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COMPARISON OF HYDRODISECTION INJECTION BETWEEN TRIAMCINOLONE ACETONIDE VERSUS DEXAMETHASONE IN CARPAL TUNNEL SYNDROME

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Abstract

Background: Carpal tunnel syndrome (CTS) is the most common nontraumatic peripheral neuropathy, which is caused by suppression of the median nerve below the transverse carpi ligament. Local corticosteroid injection is considered the fastest and most effective method for improving symptoms that occur in CTS. There are several corticosteroid agents that can be used, but there are no objective standards that can explain the most ideal drugs. Objective: To compare the effectiveness of hydrodisection injection therapy of triamcinolone acetonide versus dexamethasone on carpal tunnel syndrome. Methods: This study involved 30 participants who were diagnosed with CTS and fulfilled the inclusion criteria and no exclusion criteria were obtained. Participants were divided into two treatment groups; the first group (n = 15) injected with Triamcinolone Acetonide (TCA) 10mg / 1ml and lidocaine 1% 1 ml and the second group (n = 15) injected with Dexamethasone 4mg / 0.8ml and lidocaine 1% 1 ml. The NRS, FSS, and SSS parameters were assessed before injection and 4 weeks after injection in each agent. Then compared these parameters at 4 weeks after injection compared to the TCA group with the dexamethasone group. Results: NRS score before and 4 weeks after TCA injection (sig 0.000; p <0.05), SSS (sig 0.001; p <0.05) and FSS (sig 0.020; p <0.05), and NRS score before and 4 weeks after dexamethasone injection (sig 0.001; p <0.05), SSS (sig 0,000; p <0.05) and FSS (sig 0,000; p <0.05). At 4 weeks after injection of TCA compared to dexamethasone there were no significant results on NRS (sig 0.237; p> 0.05) and FSS (sig 0.119; p> 0.05), while SSS values were significantly different (sig 0.027; p <0.05). Conclusion: Significant improvement in NRS, FSS and SSS score was obtained at 4 weeks after hydrodisection injection, both with TCA and dexamethasone. At 4 weeks after TCA injection compared to dexamethasone, there were no significant differences in NRS and FSS scores, whereas SSS score differed significantly. Both injection agents are equally effective in treating CTS, but dexamethasone produces a better improvement in SSS score.

Keyword : Carpal tunnel syndrome, hydrodisection, dexamethasone, triamcinolone, NRS, FSS, SSS, BCTQ.

INTRODUCTION

Carpal Tunnel Syndrome (CTS) is a cutaneous neuropathy, which is caused by an emphasis on the median nerve below the transverse carpi ligament (flexor retinaculum). CTS is a peripheral nerve lesion due to the most common non-traumatic mechanism encountered, 45% of 1574 patients (1).

CTS is the most common neuropathy in the upper extremities. CTS occurs twice as much in women than men. Fifty-seven (57)% of cases occur at the age of 40-60 years. Seventy-six (76)% of cases occur at the age of 40-70 years. It is more common in the climacterium, during or immediately after pregnancy, also in weight gain. More common in the dominant hand.

Early symptoms that appear are sensory disorders, such as

numbness, tingling or pain. If this process continues, motor symptoms will appear in the form of weakness or muscle atrophy. Sensory symptoms are often the cause of disability. This disability got worse if motor symptoms have arisen so that the quality of life will be disturbed (2).

The pathophysiology of CTS is not known exactly, but most are associated with mechanical injury, ischemia, ectopic impulses, demyelination, tendonitis, and increased pressure in carpal tunnel. In the beginning, the pathology of chronic nerve compression was caused by damage of blood-nerve barrier, followed by endoneurial and subperineurial edema. After that, connective tissue consisting of perineurium and epineurium thickens, and then fibrosis occurs. Organized fibrosis in subperineurial space is associated with repetitive movements and traction.

Furthermore, there is a demyelination of segmental nerve fibers, especially large nerve fibers. In the later stages of progressive compression, severe diffuse demyelination occurs. Injury occurs to both the myelinated nerve and non-myelinated nerve, which initiates the Wallerian degeneration.

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The effects of these different stresses were studied over a period of 4 hours to 28 days, and it was found that subperineurial edema, inflammation, and formation of fibrin deposits occur within a few hours while fibrous tissue proliferation occurs within a few days, until fibrosis occurs within 28 days (3).

The diagnosis of CTS is confimed from history taking and examination. Clinical symptoms in CTS are divided into subjective symptoms and objective symptoms. The subjective symptoms of CTS include brachialgia paresthetica nocturna which is a classic symptom of paresthesia at night. Whereas the objective symptoms in the early phase of the disease may not be found, other than tenderness on the medianus nerve above the carpal tunnel. Sometimes there is swelling on the volar part of the wrist. In prolonged nerve compression, paresis and thenar atrophy with or without sensibility disorders occurs. Sometimes only sensibility disorders are found. The pain sensory can be evaluated by using the Numeric Rating Scale (NRS) (1).

Objective tests are based on provocation tests and on evaluating motor and sensory deficits that may be present in the distribution of the median nerve on the wrist. Most of these tests complement each other. Provocation tests that can be done include the Tinnel sign, Phalen test, compression test, tourniquet test, and Flick test. The combination of the Phalen and Tinnel tests supports 90% of the diagnosis of CTS (3,4).

Electroneuromyography (ENMG) and nerve conductive velocity (NCV) examinations are very important and provide a very valuable contribution and by many authors it is considered a "gold standard" in determining the diagnosis of CTS (1).

There are several questionnaires that can be used to assess the condition of CTS, including the Carpal Tunnel Questionnaire (CTQ) / Boston Carpal Tunnel Questionnaire (BCTQ), Michigan Hand Questionnaire (MHQ), Disability of Arm, Shoulder, or Hand Questionnaire (DASH), and 36 -Item Short-Form Health Survey (SF-36). BCTQ is more sensitive and specific compared to other assessment scores. BTCQ consists of two formats namely symptom severity scale (SSS) and functional status scale (FSS) (3).

Management of CTS can be classified as surgical and non-surgical treatment. Local corticosteroid injection is a non-surgical treatment which is considered as the fastest and most effective method for improving symptoms that occur in CTS. The injection technique used is the hydrodisection injection technique. The target of this technique is to place the corticosteroid below the flexor retinaculum (transverse ligament) and anatomically away from the median nerve, vascular structures, and tendon fibers in a newly created hydrodissected neutral fluid space, thus preventing needle penetration and injection injury to the median nerve, tendons, and vascular structures and permitting the corticosteroid to reside in the hydrodissected space in the vicinity of the flexor sheath of the flexor digitorum profundus tendons. Some interventions have been systematically investigated and have shown that short-term of corticosteroid injection can reduce surgical procedures in CTS patients. The mechanism of how steroids work to treat CTS is not known yet, but anti-inflammatory effects are believed to be an important factor in reducing CTS complaints and symptoms. There are several types of corticosteroids that can be used, such as hydrocortisone, dexamethasone, methylprednisolone, and triamcinolone acetonide, but there is no objective standard that can explain the ideal drug (5,6).

Each corticosteroid has a different level of effectiveness. Dexamethasone is a low molecular weight, non particulated, non cristallized, non ester glucocorticoid, water soluble, relatively small aggregation level, potent, long-acting work and has greater anti-inflammatory potential. While triamcinolone acetonide is an glucocorticoid ester preparation, molecular weight is greater than dexamethasone, water insoluble, intermediate acting, large particles and has smaller anti-inflammatory potential (7,8).

Therefore, this study was made to compare the effectiveness of hydrodisection injection therapy using an ultrasound guiding between triamcinolone acetonide versus dexamethasone in patients with the Carpal Tunnel Syndrome in the outpatient clinic of RSUD dr. Saiful Anwar Malang.

METHOD

Patient Selection

Thirty patients with idiopathic CTS were included in this study. We investigated outpatient in neurology policlinic in dr. Saiful Anwar Malang Hospital from December 2018 to Februari 2019. The study was approved by the ethics commitee of dr. Saiful Anwar Malang Hospital.

Patients were recruited if they met the following inclusion criteria: patients have complaints of neuropathic pain (paresthesia, hypesthesia, burning sensation) in the innervation area of medianus nerve, perceived complaints at least 1 month, VAS $\geq$ 5, positive Tinnel signs and Phalen test, ENMG examination supported CTS, and approved informed consent.

Patients were excluded if they had symptomatic carpal tunnel syndrome (diabetes mellitus, thyroid disease, rheumatoid arthritis), age <18 years, pregnancy, history of steroid injection for CTS treatment 6 months before, trauma, fracture or deformity of the wrist, suffering from other polyneuropathy, never had oral pharmacotherapy, thenar muscle atrophy, history of CTS decompression surgery, and infection at the injection site.

Study Design and Therapeutic Intervention Techniques

This was a randomized double blind clinical trial, comparing hydrodisection injection techniques with ultrasonography guiding between triamcinolone acetonide versus dexamethasone.

The sonography-guided injection procedure was performed in a standardized manner.The technique was in plane hydrodisection injection. The target of this technique is to place the corticosteroid below the flexor retinaculum (transverse ligament) and anatomically away from the median nerve, vascular structures, and tendon fibers in a newly created hydrodissected neutral fluid space, thus preventing needle penetration and injection injury to the median nerve, tendons, and vascular structures and permitting the corticosteroid to reside in the hydrodissected space in the vicinity of the flexor sheath of the flexor digitorum profundus tendons. First, the ulnar border of the palmaris longus tendon

was determined by having the patient oppose all the digits together while flexing the wrist; the entry target was then marked with a surgical pen on the ulnar side of the palmaris longus tendon at the second skin crease proximal to the palmar–wrist junction. This positioning was then confirmed with sonographic interrogation and identification of the median nerve, palmaris longus tendon, radial artery, and ulnar artery with Doppler imaging (9).

The patients were devided into two groups. The first group, hydrodissection injection using ultrasonography guiding with triamcinolone acetonide 10 mg/ml 1cc dan lidocaine 2% 1 cc in 3 cc syringe and using 25G needle. The second group, hydrodissection injection using ultrasonography guiding with dexamethasone 4 mg/ 0,8 ml dan lidocaine 2% 1 cc in 3 cc syringe and using 25G needle.

Review of Clinical Data

Patients were assessed at baseline and 4 weeks after the injection. The follow up criteria were Numeric Rating Scale (NRS) and Boston Carpal Tunnel Questionnaire (BTCQ).

Numeric Rating Scale (NRS) is one of the pain scoring tools which is standardized and validated, consisting of numbers 0 to 10, where 0 = no pain, 1-3 = mild pain, 4-6 = moderate pain, 7-10 = severe pain.

The BCTQ evaluates the clinical symptoms (symptom severity scale, SSS), including pain, numbness, weakness, paresthesia, and clumsiness using 11 questions with the Likert scale preprinted 5 answers ranging from no complaints to very severe or continuous complaints. The functional handicap (functional status scale, FSS) is calculated from 8 questions regarding difficulties with daily activities, including writing, holding a telephone, and so on, with a setup similar to the SSS. Each score is calculated as the mean of the responses of the individual items. A higher score indicates the worse symptom or function.

Statistical Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences Program (SPSS Version 25.0). The main demographics of patients were evaluated with descriptive studies. The divergence of outcome measure between baseline and 4 weeks after injection for each subject was computed by a general linear model for repeated measures. The level of statistical significance was set as $p<0.05$.

RESULT

Characteristic of Reasearch Subjects

Thirty patients, 30 hands, were enrolled in this study that had met the inclusion criteria and didn't get exclusion criteria. Of the 30 pastients diagnosed with CTS, the TCA group included 15 patients, and the dexamethasone group included 15 patients. The characteristics have been summarized in Table 1. The comparison of characteristic of TCA group and dexamethasone group have been summarized in Table 2. There were no significant differences in age, gender and hand between the two groups.

Changes in NRS, SSS and FSS Scores on Dexamethasone Hydrodisection Injection

The NRS, SSS and FSS scores on Dexamethasone group showed statistically significant improvement at 4 weeks after injection compare to baseline ($p<0.05$). The results in terms of NRS, SSS and FSS scores are shown in Table 4.

Table 1. Characteristics of Research Subjects

Variable	Frequency (n)	Percent (%)
Age		
18-40 years	9	30.00
41 - 60 years	19	63.00
> 60 years	2	7.00
Gender		
Men	3	10.00
Women	27	90.00
Hand		
Right	16	53.33
Left	14	46.7
Occupation		
Cigar labour	5	16.67
Teacher	4	13.33
Housewife	14	46.67
Employee	2	6.67
Retired	2	6.67
Paramedic	1	3.33
Freelancer	2	6.67
NRS		
None (0)	0	0
Mild (1-3)	0	0
Moderate (4-6)	7	23.33
Severe (7-10)	23	76.67

NRS = Numeric Rating Scale

Table 2. Data Characteristics of TCA and Dexamethasone Injection

Variable	Dexamethasone	TCA	Sig Value
Age, mean±SD	49.8±9.99	47.4±8.79	0.491*
Gender	M : 1 F : 14	M : 2 F : 13	0.543**
Hand involved	Right : 9 Left : 6	Right : 7 Left : 8	0.464**

TCA = Triamcinolone Acetonide
*T-test
**Chi-square test

Changes in NRS, SSS and FSS Scores on TCA Hydrodisection Injection

The NRS, SSS and FSS scores on TCA group showed statistically significant improvement at 4 weeks after injection compare to baseline ($p<0.05$). The results in terms of NRS, SSS and FSS scores are shown in Table 3

Table 3. Changes in NRS, SSS and FSS Scores on TCA Hydrodisection Injection at 4 Weeks After Injection

Variable	Before, mean ±SD	After, mean ±SD	Sig
NRS	7.07±1.33	5.36±1.78	p=0.000*
SSS	2.85±0.93	2.69±0.84	p=0.001**
FSS	2.28±1.01	2.20±1.03	p=0.020*

TCA = Triamcinolone Acetonide; NRS = Numeric Rating Scale; SSS = Symptom Severity Scale; FSS = Functional Status Scale
*T-test
**Wilcoxon test

Table 4. Changes in NRS, SSS and FSS Scores on Dexamethasone Hydrodisection Injection at 4 Weeks After Injection

Variable	Before, mean ±SD	After, mean ±SD	Sig
NRS	7.20±1.08	4.46±1.44	p=0.001**
SSS	2.94±0.68	2.05±0.42	p=0.000*
FSS	2.18±0.65	1.53±0.46	p=0.000*

NRS = Numeric Rating Scale; SSS = Symptom Severity Scale; FSS = Functional Status Scale
*T-test
**Wilcoxon test

Comparison of NRS, SSS and FSS Scores Between TCA Versus Dexamethasone at 4 Weeks After Hydrodisection Injection

The NRS and FSS scores between TCA versus Dexamethasone at 4 weeks after hydrodisection injection showed no significant differences, whereass SSS showed significant difference. From the table below showed that the score of Sig. SSS was 0.027 ($p < 0.05$), where the SSS mean score of dexamethasone hydrodisection injection (2.05 ± 0.42) was lower than the SSS mean score for the triamcinolone acetonide hydrodisection injection (2.60 ± 0.84). The results scores are shown in Table 5.

Table 5. Comparison of NRS, SSS and FSS Scores Between TCA Versus Dexamethasone at 4 Weeks After Hydrodisection Injection

Variable	TCA, mean ±SD	Dexamethasone, mean ±SD	Sig
NRS	5.36±1.78	4.46±1.44	p=0.237**
SSS	2.69±0.84	2.05±0.42	p=0.027*
FSS	2.20±1.03	1.53±0.46	p=0.119*

TCA = Triamcinolone Acetonide; NRS = Numeric Rating Scale; SSS = Symptom Severity Scale; FSS = Functional Status Scale
*T-test
**Mann Whitney test

DISCUSSION

Age

Based on the results of data collection, table 5.1.1 shows the most in the age range 41-60 years with total of 19 patients (63%), followed by the age range 18-40 years with total of 9 patients (30 %), then over 60 years old with 2 patients (7%). From these results, the average age most likely occur during the reproductive period, which according to the theory states that 57% (fifty-seven percent) of cases occur at the age of 40-60 years or 76% (seventy-six percent) occur at age 40 - 70 years in CTS patients (1).

Altinor and Karakas found a strong connection between age and flexor retinaculum curves, connective tissue that encloses carpal tunnels. The mechanism of this relationship is still unclear, suspected because of an increase in volume of the carpal tunnel in old age. In old age, there is a collagen transformation in flexor retinaculum, so that its elasticity decreases. This cannot accommodate if there is an pressure increasement on the carpal tunnel (2).

Gender

Based on table 5.1.1, it was found that the highest number of sex sufferers with CTS was 27 patients (90%), while men were 3 patients (10%).

Based on the theory, the prevalence of CTS is twice as much in women than in men. More common in the climacterial period, also during or immediately after pregnancy, also in weight gain (1).

Women have a risk of CTS two to three times greater than men, and this risk increases at the age of menopause. Hormonal influences play a role in this. It has been reported that there are alpha estrogen receptors in the carpal transversal ligament and tenosinovium flexor, and estrogen also regulates collagen synthesis and fibroblast proliferation. When the composition of collagen transformed, then so did the tissue. This increases the risk of tear injury from tenosinovial tissue. In addition, women have smaller hands, so the carpal tunnel is also smaller, this causes pressure increasement in carpal tunnel, then will increase the risk of CTS (2).

Hand Affected

Based on Table 5.1.1, the affected hand predominantly occurred in the right hand as many as 16 hands (53.3%) followed by the left hand as many as 14 patients (46.7%).

Based on the theory, CTS is more common in the dominant hand, but often can also occur on both sides. Bendler et al (1977) found bilateral CTS in 61% of 440 CTS patients (1).

Occupation

Based on table 5.1.1, the highest number of patients suffering from CTS was housewives with 14 patients (46.7%) followed by cigarette-rolled workers with 5 patients (16.7%).

Occupation has an important relationship with the risk of CTS.Hard working such as washing clothes and sweeping aggravate these symptoms. Repeated activity in the hand is generally suspected as the cause of this syndrome. Repetition of flexion and extension of the wrist will cause an increase in pressure in the carpal tunnel. In one study, a strong relationship between repeated wrist movements and the incidence of CTS was found. Some researchers suggest that six important risk factors for work can cause CTS. These risk factors are repetitive movements, high speed movements, uncomfortable joint position, direct pressure on the wrist, vibration, and wrist posture that is maintained for a long time (2).

Changes in NRS, SSS and FSS Scores on TCA Hydrodisection Injection

In this study, NRS and BTCQ (FSS and SSS) were examined before the injection and 4 weeks post injection of TCA and dexamethasone. NRS is one of the pain scoring tools. Filling the form can be directly or verbally for example via telephone connection. The higher score shows the more severe pain. In addition, this method only requires < 1 minute to fill it in, easy and simple, and can overcome language problems that might occur with other methods. BTCQ, consisted of SSS and FSS, is a non-invasive measuring instrument used to assess the degree of symptom improvement. The main advantage of this questionnaire is that it is focuses on symptoms and functions most often observed among CTS patients, so it is the most sensitive and responsive questionnaire for CTS. Pearson correlation coefficients of above 90% indicate excellent reliability/reproducibility attributes for both sections of this questionnaire. In contrast, because it is disease specific, the CTQ does not allow for comparisons among different conditions (3).

This study showed statistically significant improvement of NRS, SSS and FSS scores on TCA group on 4 weeks after injection compare to baseline ($p<0.05$).

The same results were also obtained in the study of Lee et al in Seoul, South Korea, where a prospective single-blind randomized method of 44 mild-to-moderate idiopathic CTS patients was administered in-plane hydrodisection injection technique with an ulnar approach in 15 patients. The patient was injected with triamcinolone acetonide 40 mg and lidocaine 1% 1 ml. Patients were examined for conditions before injection, 4 weeks after injection and 12 weeks after injection. The parameters assessed are ENMG, USG examination, and BTCQ. On BTCQ evaluation, both SSS and FSS, a faster improvement was obtained at week 4 after injection. SSS results at weeks 4 and 12 and FSS results at week 12 showed significant results (10).

Changes in NRS, SSS and FSS Scores on Dexamethasone Hydrodisection Injection

This study showed statistically significant improvement of NRS, SSS and FSS scores on dexamethasone group at 4 weeks after injection compare to baseline ($p<0.05$).

Until now, there has not been much research on CTS treated with hydrodisection injection using dexamethasone agents. One of the studies reported was a study by Moghtaderi et al (2011) in Iran. In this study, treatment was given to 20 pregnant female patients suffering from CTS who had met the inclusion criteria.. All patients were given injections of dexamethasone 4 mg in combination with lidocaine 1% 0.5 ml. Evaluation of VAS and ENMG (transcarpal median sensory nerve conduction velocity (SNCV), distal motor latency (DML) and distal sensory latency (DSL)) were performed after 3 weeks after injection. As a result, pain intensity and ENMG parameters improved significantly. This study offers results that corroborate invasive alternative therapies for CTS therapy in pregnant female patients (11).

Comparison of NRS, SSS and FSS Scores Between TCA Versus Dexamethasone at 4 Weeks After Hydrodisection Injection

Local corticosteroid injection is considered the fastest and most effective method for improving symptoms that occur in CTS. Some interventions have been systematically investigated and have shown that short-term corticosteroid injection can reduce surgical procedures in CTS patients. The mechanism of how steroids work to treat CTS is not yet known, but anti-inflammatory effects are believed to be an important factor in reducing CTS complaints and symptoms. There are several types of corticosteroids that can be used, such as hydrocortisone, dexamethasone, methylprednisolone, and triamcinolone acetonide, but there are no objective standards that can explain the most ideal drugs (5,6).

In this study, the NRS and FSS scores between TCA versus Dexamethasone at 4 weeks after hydrodisection injection showed no significant differences, while SSS showed significant difference. Table 5 showed that the score of Sig. SSS was 0.027 ($p <0.05$), where the SSS mean score of dexamethasone hydrodisection injection (2.05 ± 0.42) was lower than the SSS mean score for the triamcinolone acetonide hydrodisection injection (2.60 ± 0.84). The difference in SSS results may be related to the potential anti-inflammatory effects found in dexamethasone, where the anti-inflammatory effect of dexamethasone is 6 times greater than the anti-inflammatory effect of TCA.

Until now, there have been no studies comparing the effectiveness of hydrodisection injection between dexamethasone versus TCA in CTS patients. However, there are several studies comparing the effectiveness of dexamethasone versus TCA in other non-CTS cases. The research are: Research by Ring et al, compared the effectiveness of injection of dexamethasone versus triamcinolone in idiopathic trigger finger cases. The study was conducted on 84 patients with the RCT method. 67 patients were evaluated up to 6 weeks (35 TCA patients, 32 dexamethasone patients), and 72 patients were evaluated for 3 months (41 TCA patients, 31 dexamethasone). The parameters evaluated are the Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire, grading trigger finger based on Quinnell, and the VAS scale. As a result, TCA shows satisfaction and Quinnell grading is significantly better than dexamethason at 6 weeks evaluation, but not at 3 months evaluation. There was no significant difference in the evaluation of DASH values at 6 weeks and 3 months. In conclusion, although there was no difference in the 3-month evaluation after injection, TCA might have a faster but less durable effect than dexamethasone in trigger finger cases (12). Research by Shakir et al, compared the effectiveness of triamcinolone versus dexamethasone in transforaminal epidural injection as a treatment of cervical radiculopathy. The study was conducted on 441 patients. A total of 220 patients were injected with triamcinolone 40 mg, with a reduction in pain value of an average of 2.33 from a scale of 10. While as many as 221 patients were injected with dexamethasone 15 mg, with a reduction in pain value of 2.38 on average 10. Using two sample F test showed no statistically significant difference between the two groups in terms of reducing the scale of pain, so that injection of

triamcinolone 40 mg and dexamethasone 15 mg had the same advantage in reducing pain (8,13,14).

Although the safety benefits are clear, the widespread use of dexamethasone has been hampered by questions about its efficacy compared to particulate steroids. Much of this criticism comes from the fact that non-particulate steroids are cleared faster from the spinal canal after injection. In testing this hypothesis, Dreyfuss et al. found that 60% vs 67% of patients received at least 50% pain reduction for dexamethasone and triamcinolone. Lee et al. reported effectiveness of 69,4% vs 80,4% of patients treated with dexamethasone and triamcinolone acetonide. However, there were no statistically significant findings, and the duration of the reduced effect for dexamethasone was not definitively demonstrated. These studies support dexamethasone as a noninferior alternative to triamcinolone, with theoretical safety benefits. The authors found no evidence of significant differences in the efficacy between dexamethasone and triamcinolone in the treatment of cervical radiculopathy (8).

Unfortunately there is no further evaluation data so that it cannot make a comparison of the long-term benefits between the two drugs. However, the authors feel that reporting short-term results remains important. Triamcinolone has a half-life of 12-36 hours compared to 36-72 hours for dexamethasone. With 1 month of metabolism and excretion effectively removing drugs from the body, long-term analgesic changes may be driven by the underlying disease pathology rather than drug choice (8).

Finally, the results obtained by the pain value change rather than the functional status. Changes in pain scores alone can be less objective and may not always correlate with functional improvement of patients. However, pain data are not biased against corticosteroids and are still a meaningful rubric to compare them (12).

Although these results cannot be applied directly to larger population outside the sample population used in this study, at least these results can provide additional information that is quite important as a basis for further research in the future.

CONCLUSION

Significant improvement in NRS, FSS and SSS score was obtained at 4 weeks after hydrodisection injection, both with TCA and dexamethasone. At 4 weeks after TCA injection compared to dexamethasone, there were no significant differences in NRS and FSS scores, whereas SSS score differed significantly. Both injection agents are equally effective in treating CTS, but dexamethasone produces a better improvement in SSS score.

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REFERENCES

1. KNI Perdossi. Buku Modul Induk Gangguan Saraf perifer, Gangguan Saraf Otonom, Gangguan Paut Saraf-Otot. Indonesia; 2009.
2. Laillya N. Neurology in daily parctice. Edisi 1. Fakultas Kedokteran Universitas Padjajaran. Bandung; 2010.
3. Duncan SFM, and Kakinoki R. Carpal tunnel syndrome and related median neuropathies. Springer; 2017. DOI: 10.1007/978-3-319-57010-5.
4. Aroori S, and Spence RAJ. Carpal Tunnel Syndrome. The Ulster Medical Journal; 2008. 77(1), pp. 6–17. DOI: 10.1136/bmj.39282.623553.AD.
5. Chen PC, Chuang CH, Tu YK, et al. A bayesian network meta-analysis: Comparing the clinical effectiveness of local corticosteroid injections using different treatment strategies for carpal tunnel syndrome. BMC Musculoskeletal Disorders; 2015. 16 (1), p. 363. DOI: 10.1186/s12891-015-0815-8.
6. Martins RS, and Siqueira MG. Conservative therapeutic management of carpal tunnel syndrome. Arquivos de Neuro-Psiquiatria; 2017. 75 (11), pp. 819–824. DOI: 10.1590/0004-282x20170152.
7. MacMahon PJ, Shelly MJ, Scholz D, et al. Injectable corticosteroid preparations : An embolic risk assessment by static and dynamic microscopic analysis. Am J Neuroradiol; 2011. 32: 1830 –35. DOI: 10.3174/ajnr.A2656.
8. Shakir A, Ma V, and Mehta B. Comparison of pain score reduction using triamcinolone versus dexamethasone in cervical transforaminal epidural steroid injection. Am J Phys Med Rehabil; 2013. 92 (9) : 768 - 775. DOI: 10.1097/PHM.0b013e318282c9f2
9. Makhlouf T, Emil NS, Sibbit WL, et al. Outcomes and cost-effectiveness of carpal tunnel injections using sonographic needle guidance. Clinical Rheumatology; 2014. 33(6), pp. 849–858. DOI: 10.1007/s10067-013-2438-5.
10. Lee JY, Park Y, Park KD, et al. Effectiveness of ultrasound-guided carpal tunnel injection using in-plane ulnar approach. Medicine Journal; 2014. Dec; 93(29) pp. 1–6. DOI: 10.1097/MD.0000000000000350
11. Moghtaderi AR, Moghdateri N, and Loghmani A. Evaluating the effectiveness of local dexamethasone injection in pregnant women with carpal tunnel syndrome. Journal of Research in Medical Sciences; 2011. May; 16 (5), pp. 687–690. Available from: https://pubmed.ncbi.nlm.nih.gov/22091293/
12. Ring D, Calderon SL, Shin R, et al. A Prospective randomized controlled trial of injection of dexamethasone versus triamcinolone for idiopatic trigger finger. J Hand Surg. Elsevier; 2008. 33A:516 - 522. DOI: 10.1016/j.jhsa.2008.01.001
13. Santoso WM, Indriyono A, Munir B, Rakhmani AN, Husna M. Comparative of intraarticular injection between dextrose prolotherapy versus triamcinolone acetonide in knee osteoarthritis. Journal of Pain, Headache and Vertigo (JPHV); 2020. 1:22-26. DOI: https://doi.org/10.21776/ub.jphv.2020.001.02.1
14. Widodo MS, Andhy I, Badrul M, Alidha NR, Machlusil H. Comparative of intraarticular injection between dextrose prolotherapy versus triamcinolone acetonide in knee osteoarthritis. JPHV, 2020. 1(2):22-26. DOI: https://doi.org/10.21776/ub.jphv.2020.001.02.1