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Research Article

Investigation the Laser Acupuncture Effect on the Nocturia, Urinary Urgency and Quality of Life in Patients with Overactive Bladder Syndrome

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ARTICLE INFORMATION

Article Chronology:
Received: 09.04.2016
Revised: 31.05.2016
Accepted: 28.06.2016

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ABSTRACT

Introduction: Overactive bladder syndrome is characterized by urinary urgency with incontinence urgency, urinary frequency, and nocturia. Overactive bladder effects on the quality of life (QOL). The prevalence of this disease in the world is estimated from 16% to 17% and it is more common among the women. Different treatment methods are suggested to control overactive bladder such as medicine, physiotherapy, behavior therapy, and surgery. Laser acupuncture (LA) is a kind of invasive treatment method in which we used low power laser instead of needle on acupuncture points.

Material and Methods: In this interventional study, we enrolled 50 female patients with age range of 30-60 that were suffering from overactive bladder. 25 cases randomly were selected and received LA and other 25 cases received placebo laser. Study parameters based on 36-item Short Form Health Survey included the number of nocturia, frequency, urinary incontinence and the level of their effect on the life. The treatment duration was 9 weeks and the sessions were twice a week. Descriptive statistics of the variable has been showed as mean ± standard deviation. Statistical analysis was performed by comparing the mean of variables in two groups and along with the weeks using two-way analysis of variance. Generalized estimating equation (GEE) analysis was utilized to assess the effect of laser acupuncture longitudinally during the 4 weeks. An identity link function was used in the GEE analysis since the weekly number of records have been averaged using daily number of records for each variable. Statistical software R version 3.1.3 was used, and the significance level of 0.05 was assumed for all the tests in this study.

Results: This study shaw LA decrease the number of nocturia and urinary urgency significantly and improve QOL in the study group.

Conclusion: Our results confirmed effect of treatment of LA on decreasing of urinary urgency and nocturia.

Keywords: Overactive bladder syndrome; Laser acupuncture; Quality of life

Citation: Jafarpoor M, Sarrafzadeh J, Amini P, Nikjooy A. **Investigation the Laser Acupuncture Effect on the Nocturia, Urinary Urgency and Quality of Life in Patients with Overactive Bladder Syndrome.** J Mod Rehab 2016; 10(2): 93-7.

Introduction

The overactive bladder syndrome (OAB) is urinary urgency with frequency and nocturia (1). The prevalence of this syndrome is 16-17% and in the woman is more common than men. There are different theories about pathophysiology of this syndrome including change of central sensitivity, partial denervation of detrusor muscles, change of bladder cells performance, and disorder of bladder cells interaction. OAB effects on quality of life (QOL) and

limit social and sexual activity (2). There are many treatment approaches to control this syndrome like controlling using liquids (3), pelvic floor training, bladder control training (4, 5), time voiding and drug therapy such as tolterodine, solifenacin, and trospium. More professional treatments include physiotherapy, prolong nerve stimulation, Botox injection, and surgery. Noninvasive treatments have recently been suggested because of invasive treatments side effects. One of these treatments is acupuncture. There are many articles that approved efficacy of this method in different diseases such as headache, lung disease, woman disease, and musculoskeletal disorders (6-9).

Acupuncture is needle injection in special points in meridian channels to circulate adequate energy in these channels to establish normal homeostasis. Furthermore, acupuncture effects on biologic mediators such as cytokinin, neurotransmitters, and T-cells. Noninvasive treatment method has been used because of invasive effect of needle and possibility of infection in this method. One of these methods is laser acupuncture (LA). In this method, low level laser is used on acupuncture points. Mechanism of action of LA is same as acupuncture (10-12), but there is no study that examines the effect of LA on OAB. Hence, this study is performed to examine LA effect on decrease of OAB, clinical parameters (urinary incontinence and nocturia) and change of QOL in these patients.

Materials and methods

In this randomized controlled trial study performed at physiotherapy clinic of rehabilitation Science School of Iran University of Medical Sciences, we included 50 female patients with age range from 30 to 60 years. The patients were referred according to clinical exam and urodynamic test. Method was explained for patients and volunteer patient participated in the study. Include criteria: female patients with urinary urgency at least 2 times during 3 days and wake up at least one time during night sleep.

Exclusion criteria: receiving other treatment for OAB, enable to transfer, lower urinary tract infection, epilepsy, pregnancy, history of radiotherapy, and infection in acupuncture points. After evaluation, eligible patients participated in the study and randomly were assigned in two groups. Treatment duration was nine sessions. In the 1^{th} session, we explained method of the treatment to patients and gave them 36-item Short Form Health Survey (SF-36) questionnaire and bladder diary charts to register urinary urgency and nocturia times during 3 days. At the second session, bladder diary charts and questionnaire were caught and treatment was begun. In the treatment group, patients received infrared laser with 4 j/cm^2 and 810 nm wavelength. Time of radiation in each point was 40 seconds. In control group, sham laser was applied to acupuncture points. Bladder diary charts were given to patients at the end of each treatment week and at the end of treatment SF-36 questionnaire was given too. Then, data analysis was performed.

Descriptive statistics of the variable has been showed as mean ± standard deviation (SD). Statistical analysis was performed by comparing the mean of variables in two groups and along with the weeks using two-way analysis of variance. Generalized estimating equation (GEE) analysis was utilized to assess the effect of laser acupuncture longitudinally during the 4 weeks. An identity link function was used in the GEE analysis since the weekly number of records has been averaged using daily number of records for each variable. Statistical software R version 3.1.3 was used, and the significance level of 0.05 was assumed for all the tests in this study.

Results

Among 50 OAB patients, 25 received LA and others did not. The mean ± SD in control and intervention groups were 48.930 ± 8.129 and 49.280 ± 8.744, respectively. Table 1 shows the mean ± SD of number of nocturia and urgency weeks 1, 2, 3 and 4 for control and laser-acupuncture patients, respectively. Plots 1 exposes the longitudinal trend of number of nocturia and urgency along with the 4 weeks.

Mean ± SD of QOL has been presented in table 2. To compare the QOL in two groups before and after the intervention, two-way analysis of variance was performed (Table 3). Assessing the QOL at the significance level of 0.1, a different trend was found between the groups before and after the intervention. The laser-acupuncture group has been improved after the intervention while a descending tendency was resulted for control group (P = 0.067).

Table 4 shows the results of GEE analysis for each response variable. Based on the results, two groups follow a different trend along with 4 weeks for average number of nocturia and urgency. Each group resulted a statistical formula for several response variables as are shown in figure 1. A straightforward interpretation can be carried out by replacing the “week” in the formula by the number of week (0, 1, 2 or 3).

Table 1. The mean ± SD of number of response variables along with 4 weeks in different groups (per week)

Group	Variables	Week 0	Week 1	Week 2	Week 3	Week 4
Control	Nocturia	2.280 ± 0.792	2.240 ± 0.813	2.000 ± 0.707	2.000 ± 0.764	3.120 ± 4.419
	Urgency	2.280 ± 0.936	2.360 ± 0.907	2.040 ± 0.889	2.160 ± 0.943	3.360 ± 6.244
Intervention	Nocturia	2.520 ± 1.262	5.520 ± 1.262	2.280 ± 1.021	1.600 ± 0.913	1.240 ± 0.879
	Urgency	2.24 ± 0.91	2.20 ± 1.08	1.680 ± 0.852	1.240 ± 0.779	1.120 ± 0.781

SD: Standard deviation

Table 2. Mean ± SD of QOL

Variable	Group	Before	After
QOL	Intervention	59.960 ± 12.317	59.600 ± 9.359
	Control	59.160 ± 9.109	58.120 ± 10.353

SD: Standard deviation, QOL: Quality of life

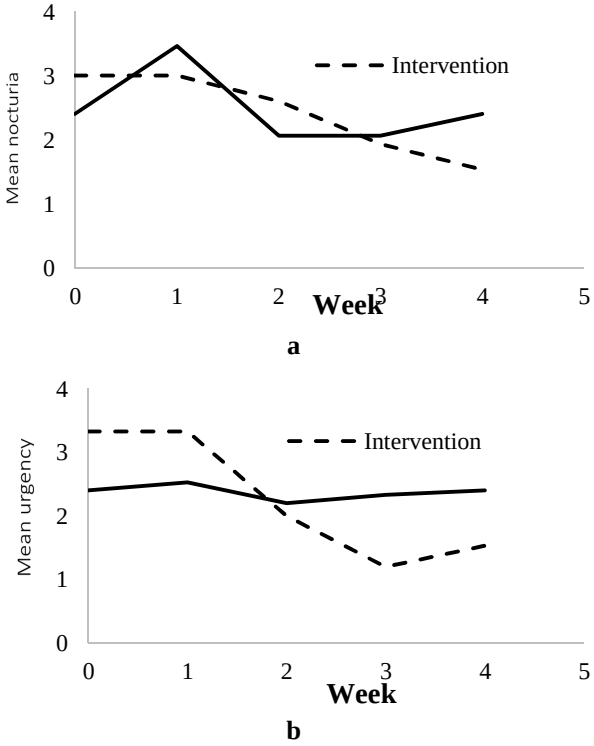

Figure 1. (a and b) The trend of mean nocturia and mean urgency over the time in different groups (dashed line: Intervention, line: Control)

Discussion

This study examined effect of LA on decreasing some OAB clinical parameters. OAB is a chronic disease, which in turn effects on QOL. This syndrome can naturally be followed by urinary urgency and nocturia with or without urinary incontinence. Non-drug treatments are dramatically suggested as the first line treatment methods. In spite of the fact that acupuncture is defined as injection of needle to acupuncture points and be one of these methods, there are some limitations in this method such as possibility of infection and patient's resistance to use of needle. In this study, we were emitting laser on acupuncture points related to bladder performance based on traditional Chinese medicine. Some studies examined effect of acupuncture on OAB also used these points (7, 10, 13). Even though some studies revealed the effect of acupuncture on decreasing of OAB symptoms and confirmed treatment effect of this method in this disorder, there is not any study that investigates treatment effect of LA on OAB.

In this study, the low-level laser was emitted on acupuncture points. Over the last few years, high power laser is also used in physiotherapy. However, LA means the use of low-level laser on acupuncture points, pain and trigger points (9, 14, 15). Hypothesis of this study was to evaluate LA on some clinical parameters of OABs such as nocturia, urinary urgency and QOL. Our results clearly illustrated significant improvement in each of variables. LA does have effectiveness similar to needle acupuncture (12, 13, 16, 17). More importantly, we also used LA for overactive bladder treatment. Although previous studies were carried out into efficacy of acupuncture for OAB treatment which these studies confirmed this method (10, 16), as a result of less danger and more acceptable in the patients, laser is better than needle. Moreover, we are able to apply laser on acupoints and create a real placebo group in LA method. In addition, the use of acupuncture with other treatments such as drug therapy and behavioral therapy could be effective (10). That could be as the best option when the use of anticholinergic drugs is prohibited (18). Listcher et al. stated the use of acupuncture can be followed by positive effect to decrease clinical parameters of OAB (19). Honjo et al. indicated acupuncture which be perceived as one of effective and safe methods in OABs treatment. Western medicine has suggested some mechanisms to describe causes of acupuncture efficacy including decrease the activity of bladder wall cells afferent fibers (15) adequate circulation of energy in meridian channels (16), decrease of central sensitivity and improvement in inhibitory message from central nervous system descending pathway (20), effect on parasympathetic and inhibition of this system neurotransmitter (acetylcholine).

In general, acupuncture inhibits acetylcholines. As a consequence, it controls parasympathetic system. Afferent fibers of bladder mainly originate from parasympathetic nerve system and acupuncture inhibits afferent fibers of bladder wall.

Table 3. Results of two-way analysis of variance assessing QOL

Variable	Effects	Sum of scores	Fisher statistic	P value
QOL	Group*Week	368.64	3.434	0.067
	Week	196	1.826	0.180
	Group	139.24	1.297	0.258

QOL: Quality of life

Table 4. Results of GEE analysis assessing the effect of laser-acupuncture on response variables over the time (per week)

Response variable	Independent variable	Coefficient	SE	P value
Nocturia	Intercept	2.36	0.196	< 0.001
	Group (laser-acupuncture)	0.853	0.413	0.039
	Week	−0.40	0.035	0.253
	Week*Group	0.36	0.101	< 0.001
Urgency	Intercept	2.413	0.220	< 0.001
	Group (laser-acupuncture)	1.213	0.436	< 0.001
	Week	−0.20	0.034	0.559
	Week*Group	−0.753	0.126	< 0.001

GEE: Generalized estimating equation, SE: Standard error

Therefore, it increases capacity of bladder and controls bladder muscle contraction by inhibiting the parasympathetic nerve system. To put in another way, acupuncture does create relaxation on muscles which be innervated by parasympathetic nerve system. As a result, radiation of laser on Bladder (BL) acupoints that there are these points at parasympathetic level which be able to create general relaxation in the bladder (7). In the studies of LA, LA has similar effects of acupuncture (21). Quah-Smithand co-worker (12) evaluated effect of LA on depression. Laser radiated to acupoints during 10 seconds with energy density 1 j/cm^2, and end of the treatment was seen a significant improvement in the treatment group. Yousri et al. revealed the effect of LA on allergic rhinitis treatment. Time radiation was 84 seconds and power density 30 W. Finally, treatment results were significant.

Treatment doses in different studies are different from 1 to 100 j/cm². Lischer and co-worker evaluated the optimal dose for LA and stated minimum dose to create physiologic changes was 1.3 j/cm^2 and the best option was 4 j/cm^2, also we applied this dose on acupuncture points. There is no study to evaluate the effect of LA on OABs. Our study clearly showed a significant difference in urinary urgency, nocturia and QOL between control and treatment groups. However, on account of short time duration of our study, there is possibility of placebo effect, so we suggest follow up in the future studies. We observed a clear downward trend in urinary urgency and nocturia which this trend was starting from the end of the 1st week and be continuing to the end of treatment. Consequently, if we will have increased our sessions, we will be able to see more effect of this treatment on improvement in variables. In this study, improvement of QOL was not significant but in terms of significances of interaction effect of time on QOL in the treatment group, we will have significant improvement of QOL with increasing of treatment sessions.

Conclusion

The results of this study pointed out that effect of LA on OABs was positive and the number of urinary urgency and nocturia in intervention group compared to control group significantly decreased. Improvement of QOL after the treatment is seen in interventional group, but there is no statistically improvement in this variable before and after the treatment in both groups.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgement

Hence, I want to give my thanks Iran University of Medical Sciences and Doctor Javad Sarrafzadeh for supporting my thesis.

REFERENCES

1. Foon R, Drake MJ. The overactive bladder. Ther Adv Urol 2010; 2(4): 147-55.
2. Leong RK, De Wachter SG, van Kerrebroeck PE. Current information on sacral neuromodulation and botulinum toxin treatment for refractory idiopathic overactive bladder syndrome: a review. Urol Int 2010; 84(3): 245-53.
3. Guyton AC, Hall JE. Textbook of medical physiology. Philadelphia, PA: Elsevier Espa̋a; 2006.
4. Banakhar MA, Al-Shaiji T, Hassouna M. Sacral neuromodulation and refractory overactive bladder: an emerging tool for an old problem. Ther Adv Urol 2012; 4(4): 179-85.
5. Sivalingam N, Loh KY. Concepts in the management of the overactive bladder in women. Med J Malaysia 2012; 67(1): 137-41.
6. Campbell JD, Gries KS, Watanabe JH, Ravelo A, Dmochowski RR, Sullivan SD. Treatment success for overactive bladder with urinary urge incontinence refractory to oral antimuscarinics: a review of published evidence. BMC Urol 2009; 9: 18.
7. Graham P, Cook T. Acupuncture for the treatment of overactive bladder. Journal of the Association of Chartered Physiotherapists in Women's Health 2008; 102: 53-8.
8. Le NB, Kim JH. Expanding the role of neuromodulation for overactive bladder: new indications and alternatives to delivery. Curr Bladder Dysfunct Rep 2011; 6(1): 25-30.
9. Baxter GD, Bleakley C, McDonough S. Clinical

effectiveness of laser acupuncture: a systematic review. J Acupunct Meridian Stud 2008; 1(2): 65-82.
10. Emmons SL, Otto L. Acupuncture for overactive bladder: a randomized controlled trial. Obstet Gynecol 2005; 106(1): 138-43.
11. Kubo K, Yajima H, Takayama M, Ikebukuro T, Mizoguchi H, Takakura N. Effects of acupuncture and heating on blood volume and oxygen saturation of human Achilles tendon in vivo. Eur J Appl Physiol 2010; 109(3): 545-50.
12. Quah-Smith I, Smith C, Crawford JD, Russell J. Laser acupuncture for depression: a randomised double blind controlled trial using low intensity laser intervention. J Affect Disord 2013; 148(2-3): 179-87.
13. Gottschling S, Meyer S, Gribova I, Distler L, Berrang J, Gortner L, et al. Laser acupuncture in children with headache: a double-blind, randomized, bicenter, placebo-controlled trial. Pain 2008; 137(2): 405-12.
14. Moustafa Y, Kassab AN, El Sharnoubi J, Yehia H. Comparative study in the management of allergic rhinitis in children using LED phototherapy and laser acupuncture. Int J Pediatr Otorhinolaryngol 2013; 77(5): 658-65.
15. Honjo H, Kawauchi A, Ukimura O, Soh J, Mizutani Y, Miki T. Treatment of monosymptomatic nocturnal enuresis by acupuncture: A preliminary study. Int J Urol 2002; 9(12): 672-6.
16. Kitakoji H, Terasaki T, Honjo H, Odahara Y, Ukimura O, Kojima M, et al. Effect of acupuncture on the overactive bladder. Nihon Hinyokika Gakkai Zasshi 1995; 86(10): 1514-9.
17. Round R, Litscher G, Bahr F. Auricular acupuncture with laser. Evid Based Complement Alternat Med 2013; 2013: 984763.
18. Radvanska E, Kamperis K, Kleif A, Kovacs L, Rittig S. Effect of laser acupuncture for monosymptomatic nocturnal enuresis on bladder reservoir function and nocturnal urine output. J Urol 2011; 185(5): 1857-61.
19. Litscher G, Opitz G. Technical parameters for laser acupuncture to elicit peripheral and central effects: state-of-the-art and short guidelines based on results from the medical university of Graz, the German academy of acupuncture, and the scientific literature. Evid Based Complement Alternat Med 2012; 2012: 697096.
20. Paik SH, Han SR, Kwon OJ, Ahn YM, Lee BC, Ahn SY. Acupuncture for the treatment of urinary incontinence: A review of randomized controlled trials. Exp Ther Med 2013; 6(3): 773-80.
21. Bjordal JM, Couppe C, Chow RT, Tuner J, Ljunggren EA. A systematic review of low level laser therapy with location-specific doses for pain from chronic joint disorders. Aust J Physiother 2003; 49(2): 107-16.