

Results: The mean age was 48.1 ± 1.5 years. Most of patients (n: 52, 73.2%) yielded either good or excellent response to treatment, while (n: 19, 26.8%) from patient had either fair or poor response to treatment, there was statistically significant difference between the 2 groups.

Conclusion: Trigger points injection with PRP seems to be an effective, safe and cheap pain management method in CTTH.

Keywords: Chronic Tension Headache, Pain Management, Trigger Points, Platelets Rich Plasma, Iraq.

فعالية حقن نقاط التوتور بالصفائح الغنية بالبلازما كطريقة لمعالجة الآلام المزمنة في الصداع التوتوري المزمن

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الملخص: هدفت الدراسة إلى تقييم فعالية حقن نقاط التوتور بالبلازما الغنية بالصفائح الدموية كطريقة لمعالجة الآلام المزمنة في مرضى الصداع التوتوري المزمن.

طريقة البحث: دراسة استيعادية أجريت على مدى سنتين ونصف (1 تموز 2018 – 31 آذار 2019)، 71 مريضاً (57 إناث و 14 ذكور) في مركز الدكتور عبد الله الكربولي لطب العائلة وإدارة الألم في محافظة كركوك، العراق بسبب شكاوهم من الصداع التوتوري المزمن، تم حقن نقاط التوتور العضلي عند المرضى بالبلازما الغنية بالصفائح الدموية التي تم تحضيرها بواسطة الطرد المركزي للدم المسحوب من المرضى. الاستجابة للعلاج صنفت إلى ممتاز، جيد، مقبول وضعيف.

النتائج: معدل العمر كان $48,1 \pm 1,5$ سنة. معظم المرضى (عدد 52، 73,2%) أظهروا أما استجابة جيدة أو ممتازة للعلاج، بينما (عدد 19، 26,5%) من المرضى أظهروا أما استجابة مقبولة أو ضعيفة وكان هناك فرق ذو دلالة إحصائية معنوية بين المجموعتين.

الاستنتاج: حقن نقاط التوتر العضلي بالبلازما الغنية بالصفائح الدموية يبدو أنه طريقة فعالة، آمنة ورخيصة لمعالجة الآلام المزمنة للصداع التوترية المزمن.

الكلمات المفتاحية: الصداع التوترية المزمن، معالجة الآلام، نقاط التوتر العضلي، البلازما الغنية بالصفائح الدموية، العراق.

Introduction

Headache is one of the most common symptoms in the general population [1]. Tension type headache (TTH) is the most frequent headache with the basis of myofascial and trigger point disorders [2]. Chronic tension type headache was defined using IHS diagnostic criteria, which are identical to those for episodic tension type headache (ETTH) except that the attack frequency was 15 or more attacks per month for at least 6 months, and one associated symptom of nausea, photophobia or phonophobia was permitted [3].

The majority of headaches are termed primary headache, which refers to head pain not attributable (i.e. secondary) to another disease process (e.g. brain tumor). The most common primary headache, tension-type headache (TTH), represents approximately 80% of all headache diagnoses is extremely prevalent and is associated with significant socioeconomic cost and reduced quality of life [4].

Chronic tension type headache (CTTH) is also a common condition, the pathophysiology of which is not well understood. Overactivity of the pericranial muscles is thought to play a role, although sustained muscle contraction is probably a consequence rather than a cause of headache [5]. Main symptoms of TTH are pressure around the forehead, dull head pain and tenderness around the forehead and/or scalp. It can appear as mild, moderate or intense pain in the head, neck and/or behind the eyes. TTH is often defined by patients as a feeling of having a tight band around their forehead [6].

A detailed history of the patient's headache is of paramount importance in making the correct diagnosis. Information gathered in the history is compared with the diagnostic criteria to create the best diagnostic match. The examination in headache is based on the general neurologic examination. Additional features include examination of the superficial scalp vessels, neck vessels, dentition and bite, the temporomandibular joints, and cervical and shoulder musculature. Pericranial muscle tenderness is thought to be an important physical finding in the diagnosis of tension-type headache [7].

Trigger points defined as discrete, focal, hyperirritable spots located in a taut band of skeletal muscle. The spots are painful on compression and can produce referred pain, referred tenderness, motor dysfunction and autonomic phenomena [8]. Active myofascial trigger points are prevalent in TTH coherent with the hypothesis that peripheral mechanisms are involved in the pathophysiology of this headache disorder. Active myofascial trigger points in pericranial muscles in TTH patients are correlated with generalized lower pain pressure thresholds indicating they may contribute to a central sensitization [9]. Both peripheral and central mechanisms have been suggested as important components of TTH [10]. Furthermore, there has been demonstrated increased muscle stiffness in the trapezius muscle in TTH

patients[11]. Studies show that the referred pain elicited by active myofascial trigger points reproduce the headache pattern in TTH patients [12].

In the past few years, researches focused on finding new safe biochemical regenerative and pain management treatment method. Platelet rich plasma (PRP) was one of the major interests of studies as a new potential therapy. PRP is one of the most newest subjects in regenerative medicine for many musculoskeletal conditions [13]. PRP is a biological agent gained its pleasant, safe and fast appearance in family medicine and sport medicine practice as a cheap natural physiological method. PRP is a fractionated volume of plasma of the own patient's blood which contains a platelets concentrate [14].

The aim of this study is to evaluate the effectiveness of injection of trigger points with PRP as pain management method for in CTTH.

Patients and Methods

This is a retrospective study of a group of patients with CTTH, their chronic headache managed by trigger points PRP injection in Dr Abdullah Al-Karboli Medical Center For Family Medicine And Pain Management in Kirkuk, Iraq. Over 2.5 years period (July 1, 2016–March 31, 2019) 71 CTTH patients received trigger points PRP injection. (57 females and 14 males) were enrolled in the study. A detailed history was taken according to a questionnaire and a complete physical examination was done. The clinical notes were reviewed to ascertain the clinical presentations and response of patients to PRP therapy.

In order to prepare PRP, autologous blood from the patient's own vein was drawn by a 50-ml syringe; the amount of blood determined by the size of the area to be treated. The withdrawn blood was then placed in aseptic tubes, each one filled with 9 ml blood and 1 ml 3.8% sodium citrate as an anticoagulant. The tubes were then placed in a centrifuge at 1500 rpm for 10 min separating the sample into three parts; the upper part made of plasma, the middle part (puffy coat) made of white blood cells (WBCs) while the lower part made of red blood corpuscles (RBCs). The upper two thirds of plasma were then discarded while the lower third was transferred to another tube and placed in a centrifuge again. After 15 min of centrifugation at 3000 rpm, the upper half of the sample was discarded while the lower half would form the PRP.

Patients received either 2 or 3 doses of PRP intramuscular injections in trigger points in neck and/or upper back, 4 weeks interval between each dose and using 30G needle after marking trigger points numbing the skin injecting 1/2 cc of lidocaine & 1/2 cc of PRP in each point, procedures done under aseptic condition.

In this study, follow up of patients continue for six months after the last injection session, the author used a symptom based patient directed questionnaire to assess the outcome after PRP therapy. The questionnaire was similar to that described by Bhattacharya et al in their study of thoracic outlet

compression but slightly modified. The questionnaire asked patients to grade their perception of symptomatic relief using the terms “Excellent” for complete relief of symptoms, “Good” for relief of most major symptoms, “Fair” for relief of some symptoms, but persistence of others and “Poor” for no improvement [15].

Body mass index (BMI) of the patients was calculated by the equation: Weight in kilogram/(Height in meter)² and accordingly, the patients were classified as having a healthy body weight (18.5-24.9), overweight (25-29.9), obesity I (30-34.9), obesity II (35-39.9) and obesity III (≥ 40) [16].

Statistical analysis was performed using z test for 2 population proportions.

Results

There were 71 patients (57 females and 14 males) with a female: male ratio of 4:1. The age ranged between 26 and 71 years with a mean of 48.1 ± 1.5 years. **Figure 1** displays the age and sex distribution of the studied patients.

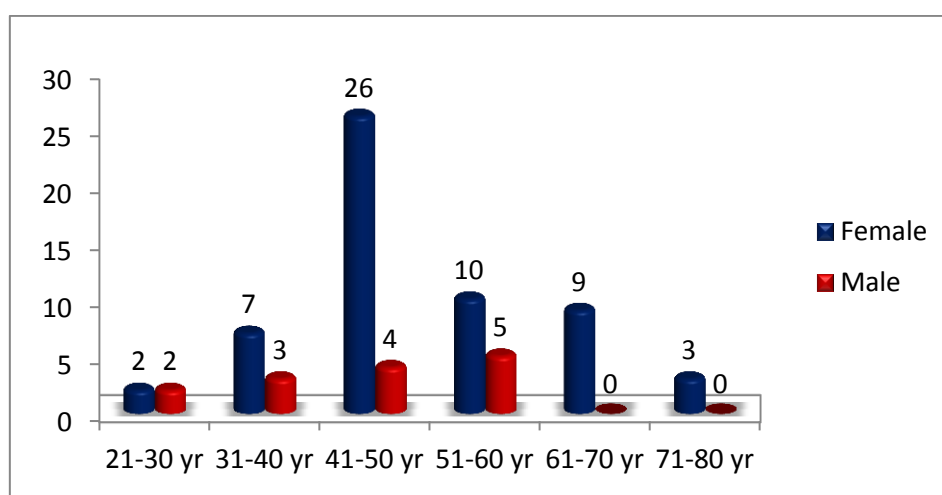


Figure (1) Patients Age & Sex Distribution.

All the female patients were either housewives (n: 38, 66.7%) or governmental employee (n: 19, 33.3%) while most males were government employees (n: 8, 57.1%) as shown in Figure2.

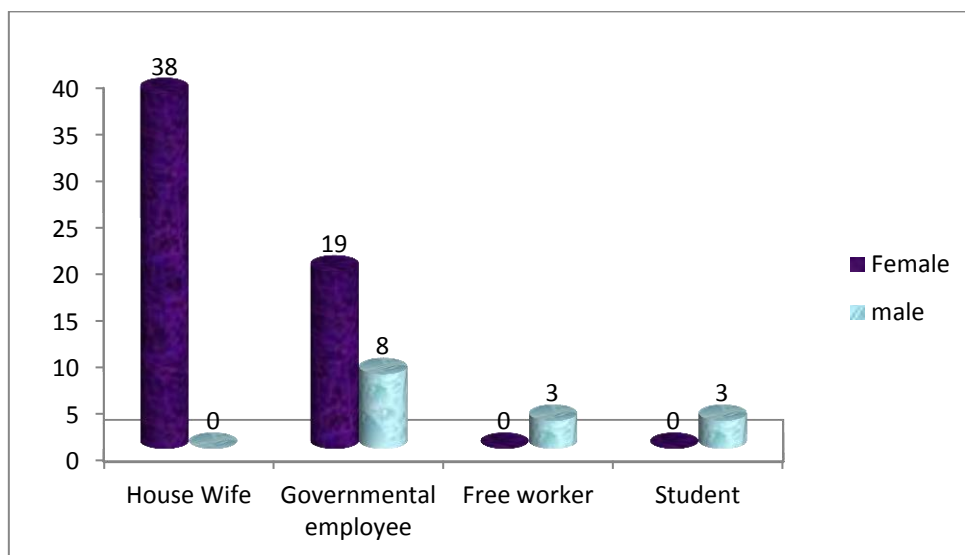


Figure (2) Patients Job Distribution.

Most of the patients was over weight or obese (n:60, 84.5%) while the patients with normal healthy weight was (n: 11, 15.5%) as shown in Figure 3.

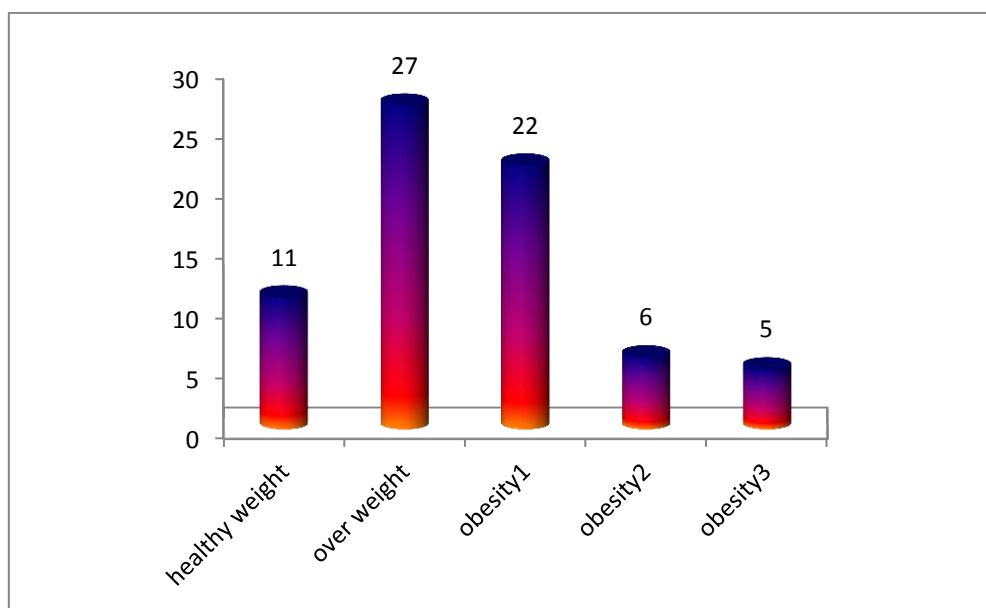


Figure (3) Patients BMI distribution.

Table(1) shows the co-morbidities encountered in the studied patients.

Table 1: The Co-Morbid Conditions

Co-morbidity	Sex		Total
	Females	Males	
Overweight or obese	48 (45.7%)	12 (11.4%)	60 (57.1%)
HT	10 (9.5%)	2 (1.9%)	12 (11.4%)
DM & HT	5 (4.7%)	2 (1.9%)	7 (6.6%)

Co-morbidity	Sex		Total
	Females	Males	
DM	1 (0.95%)	1(0.95%)	2 (1.9%)
Hyperthyroidism	2 (1.9%)	0	2 (1.9%)
Migraine	2 (1.9%)	0	2 (1.9%)
Fauvism	1 (0.95%)	0	1 (0.95%)
Nephrectomy	1 (0.95%)	0	1 (0.95%)
			87 (82.8%)

HT: hypertension,
DM: diabetes mellitus

The top co-morbid condition was obesity as most of the patients (n: 60, 84.5%) were either overweight or obese. Hypertension ranked second (n: 19, 26.8%) had HT either alone or in combination with DM, while nine patients (12.7%) had DM either alone or in combination with HT as shown in Table 1.

Figure 4 shows that (n: 64, 90.2%) from patients received three sessions while (n: 7, 9.8%) received two sessions of PRP injections.

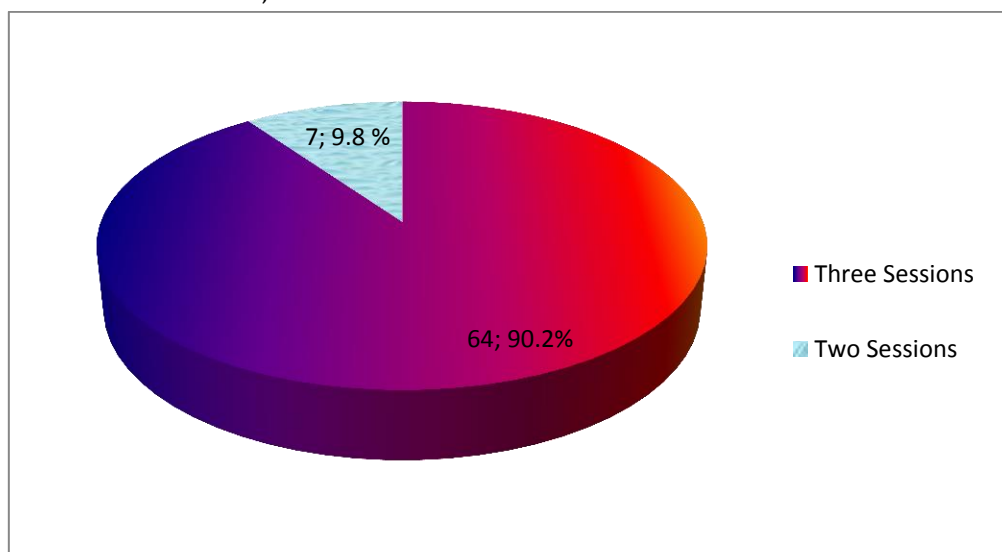


Figure (4) Distribution of patients treated with two or three sessions of PRP injections

As shown **Figure 5** (n: 52, 73.2%) from patients had either excellent or good response to treatment, while (n: 19, 26.8%) from patient had either fair or poor response to treatment, there was statistically significant difference between the 2 groups ($p < 0.01$).

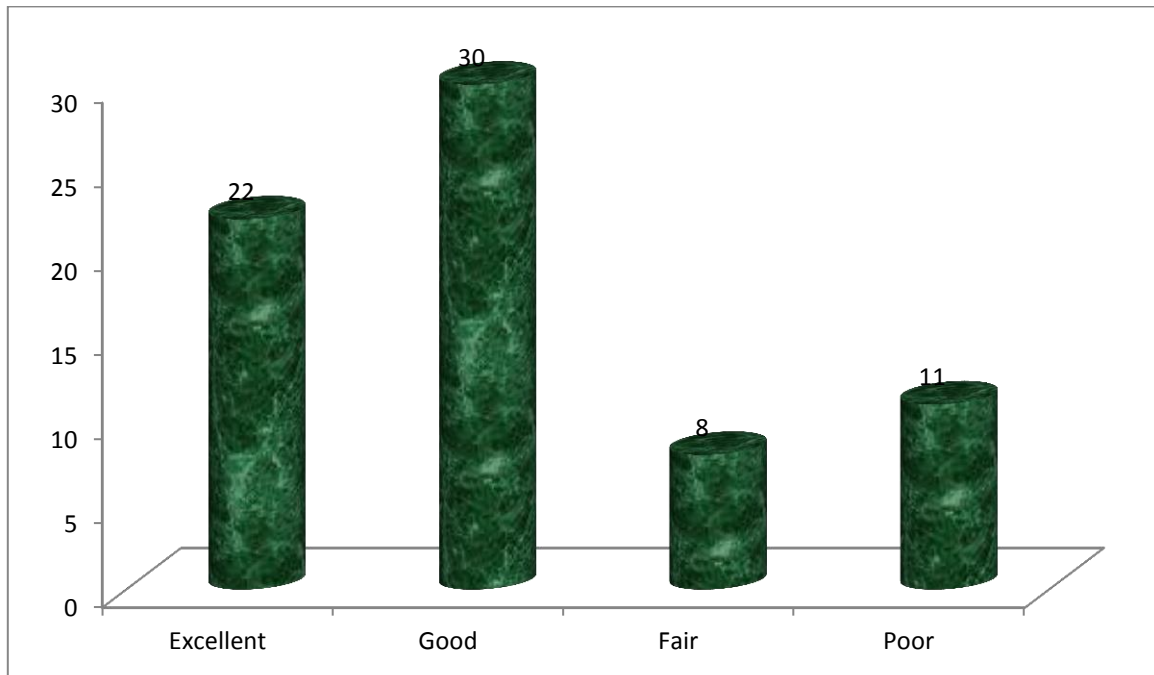


Figure (5) Distribution of patients according to response to treatment.

Discussion

Headache is one of the most common symptoms in the general population. According to population-based studies, the annual prevalence rates are 38.3% for episodic tension-type headache (ETTH) and 2.2% for chronic tension-type headache (CTTH) [3]. Chronic tension-type headache is a distressing condition which can affect patients almost daily and can often be difficult to treat effectively. Medication overuse for headache can be a common cause of many side effects. Patients should be queried about all symptomatic treatments used, including over-the-counter analgesics with its all potential risk of side effects associated with long term use of these medicines.

This study shows that 71 patients (57 females and 14 males) with a female: male ratio of 4:1 which means CTTH were more common in females than male, while in study done in 2017 shows that CTTH occur twice as frequently in women as in men [6].

In this study most of patients complaining from CTTH ($n: 45, 63\%$) falls in fourth and fifth decade age groups, this is partially in agree with results founded in study done by Silberstein in 2002 who stated that the prevalence of tension-type headache is highest between the 2nd and 5th decades of life, peaking between 30 and 40 years of age [17].

The present study demonstrated clinical benefits of trigger points injection with PRP for patients complaining from pain associated with CTTH. The results of our study showed that only 11 patients (15.5%) had poor response while 60 patients (84.5%) had either excellent, good or fair response, which is in convenience with the results of a study done by Stein J in 1996 who stated that; trigger points injections either with local anesthetics, corticosteroids, non steroidal anti inflammatory drugs or saline, as well as dry

needling are common tools in the management of myofascial pain syndromes, the mechanism of action of injections is unclear as the type of substances injected seems to be irrelevant for improvement of pain [18].

This study may be the first one using PRP in patients with CTTH. PRP has been widely used in clinical studies. Platelets are present in PRP at a higher concentration than in full blood. The active platelets have biologically active proteins that bind to trans-membrane receptors in the target cells. This binding leads to gene expression resulting in cellular recruitment, growth and morphogenesis and at the same time reduction in inflammation [19].

In summary, post-treatment results of patients with CTTH their trigger points injected with PRP, the treatment found to be effective. According to the results, application of 2-3 injection sessions is said to be an effective, cheap and safe treatment approach that provides long-lasting state of well being for patients with CTTH. For putting out the efficacy of PRP injections in frequent exactly, randomized, placebo-controlled and long term follow up studies with repetitive PRP injections are needed.

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