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Tolerability and Efficacy of Long-Term Lidocaine Trigger Point Injections in Patients with Chronic Myofascial Pain

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Abstract

Objective: To ascertain the tolerability and efficacy of long term lidocaine trigger point injections (LTPI) in alleviating myofascial pain.

Method: A cohort of individuals (n=74; 23 men, 51 women) aged 18 to 85 years (mean: 44 years) who received ≥ 5 single or multiple LTPI between January 2001 and January 2010 from a private neurology practice were selected for the study. All study patients' charts were reviewed for age, gender, etiology of myofascial pain, comorbidities, total number of visits, visit intervals, location and alternative pain treatment modalities. Efficacy was determined by post-procedure surveys.

Results: A demographic analysis from the 74 included individuals revealed a female predominance (N=51, 69%). Ages at the initiation of injection ranged from 23 to 76 years. Chronic myofascial syndrome (n=26, 35%) and chronic back pain (n=25, 34%) were the most common etiologies. The common sites of injections were neck and/or shoulder muscles (n=66, 89%). The visit interval varied in monthly increments with the majority of this cohort at 1-2 month intervals (n=58, 79%). Of the 24 patient-answered questionnaires, 22 (92%, P<0.0001) reported pain relief. The mean reported pain level on a scale of 1-10 was 8.9 ± 0.4 (± SE) prior to treatment, which was reduced (70%) to 2.7 ± 0.5 after treatment (P<0.0001). The patients reported benefit upto 26 ± 5 (± SE) days post injection.

Discussion: From our cohort study, long-term trigger point injection appears to be a well-tolerated adjunct treatment modality for various types of myofascial pain. The efficacy was demonstrated by a questionnaire answered by a smaller cohort. Further prospective study is suggested to attest this conclusion.

Keywords: Trigger points injection; Myofascial; Lidocaine; chronic pain

Introduction

Myofascial pain is defined as pain derived from myofascial trigger points, as first described by Drs. David Simons and Janet Travell [1-5]. The classic definition of a myofascial trigger point is a focal hyperirritable area in skeletal muscle, which is associated with a hypersensitive palpable nodule, described as "a taut band". Manual compression of a trigger point produces a local twitch response, with characteristic local and referred pain in a zone of reference [2-6]. Myofascial pain is caused by recurrent "biomechanical overloading" and excessive isometric muscle contraction, leading to injured skeletal muscle fibers with increased tone and tension [2-4]. Repeated mechanical stress leads to muscle injury and fatigue, resulting in the formation of trigger points surrounding skeletal muscle, termed the "injury pool theory" [3,4].

Myofascial pain has a high prevalence among the general patient population, ranging from 30% in internal medicine clinics to over 83% in specialty pain management clinics in the United States. Musculoskeletal pain is a growing cause of disability, affecting approximately 10% of the general US population with an estimated yearly cost of over $US47 billion [3,4]. Myofascial pain is the primary source of pain in 85% of injury-related musculoskeletal pain patients and up to 90% of chronic pain patients [3,4,6].

As the diagnostic criteria are broad, myofascial pain manifests itself in a variety of clinical musculoskeletal pain syndromes, which explains the challenging nature of effective pain management in patients. Various methods have emerged, including non-invasive and invasive treatments. Non-invasive oral treatments include nonsteroidal anti-inflammatories, opioid analgesics, muscle spasmolytics, neuropathic analgesics and antidepressants. Therapeutic injections represent the majority of invasive treatments and include local anesthetics, corticosteroids, neurolytic agents, botulinum toxin and dry needle injections [4-9]. Still, the controversy remains regarding the most efficacious treatment of myofascial pain.

Therapeutic injections have generally been used for treating pain associated with myofascial trigger points. The goal of intervention is the direct inhibition of afferent and efferent sensorimotor pathways to induce muscle relaxation and relief of both local and referred trigger point pain [7,8]. Limited data exists on the efficacy and tolerability of local anesthetic injections, specifically lidocaine trigger point injections (LTPI). In this retrospective study we sought to further explore the tolerability of LTPI and analyze LTPI patient demographics and treatments including the total number of LTPI visits, the interval between LTPI visits and the locations of LTPI. Efficacy of LTPI was explored as well.

Methods and Material

After obtaining institutional internal review board approval, a charts review was conducted to patients who attended a single Neurology private practice between January 2001 and January 2010. All clinic charts were electronically screened for use of the Current Procedural Terminology code 20553. All patients who had received ≥ 5 single or multiple LTPI were selected.

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All LTPI were performed independently by one of two board-certified neuromuscular specialists, thus limiting inter-physician LTPI technique variability. LTPI techniques were standardized to the universal technique for injection, with 1% Lidocaine solution [3,4]. After being cleansed with alcohol, the trigger point is isolated with a pinch between the thumb and index finger with stabilizing pressure to prevent the trigger point from rolling away from the advancing needle. The needle (25G, 1and 1/2 inch) is inserted 1-2 cm away from the trigger point and then advanced into the trigger point at an acute angle of 30 degrees to the skin. As the needle contacts the trigger point, muscle twitching may be experienced. A small amount (0.2 mL) of 1% lidocaine is injected once the needle is inside the trigger point. The needle is then withdrawn to the level of the subcutaneous tissue, and then redirected superiorly, inferiorly, laterally, and medially. The needling and injection process is repeated in each direction without withdrawing the needle until the local twitch response is extinguished or until the muscle relaxes.

All study patients' charts were manually reviewed to collect the patients' age, gender, etiology of myofascial pain, comorbidities, total number of LTPI visits, interval between LTPI visits, location of LTPI and alternative myofascial pain treatment modalities. Data for the locations of LTPI were divided into anatomic regions: neck and shoulder, paraspinal, glutei and extremities. Intervals between LTPI were categorized into < 1 month, 1 month, 1-2 month, 2 month and > 2 month intervals. All additional myofascial pain treatments (current and prior) used by each patient were recorded.

Alternative myofascial pain therapies were divided into categories of non-invasive myofascial pain management and invasive myofascial pain management. Non-invasive medical myofascial pain management included selective serotonin reuptake inhibitors (SSRI) and selective norepinephrine and serotonin reuptake inhibitors (SNRI), muscle relaxants, opiates, GABA analogues, non-steroidal anti-inflammatories, and analgesic patches. Invasive myofascial pain therapy modalities included surgical, epidural and intraarticular steroid injections, botulinum toxin injections, and transcutaneous electrical nerve stimulation (TENS) and acupuncture.

LTPI benefits, efficacy and tolerability were gauged using LTPI Patient Questionnaires, which were distributed to those patients who were actively receiving LTPI. LTPI Questionnaire questions included: 1) stating the three best individual outcomes of trigger point injections; 2) the length of subjective benefit from each LTPI; 3) adverse reactions to LTPI; 4) a subjective rating of pain relief based on a numeric pain scale (NPS) with a range of 1-10. To determine the statistical significance of the frequency of occurrence of positive pain relief responses, the binomial test was used (NCSS). The statistical significance of reduced pain scale (NPS) responses was determined with the paired Student's t-test. $P < 0.05$ was considered statistically significant.

Results

The total number of patients who received LTPI between January 2001 and January 2010 was 266, of whom 74 matched the study selection criteria (excluding those 192 patients with < 5 total LTPI visits). Patient's demographic characteristics are listed in Table 1. Female predominance (N=51, 69%) was observed. Patients' age at the initiation of LTPI treatment ranged from 23 to 76 years, with a majority 64% (n=47) between the ages of 40 to 60 years and with a mean age of 44 years.

Chronic myofascial syndrome (n=26, 35%) and chronic back pain (n=25, 34%) represented the most common etiologies of myofascial pain (Table 1). Other common etiologies of myofascial pain in the patient population studied included: cervical headache (n=12, 16%), cervalgia (n=19, 26%), musculoskeletal pain (n=20, 27%), radiculopathy (n=12, 16%) and focal dystonia or spasticity (n=3, 4%). Other rare, more specific etiologies included Charcot Marie Tooth 1A, iliotibial band syndrome, pectoralis impingement and piriformis syndrome (all of which affected approximately 1% of the study population). Locations of LTPIs were evaluated, in addition to the etiology of chronic myofascial pain. Most patients received LTPI in more than one anatomic location. Of the 74 total patients, 89% (n=66) received LTPI in the neck and shoulder muscles and 72% (n=53) in the paraspinal muscles (Figure 1).

Additionally, LTPI visit intervals and total numbers of LTPI visits were reviewed. The intervals between LTPI of study patients are summarized in Figure 2. The most common interval between LTPI

Characteristics	Patient Number: n=74 (%)
Gender	
• Male	23 (31%)
• Female	51 (69%)
Age (y): mean=44	
• <40	12 (16%)
• 40 - 60	47 (64%)
• >60	15 (20%)
Etiology of myofascial pain	
• Cervical headache	12 (16%)
• Cervalgia	19 (26%)
• Charcot Marie Tooth 1A	1 (1%)
• Chronic Back Pain	25 (34%)
• Fibromyalgia	26 (35%)
• Focal Dystonia or Spasticity	3 (4%)
• Iliotibial Band Syndrome	1 (1%)
• Pectoralis impingement	1 (1%)
• Piriformis Syndrome	1 (1%)
• Radiculopathy	12 (16%)

Summary of study patient demographics, including age, gender and etiology of chronic myofascial pain.

Table 1: Patient Demographic Characteristics.

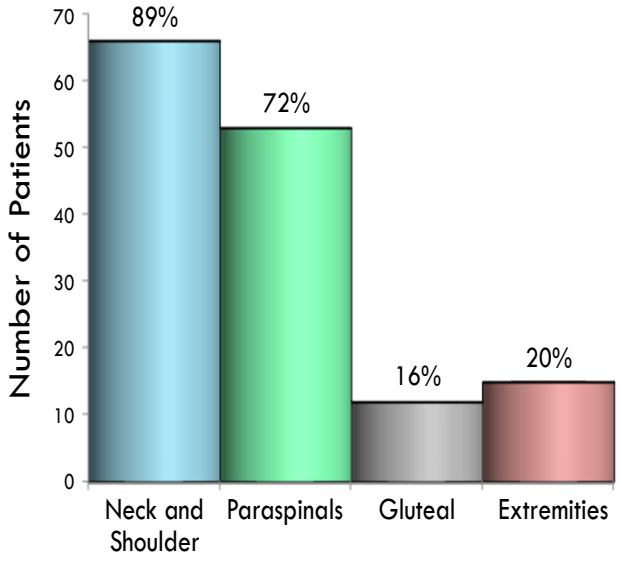

Figure 1: Anatomic Location of LPTI.Summary ofthe frequency of LPTI in four anatomic regions: neck and shoulder, paraspinals, gluteal and extremities.

clinic visits was 1-2 months, representing 79% (n=58) of all included patients. A total of 16% (n=12) of patients had LTPI in <1 month interval and 5% (n=4) had LTPI in > 2 months intervals. The total number of LTPI visits was divided into the deciles shown in Figure 3. Between 5 and 10 total LTPI visits the most common frequency, representing 28% (n=21) of all patients. Second was 41 to 50 total LTPI visits at 18% (n=13) of the total study patients.

The efficacy of LTPI in management of myofascial pain was assessed using patient questionnaires. While a total of 24 patients completed the LTPI questionnaire, 54% (n=13) of them reported pain using a numeric pain scale (NPS). Patients reported the subjective benefits of LTPI in myofascial pain, its adverse effects, and a quantitative reduction of myofascial pain, the results of which are summarized in Table 2. Of the 24 patients who completed the LTPI Patient Questionnaire 92% (n=22, P<0.0001) reported pain relief, 42% (n=10) felt decreased muscle tension or relaxation of injected muscles, 13 (54%) described increased mobility and range of motion, and 21% (n=5) stated an improved overall quality of life. The patients reported benefit from LTPI at up to a mean of 26 ± 5 (± SE) days post injection. 13 patients documented LTPI-induced pain relief using the NPS. 39% (n=5) experienced a 75-100% relative reduction in pain and 54% (n=7) reported a 50-74% relative reduction in pain. The mean reported pain level on the NPS was 8.9 ± 0.4 (± SE) prior to treatment which was reduced (70%) to 2.7 ± 0.5 after treatment (P < 0.0001). Adverse effects of LTPI in myofascial pain were limited to transient injection site soreness in 50% (n=12) of patients and transient local numbness in 8% (n=2) of patients. A total of 29% (n=7) of patients denied any adverse effects from LTPI.

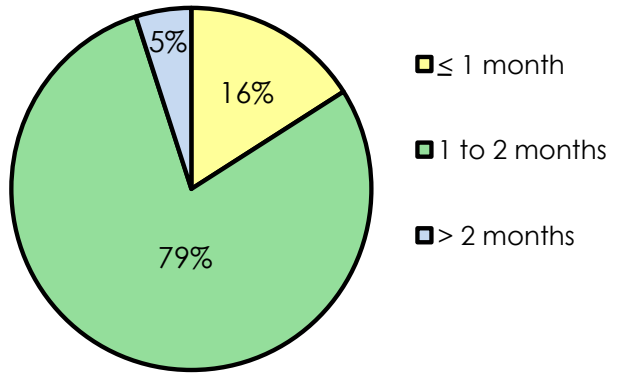

Figure 2: LPTI Visit Intervals.Graphic representation of the frequency of LTPI visit intervals divided into monthly intervals.

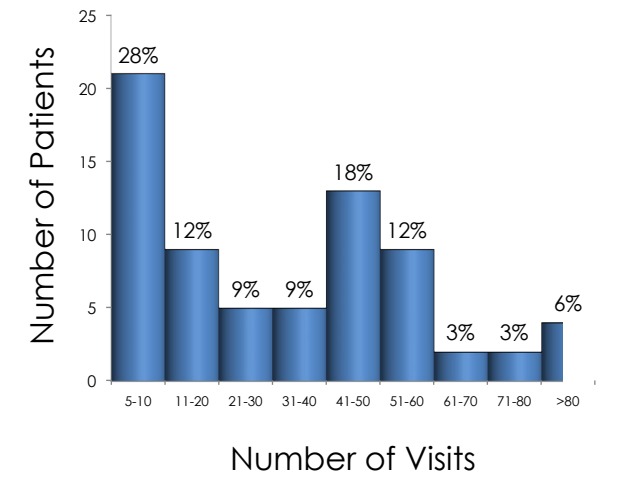

Figure 3: LPTI treatment frequency. Graphic representation of the frequency of the total number of LTPI visits divided into deciles.

Patient Reported Benefits of LTPI in myofascial pain (n=24)	N (%)
• Pain relief	22 (92%)
• Relaxes muscles or decreases muscle tension	10 (40%)
• Increased mobility and range of motion	13 (52%)
• Improved quality of life	5 (20%)
Patient Reported Adverse Effects of LPTI (n=25)	**N (%)**
• No adverse effects	7 (28%)
• Transient injection site soreness or discomfort	12 (48%)
• Transient local numbness	2 (6%)
Percentage of Total Pain Reduction Based on NPS (n=12)	**N (%)**
• 0 – 25%	0
• 25 - 50%	1 (8%)
• 50 – 75%	6 (50%)
• 75 – 100%	5 (42%)

Summary of LTPI patient questionnaires results, including subjective benefits and adverse reactions of LTPI and percentage of total pain reduction based on NPS results

Table 2: LTPI Patient Questionnaires Results.

All patients used LTPI as an adjunct therapy, in addition to other myofascial pain treatment modalities. Alternate therapies, invasive and non-invasive, are summarized below in Table 3. The most common non-invasive adjunct therapies included SSRIs or SNRIs, and muscle relaxants, used in 45% (n=33) of patients. Other pharmacologic agents used were nonsteroidal antiinflammatories (NSAIDs) in 29% (n=22) of patients, opiate derivatives in 29% (n=22), GABA-analogues in 23% (n=23) and analgesic patches in 19% (n=14). Of note, opiates were gradually discontinued in 4 patients after the addition of LTPI. Invasive therapies are dependent on the etiology of pain. The most common invasive myofascial pain treatment modality included surgical intervention, with most patients undergoing spinal surgeries (i.e. laminectomy, fusion, etc). Botulinum toxin injections were utilized in 15% (n=11) of patients and steroid injections in 23% (n=17). Other less common adjunct therapies included acupuncture and TENS.

Discussion

The management of myofascial pain is a broad and diverse field affecting both primary care and specialized physicians. Treatment options are vast, ranging from pharmacological to surgical. Limited studies are available addressing the overall tolerability and effectiveness of LTPI in myofascial pain. In this study, we investigated the role of LTPI in the management of myofascial pain. The results of our retrospective study show that LTPI is a tolerable and effective long-term adjunct treatment modality for various types of myofascial pain.

Several trends in patient demographics were identified, which in some instances reflected the etiologies of myofascial pain. LTPI patients were predominantly women, which correlate with the female predominance in chronic myofascial syndrome, the most common cause of myofascial pain in this study. The mean patient age was 44 years old, with a 64% majority of patients between the ages of 40 and 60 years old. However, we showed that LTPI could be used safely in not only younger (< 40 year old, n=12, 16%), but also older patients (> 60 year old, n=15, 20%). LTPI provide a valuable therapeutic option in older patients who have accrued multiple medical problems, patients in whom myofascial pain management can be challenging.

Review of the study data revealed that the most common locations

Alternative myofascial pain Therapies	N (%)
Non-invasive Treatments:	
• SSRI or SNRIs	33 (45%)
• Muscle relaxants (including cyclobenzaprine, carisoprodol, tizanidine, metaxalone)	33 (45%)
• GABA analogues (pregabalin, neurontin)	23 (21%)
• NSAIDs (ibuprofen, acetaminophen, naprosyn, diclofenac, meloxicam, ketoprofen, rofecoxib, nabumetone, celecoxib)	22 (29%)
• Opiate-derivatives	22 (29%)
• Topical non-narcotic analgesic patches (lidoderm, diclofenac)	14 (19%)
Invasive Treatments:	
Botulism derivatives (rimabotulilnumtoxinBonabotulinumtoxin A, • abobotulinumtoxin A-Dysport)	11 (15%)
• Trancutaneous electrical nerve stimulation (TENS)	4 (5%)
• Steroid injections (intraarticular and epidural)	13 (18%)
• Surgical intervention	17 (23%)
• Acupuncture	1 (1%)

Summary of study patients' alternative chronic myofascial pain treatment modalities, divided into Invasive and non-invasive measures and further subdivided into distinct classes of treatments

Table 3: Alternative myofascial pain Therapies.

of LTPI were the neck and shoulder regions and paraspinal muscles. Again, these correlate with the most common etiologies of myofascial pain-- fibromalygia, chronic back pain, cervalgia, cervical headache and radiculopathy, respectively. Other anatomic locations of myofascial pain effectively treated with adjunct LTPI were the extremities and gluteal regions.

One of the key points addressed by this study was to identify an effective treatment interval for LTPI in the clinical setting. The most common interval between LTPIs in the study patient population was 1-2 months (n= 58, 79%), followed by patients presenting less than one month (n=12, 16%) (Figure 2). Duration of treatment, as represented by total number of LTPI visits, was variable (Figure 3). The total number of LTPI visits ranged from 5 to 178. There was no correlation between the etiology of myofascial pain, age or gender and the duration of treatment.

One of the most important factors in the management of myofascial pain is the subjective efficacy of the treatment modality. The goal of treatment in myofascial pain is the relief of pain. The most common patient-reported (n=11, 85%) benefit of LTPI was 50-100% pain relief. Other reported benefits including decreased muscle tension, increased mobility and improved quality of life.

Adverse effects of LTPI were limited to transient injection site discomfort or numbness. 28% (n=7) patients reported no adverse effects. No significant chronic adverse effects of long term LTPI, such as skin or subcutaneous tissue inflammation or necrosis, were observed in this study. LTPI are a tolerable alternative to more invasive myofascial pain treatment modalities. Future studies of muscle structure using advanced imaging techniques, such as muscle ultrasound, might be useful to further demonstrate any subtle muscle structure changes caused by repetitive injections.

In all reviewed cases, LTPI were used as an adjunct therapy to either pharmacological or surgical treatments. Most patients used concomitant muscle relaxants, GABA analogues and/or SSRI/SNRIs, which are common medical options in the management of myofascial pain. In patients with end-stage renal disease or hepatic failure, LTPI provides a focal therapeutic option with reduced systemic effects. In addition, LTPI can be used to help decrease narcotic dependence. The risk of potential narcotic abuse is a growing concern in the area of pain management. Four patients in this study were gradually tapered off of all opiate medications with adjunct LTPI treatments.

The effectiveness of adjunct LTPI therapy in the management of myofascial pain as demonstrated by this study greatly outweighs the reported adverse effects. LTPI provide a safe and tolerable alternative to systemic pharmacologic and invasive surgical myofascial pain treatment modalities. Our limited study is the largest retrospective review to evaluate the usage of LTPI in myofascial pain. This study raises the issue of the need for further exploration of LTPI with a goal to develop standardized treatment guidelines. LTPI provides a key adjunct treatment to help patients who suffer from chronic pain.

This is a retrospective cohort study in one private office setting. As the LTPI was used as an adjunct therapy, the other treatments the patients utilized were varied (Table 3). Thus comparison within different therapeutic options was not possible. Even though our study is the largest retrospective review in LTPI, the total number was limited to 74 patients. A large-scale, multi-center study is needed to further validate our results.

References

1. Imamura ST, Fischer AA, Imamura M, Teixeira MJ, TchiaYeng Lin, et al. (1997) Pain management using myofascial approach when other treatment failed. Phys Med Rehabil Clin North Am 8: 179–196.
2. Alvarez DJ, Rockwell PG (2002) Trigger points: diagnosis and management. Am Fam Physician 65: 653-660.
3. Borg-Stein J, Simons DG (2002) Focused review: myofascial pain. Arch Phys Med Rehabil 83: S40-47, S48-9.
4. Simons DG, Travell J Myofascial Pain and Dysfunction: The Trigger Point Manual. Lippincott Williams & Williams.
5. Han SC, Harrison P (1997) Myofascial pain syndrome and trigger-point management. Reg Anesth 22: 89-101.
6. Cummings TM, White AR (2001) Needling therapies in the management of myofascial trigger point pain: a systematic review. Arch Phys Med Rehabil 82: 986-992.
7. Wheeler AH (2004) Myofascial pain disorders: theory to therapy. Drugs 64: 45-62.
8. Lavelle ED, Lavelle W, Smith HS (2007) Myofascial trigger points. Anesthesiol Clin 25: 841-851.
9. Chen CK, Nizar AJ (2011) Myofascial pain syndrome in chronic back pain patients. Korean J Pain 24: 100-104.

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