Biomedical Journal of Indonesia:Jurnal Biomedik Fakultas Kedokteran Universitas Sriwijaya
https://ejournal.unsri.ac.id/index.php/bji
Vol 6 No 2 July 2020

Dry Needling Can Be an Alternative Treatment for Hemifacial Spasm

Marisdina S.[1*], Sugiharto H.[1], Pradian A.[2]

[1]Lecturer Staff of Neurology Department, Medical Faculty of Universitas Sriwijaya/Mohammad Hoesin Hospital, Palembang

[2]Resident of Neurology Departement, Medical Faculty of Universitas Sriwijaya/Mohammad Hoesin Hospital, Palembang

*Correspondence Author Email: sellymarisdina@gmail.com

Abstract

Treatment with botulinum toxin injections is preferred to microvascular decompression surgery therapy, but this injection is only effective in a few months and quite expensive. This study is the first study to assess the effectiveness of dry needling on clinical improvement of hemifacial spasm compared to standard therapy of botulinum toxin injection. The study design was quasi experimental. Total of 24 subjects were divided into two groups. The first group underwent dry needling intervention while the other had botulinum injection. Clinical severity before and after treatment in both groups was assessed using Jankovic and HFS7 scores. In dry needling group there were significant differences between Jankovic and HFS7 score at baseline and at week 1, 2, 3 and 4. While in botox group significant differences were also Jankovic and HFS7 score at baseline and at weeks 2 and 4. There were also a significant difference of Jankovic and HFS7 score when we compared dry needling group to botulinum toxin group. Dry needling can be an alternative treatment for hemifacial spasm, although clinical improvements based on Jankovic and HFS7 scores in dry needling group were not as effective as those with botulinum toxin injections.

Keywords: dry needling, botulinum toxin, Jankovic score, HFS7 score

Introduction

Hemifacial spasm is a common movement disorder case in daily clinical practice. Epidemiological data on hemifacial spasms are quite limited. The average prevalence is 11 per 100,000 population, 14.5 per 100,000 in women and 7.4 per 100,000 in men. In Germany, the

estimated prevalence is 8000 to 9000 people.[1] The incidence in women is more than that in men with ratio of 2:1. Based on Yaltho and Jankovic study in 2011, out of 215 patients, the ratio of men to women was 1:1.8.[2] One study in Indonesia also reported that the majority of research subjects were women (64,7%).[3] Therapeutical management of hemifacial spasm includes oral medications such as anticonvulsant drugs, benzodiazepines, baclofen and gabapentin, facial nerve decompression surgery and intramuscular injection of botulinum toxin. Oral medication only provides mild improvement and there are significant side effects. Surgical treatment with microvascular decompression gives 90% success in cases, although it can still be recurrent and must be reoperated. Side effects from surgery can also be found including hearing loss, temporary or permanent facial nerve damage and intracranial hemorrhage.[4] Because of the side effects of oral medication and surgery, botox injection is preferred as long-term treatment of hemifacial spasm to drugs or surgery. Some studies even support the use of Botox as a first-line treatment for hemifacial spasm. This toxin works by inhibiting the release of acetylcholine in the synaptic cleft, causing muscle paralysis.[5] Unfortunately, injection with botulinum toxin is only effective in a few months, then should be repeated and the cost is quite expensive. Although injection with botulinum toxin provide benefits in the management of hemifacial spasm, but this treatment is not very popular in Indonesia because of the high cost and the limited coverage of goverment insurance.

Current techniques are developing on the principle of peripheral and central sensitization. One of them is dry needling. This action is widely performed in several countries for myofascial pain syndrome management. Myofascial trigger points are tight band muscle nodules caused by motor end plate dysfunction in the muscle.[6,7] Movement disorders therapy with dry needling techniques have never been reported. One case study has reported the success of dry needling technique in the management of cervical dystonia.[8] This success was assumed to be due to the penetration of the needle through the skin to produce physiological effects through the control activity of inhibiting various neurotransmitters, and activating the suppression system in the spinal cord.

This is the first study to assess the effectiveness of dry needling in clinical improvement of hemifacial spasm compared to standard therapy botulinum toxin injection. This research is part of other research study with longer observation time. This study assessed the effectiveness of dry

needling compared to botulinum toxin injection in the treatment of hemifacial spasms using Jankovic and HFS 7 scores.

Methods

The design of this study was quasi-experimental while the aim was to assess the effectiveness of dry needling and botulinum toxin injections in clinical improvement of hemifacial spasms. The population of this study were hemifacial spasm patients who visit neurology clinic at RSUP Dr. Moh. Hoesin Palembang from January 2018 to December 2019. All patients diagnosed with hemifacial spasm were included in this study, while those who were not willing to participate in the study were excluded. The subjects are taken consecutively. Firstly, all hemifacial spasm patients are included in dry needling group. The number of subjects in dry needling group was 12. Then another 12 patients with similar age and severity with the ones in dry needling group were included in the botulinum toxin group. This study has received a certificate of ethics approval from the Health Research Ethics Commission of Mohammad Hoesin Hospital and Faculty of Medicine Universitas Sriwijaya No. 476/kepkrsmhfkunsri /2019.

Before intervention, all samples in both groups were interviewed and assessed for the Jankovic and HFS7 scores. In dry needling group, the treatment were performed 3 times, at the beginning and every two weeks. Evaluation of Jankovic and HFS 7 scores were assessed 1 week after and right before each intervention. Evaluation of Jankovic and HFS 7 scores every 1 week after each intervention were assessed by telephone or video call for patients who were unable to visit the clinic or who live outside the city. In the botulinum toxin group, patients who met the inclusion criteria and had performed a matching process to the dry needling group would be also interviewed and assessed the Jankovic and HFS7 scores before intervention. Botulinum toxin injection was only performed once at the beginning of the study. Then the evaluation of Jankovic and HFS 7 scores were assessed every 2 weeks after the intervention. Evaluation for patients which live outside the city or were unable to visit the clinic were assessed by telephone or video call. The dry needling procedure was performed by one neurologist by using several thin filiform needles

pricked in contracted muscles. The location of needle insertion and the number of needles were adjusted to the severity of the contracted muscles. The botulinum toxin injection procedure was done by a neurologist. The procedure was carried out by injecting botulinum toxin from the pharmaceutical company of Kalbe Farma (Lanzox). The dose and location of the injection were adjusted to the severity of the contracted muscles.

Data analysis was performed using SPSS version 24.0. Paired t-test was conducted to compare the difference between Jankovic and HFS7 score at baseline, the second week and the fourth week in both groups. Additional analysis were conducted at the first and third weeks in dry needling group. Friedman or repeated ANOVA test was used to compare the difference between Jankovic and HFS7 score in both groups.

RESULTS

Table 1 shows that most subjects were female (66.7%), half of the subjects experienced a hemifacial spasm for 3-6 years, the location was mostly on the right (75%). Almost all subjects experienced clinical severity of Jankovic score 2 (91.7%) and more than half experienced clinical severity of severe HFS7 score (58.3%). There was no significant difference in age between the dry needling group and the botox injection group. Jankovic and HFS7 severity scores of both groups also had no significant difference.

Tabel 1. Characteristic of subjects

Variables	Dry needling group	Botolinum toxin group	Total	%	p
Age	56,66±9,108	59,41±7,704			0,433*
Men	5	3	8	33,3	
Women	7	9	16	66,7	
Onset of hemifacial spams					
<3 years	3	6	9	37,5	
3-6 years	7	5	12	50	

>6 years	2	1	3	12,5	
Location of hemifacial spasm	9	9	18	75	
Right	3	3	6	25	
Left					
Jankovic score					
Jankovic 0	0	0	0	0	
Jankovic 1	0	2	2	8,3	
Jankovic 2	12	10	22	91,7	
HFS-7 score					
HFS-7 mild (0-9)	0	0	0	0	
HFS-7moderate(10-18)	6	4	10	41	
HFS-7 Berat (19-28)	6	8	14	58,3	
Baseline score					
Jankovic	2	1,83±0,389			0,514¶
HFS-7	19.00±3,275	20,25±4,159			0,356*

*T-test independent, ¶Mann Whitney

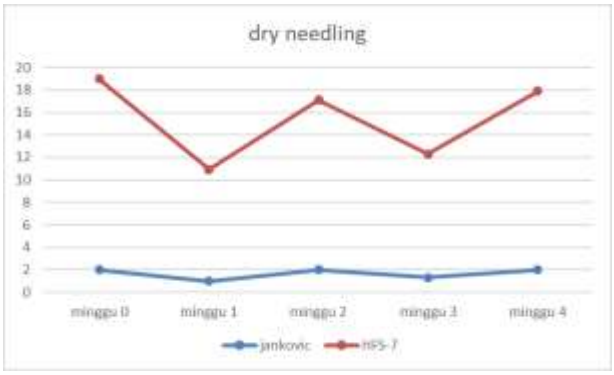
In dry needling group, there were significant differences of Jankovic and HFS7 between baseline score and evaluation score at week 1, 2, 3 and 4. While in botox group, significant differences of Jankovic and HFS7 scores were also found between baseline score and evaluation score at week 1, 2 and 4.

Table 2. The mean of Jankovic and HFS-7 score in each Dry Needling and Botulinum Toxin group

	Baseline	Minggu ke 1	Minggu ke 2	Minggu ke 3	Minggu ke 4	p
Dry needling group	2,0	1,0	2,0	1,33	2	0,000*
Jankovic	19,00	10,92	17,1	12,3	17,9	0,000*

HFS-7						
Botulinum toxin group						
Jankovic	1,83	-	0,58	-	0,25	0,000*
HFS-7	20,25		12,33		9,17	0,000*

*Kruskal Wallis Test



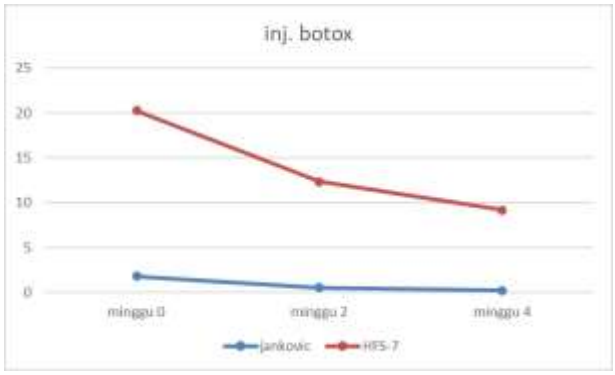


Figure 1. Jankovic and HFS7 score in each dry needling and botulinum toxin group

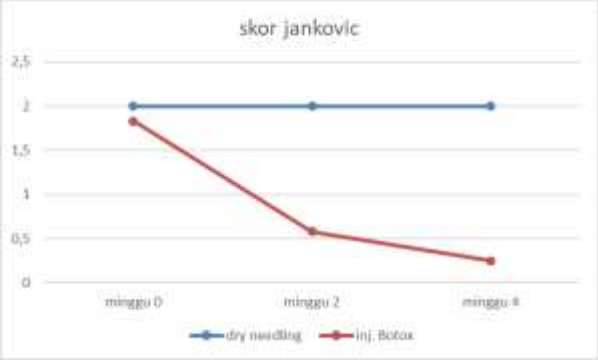
In Friedman's analysis, there was a significant difference of Jankovic score between the dry needling group and botulinum toxin group with p value <0,0001. While the analysis of Repeated Anova showed a significant difference HFS7 score between both groups with a p value <0,0001.

Table 3. Comparison of Jankovic and HFS-7 score between two groups

	Baseline	Minggu ke 2	Minggu ke 4	p
Jankovic score				
Dry needling group	2,0	2,0	2,0	0,000*
Botulinum toxin group	1,83	0,58	0,25	

HFS7 group	19,00	17,1	17,9	0,000¶
Dry needling group	20,25	12,33	9,17	
Botulinum toxin group				

*Friedman, ¶Repeated *ANOVA*



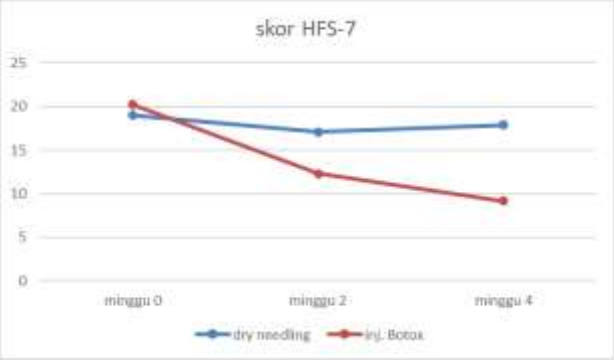


Figure 2. Comparison of Jankovic and HFS-7 score between two groups

Discussion

This study found that dry needling did not show same effectiveness as standard therapy of botox injection in clinical improvement of hemifacial spasms based on Jankovic and HFS7 scores assessments. However, this study found significant differences between the Jankovic and HFS7 baseline scores and the Jankovic and HFS7 evaluation scores in each group. At the time of the evaluation, fluctuations were obtained in dry needling procedure. Every 1 week after dry needling intervention, a significant clinical improvement was obtained based on Jankovic and HFS7 score compared to the baseline score. Even though every 2 weeks after the intervention, the severity returned to baseline. Unlike in dry needling group, in botulinum toxin group, Jankovic and HFS7 scores were declined when evaluated at week 2 and 4.

The temporary effectiveness of dry needling can be explained by Hsieh et al. study. This study showed that if dry needling was performed once a week, it would give a short-term analgesic effect, but if it was performed in 5 cycles for 5 consecutive days, it would maintain the substance P (SP) and calcitonin gene-related peptide (CGRP) to remain low. However, after passing through the cycle, SP and CGRP will increase, accompanied by a higher TNF-alpha increase, as well as increase in NOS, HIF-1, COX-2 and VEGF.[9] Although Hsieh et al study was not conducted in

hemifacial spasm patients, but this can explain why there were fluctuative clinical improvement in the dry needling group in this study. Chandra et al reported one case study of the successful management of dry needling in a case of movement disorder, which was cervical dystonia. Dry needling that was performed 5 times with 1 week interval showed significant improvement. This improvement last up to 6 months.[8]

Botulinum toxin injection has been proven effective in the management of dystonic movement disorders, such as hemifacial spasms or other focal dystonias. Previous studies have also shown significant effectiveness on clinical improvement scores for hemifacial spasm. Karp and Alter reported that this injection was effective 76-100% with monitoring of clinical improvement for up to 3-4 months. Although clinical improvement is also temporary which is about 3-6 months, this procedure is preferred to surgery management. The recurrence time which ranges from 3-6 months can be explained by the theory of nerve sprouting which is the second phase in the mechanism of action of botulinum toxin.[10]

Although the clinical improvement of hemifacial spasms managed by dry needling is not as effective as botulinum toxin injection, this intervention in myofacial trigger points are proven to reduce muscle contraction in cases of focal dystonia especially hemifacial spasm and dystonia. Further research can be carried out by considering the technique and frequency of the dry needling cycle which might provide a longer clinical improvement.

Conclusion

Dry needling can be an alternative management for hemifacial spasm, although clinical improvement based on Jankovic and HFS7 scores is not as effective as botulinum toxin injections.

References

1. Rosenstengel C, Matthes M, Baldauf J, Fleck S, Schroeder H. Conservative and Surgical Treatment Options. 2012;109(2):667-673. doi:10.3238/arztebl.2012.0667

2. Yaltho TC, Jankovic J. The Many Faces of Hemifacial Spasm : Differential Diagnosis of Unilateral Facial Spasms. 2011;26(9):1582-1592. doi:10.1002/mds.23692

3. Yanni, Anam Ong P, Gunadharma S. Efikasi dan kualits hidup pasien spasme hemifasial

dengan suntikan toksin botulinum tipe A. *neurona*. 2010;27(2):1-15.

4. Karp BI, Alter K. Botulinum Toxin Treatment of Blepharospasm , Orofacial / Oromandibular Dystonia , and Hemifacial Spasm. *Semin Neurol*. 2016;36:84-91. doi:http://dx.doi.org/10.1055/s-0036-1571952.ISSN0271-8235

5. Jankovic J. Botulinum Toxin : State of the Art Mechanism of Action and Pharmacology of BoNT. 2017;00(00):1-8. doi:10.1002/mds.27072

6. Dommerholt J. Dry Needling in Orthopaedic Physical Therapy Practice. *Orthop Pract*. 2015;16(January 2004):15-20.

7. Dommerholt J, Mayoral O, Gröbli C. Trigger Point Dry Needling. *J Man Manip Ther*. 2006;14(4):70-87.

8. Chandra S, Sugiharto H, Marisdina S, Susan D. Abstracts/Journal of the Neurological Sciences 405S(2019)116542. In: *Management of Cervical Dystonia with Dry Needling*. Elsevier B.V.; 2019:260-261. doi:10.1016/j.jns.2019.10.1296

9. Hsieh Y, Yang S, Yang C, Chou L. Dry Needling at Myofascial Trigger Spots of Rabbit Skeletal Muscles Modulates the Biochemicals Associated with Pain , Inflammation , and Hypoxia. 2012;2012. doi:10.1155/2012/342165

10. Nigam P, Nigam A. Botulinum toxin. *Indian Nournal of Dermatology*. 2010;55(1):8-14. doi:10.4103/0019-5154.60343